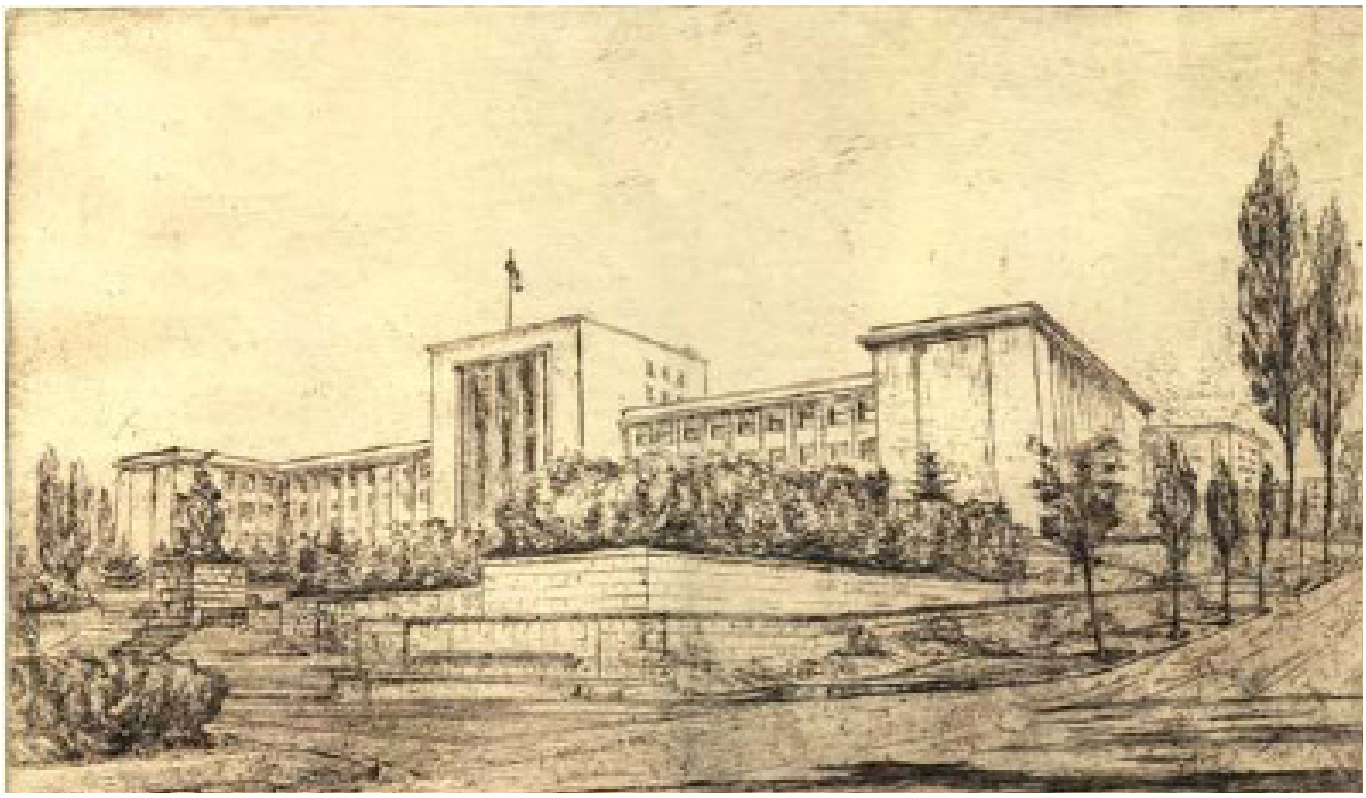
BULLETIN
OF
”CAROL I” NATIONAL DEFENCE UNIVERSITY

3 / 2020



SCIENTIFIC PUBLICATION HIGHLY ACKNOWLEDGED IN THE FIELD OF ”MILITARY SCIENCES, INFORMATION AND PUBLIC ORDER” OF THE NATIONAL COUNCIL FOR ATTESTATION OF ACADEMIC DEGREES, DIPLOMAS AND CERTIFICATES, INDEXED IN INTERNATIONAL DATABASES EBSCO, CEEOL, GOOGLE SCHOLAR, INDEX COPERNICUS, PROQUEST, DOAJ & ERIH PLUS

PUBLICATION FOUNDED IN 1937

”CAROL I” NATIONAL DEFENCE UNIVERSITY PUBLISHING HOUSE
BUCHAREST, 2020

Cover: Andreea GÎRTONEA

The articles published in the Bulletin of ”Carol I” National Defence University, ISSN 2284-936X, L 2284-936X, are also found in full text – title, author, abstract, content and bibliography – in the Romanian version of the journal, ISSN 1584-1928.

EDITORIAL BOARD

1. HONORIFIC BOARD

Brigadier Gen. Dorin-Corneliu PLEȘCAN	"Carol I" National Defence University
Georgeta GAVRILĂ, PhD	Ministry of National Defence
Brigadier Gen.Prof. Constantin Iulian VIZITIU	Military Technical Academy
Brigadier Gen.Prof. Ghiță BÎRSAN, PhD	"Nicolae Bălcescu" Land Forces Academy
Brigadier Gen.(Air) Prof. Gabriel RĂDUCANU, PhD	"Henri Coandă" Air Forces Academy
Commander Assoc.Prof.Eng. Alecu TOMA, PhD	"Mircea cel Bătrân" Naval Academy
Col.Assoc.Prof. Marius-Victor ROȘCA, PhD	"Carol I" National Defence University
Col.Prof. Valentin DRAGOMIRESCU, PhD	"Carol I" National Defence University
Col.Prof. Daniel GHIBA, PhD	"Carol I" National Defence University
Col.Prof. Ion PURICEL, PhD	"Carol I" National Defence University
Col.Prof. Ioana ENACHE, PhD	"Carol I" National Defence University
Col.Assoc.Prof. Cosmin-Florin OLARIU, PhD	"Carol I" National Defence University
Col.Prof. Doina MUREȘAN, PhD	"Carol I" National Defence University
Col.Lect. Florin CÎRCIUMARU, PhD	"Carol I" National Defence University
Col.Prof. Marinel-Dorel BUȘE, PhD	"Carol I" National Defence University
Col. Alin CRIVINEANU	"Carol I" National Defence University
Col.Assoc.Prof. Ștefan-Antonio DAN ȘUTEU, PhD	"Carol I" National Defence University
Col.Assoc.Prof. Daniel ROMAN, PhD	"Carol I" National Defence University
Maj.Assoc.Prof. Marinel-Adi MUSTAȚĂ, PhD	"Carol I" National Defence University
Lect.Florian BICHIR, PhD	"Carol I" National Defence University
Col.Prof. Cezar VASILESCU, PhD	"Carol I" National Defence University
Inspector Carol Teodor PETERFY	Organization for the Prohibition of Chemical Weapons – OPCW (Winner of the Nobel Peace Prize in 2013)

2. SCIENTIFIC BOARD

Assoc.Prof. Iulian CHIFU, PhD	"Carol I" National Defence University
Prof. Daniel DUMITRU, PhD	"Carol I" National Defence University
Prof. Gheorghe MINCULETE, PhD	"Carol I" National Defence University
Prof. Teodor FRUNZETI, PhD	"Titu Maiorescu" Christian University
Prof. Sorin TOPOR, PhD	"Carol I" National Defence University
Prof. Marian NĂSTASE, PhD	The Bucharest University of Economic Studies
CS II Alexandra SARCINSCHI, PhD	"Carol I" National Defence University
CS II Cristina BOGZEANU, PhD	"Carol I" National Defence University
CS III Sorin CRISTESCU, PhD	"Carol I" National Defence University
Pavel OTRISAL, PhD	University of Defence, Brno, Czech Republic

CONTENT

UNIVERSITATEA NAȚIONALĂ DE APĂRARE
„CAROL I”

10.12753/2284-9378-20-32

UPDATING LEGISLATION IN THE FIELD OF NATIONAL SECURITY – ADAPTING TO THE NEW REALITIES. NEEDS AND CHALLENGES

Georgian POP*

Romanian legislation specific to the national security is, at a great extent, quite obsolete. The laws were established in the 90s' and are submitted to the logic specific to the Cold War. In the meantime, not only the crisis generated by COVID – 19 but also the technological and geopolitical evolutions which appeared during the latest decades have emphasized the need to adapt the laws to the new realities. Comparing the situation specific to the three decades before, new security risks have shown up, for example cyber risks. The New Defence Strategy of our country (the one of 2020), emphasizes the keen need to update these laws.

The great challenge for the legislative initiative consists in finding a right balance between the need to prevent/counteract these risks, on the one hand, and, on the other hand, the need to protect the fundamental freedom and to assure the care to respect the constitutional rights of the citizens. The lack of this balance can open the way either towards abuse against the citizens or towards institutional inefficiency. Consolidation of democracy and state are dependent, greatly, on the content of these laws.

To have a legislation that is modern and adequate, adapted to the democratic environment, the principle of constitutionality (namely to protect the citizens' freedom and fundamental rights), must be the base of the legally regulation specific to new security risks.

Keywords: security; legislation; risks; challenges; adaptation.

An analysis of the factors that have led to changes and improvements in legislation over time is a fascinating journey into universal history. If in legislative theory and practice certain concepts and principles have remained valid from antiquity to the present, the actual content of the laws has undergone, in each historical stage, consistent changes.

At higher or lower speeds, war and peace, the crises that humanity has gone through, scientific discoveries, technological inventions and innovations, geopolitical dynamics or social developments have shaped every historical period. Adapting laws to these developments has always been both a necessity and a challenge for the legislators of all times.

In recent decades, technological developments have been spectacular, influencing the economy, industry, politics, scientific research, entertainment, lifestyles, social interaction, etc.

For example, 30 years ago we considered science-fiction the smart phone technology that we use today, on a daily basis, in a natural way. As a result, the pace of political, economic and social change has been accelerating.

**** Member of the Romanian Parliament***
e-mail: *georgianpop75@gmail.com*

In recent decades, technological developments and geopolitical dynamics have made security risks increasingly complex. Practically, there have never been such evolutions and challenges in history, hard to imagine a few decades ago. Cyber risks, the use of drones to cause security incidents, hybrid warfare and, in general, new asymmetric risks have not been defined in specific national security legislation.

The crisis generated by COVID-19 has highlighted, in addition to the developments of recent decades, the need to update legislation. Innovative technologies (robots, drones, IT applications, etc.) have facilitated human action and, implicitly, pandemic management. By comparison, 100 years ago, during the pandemic known in history as the "Spanish flu", no one could have imagined that robots could disinfect hospitals, that drones could deliver drugs to areas at risk to humans, that mobile applications could be used to identify the social interaction of infected people. But obviously, the use of new technologies can be dual, depending on the user's intentions: in addition to the benefits, new technologies can be used to limit fundamental rights and freedoms.

From saving lives to abusing fundamental freedoms, there is, in some cases, a very fragile line that needs to be regulated, correctly and precisely, within a law. If laws are not clear enough, committing abuses undesirably falls into the realm of human arbitrariness.

The need to update legislation

One of the great challenges for Parliaments, not only in Romania, but in most countries of the world, is related to the adaptation of security legislation to recent developments, including the developments generated by the COVID-19 crisis.

Romanian legislation was drafted and adopted in the 1990s[1]. In general, the logic specific to that period was a "cold war" type, the main security risks being military aggression, espionage, terrorism, hostile actions, spreading false information, propaganda for war, risks of secession, diversion, attacks against constitutional order etc.

The last three decades have brought significant changes. If, for example, 30 years ago we would have defined a military aggression mainly in conventional terms, today an aggression against a state/community can be of the cyber type. That is, instead of classic tanks, an attack can be made in the virtual environment, with weapons from the cyber arsenal, to destroy or paralyze certain critical infrastructures. The effect produced, political and military, is, in most cases, comparable to the damage caused by conventional weapons. Espionage has changed a lot. If during the Cold War states sent their spies to obtain secret documents and information, today it can be done through cyber tools, remotely, not just through agents sent to the scene.

If in the '90s the potential aggressors were mainly state entities or terrorist organizations clearly defined, relatively easy to identify, today we face a series of diffuse, asymmetric, unconventional threats, whose perpetrators are more difficult to identify and counteract: troll factories/farms, hackers, lone wolves who self-radicalize on social networks and commit terrorist attacks, etc. For these new risks, the legislation drafted 30 years ago does not provide definitions and legal frameworks.

Prevention is the golden rule of modern intelligence. Let us take espionage as an example. Effective prevention means manipulating and hijacking spies of a hostile power in order to fail to obtain the secret information they are targeting or to fail to recruit / influence important leaders. If the espionage / betrayal action took place, prevention failed. Even though the court later convicts the culprits, both spies and traitors, the damage is done. The same is true for terrorist attacks. Prevention means that any attempt is thwarted, blocked, pre-met, that is, the actual attack does not occur there are no human victims and destroyed infrastructure. It is preferable for terrorists to be blocked, expelled, pre-trial detained than to be tried and convicted after committing attacks, because in such cases prevention means saving lives.

Current legislation provides the legal tools needed to prevent/counter classic risks such as espionage or terrorism. But it does not cover new risks, such as "troll factories", for example, used by a hostile power to create diversions and destabilization.

A simple reading, in 2020, of the Romanian legislation in this field reveals that security risks have evolved and diversified while the legislative provisions have lagged behind these developments. Obsolete and inadequate legislation represents intrinsically a vulnerability as it does not provide the legal tools to prevent and counteract these risks.

Challenges for the legislative process

The fundamental role of legislation is to adequately regulate all areas of social life. From the perspective of national security legislation, we currently have some major challenges.

A first challenge concerns the exhaustive dimension of the future legislative package so as to cover the great diversity of risks that have occurred in recent years. It is thus necessary to supplement the list of national security risks by including those that have occurred in recent decades. The approach must be balanced, in order to avoid both the evading of real risks and the abusive, forced introduction of some security risks.

Secondly, a significant challenge associated with the legislation in this field is the observance of the principle of Constitutionality, namely finding the right balance between, on the one hand, the need for efficiency in ensuring national security (meaning risk prevention) and, on the other hand, protecting fundamental human rights and freedoms.

How do we draft new legislation to enable us to maximize the benefits of IT&C technology (legislation should not be a brake on development)

and at the same time to minimize the risks of these technologies being used as a weapon against citizens, communities or states? How do we draft new laws to avoid the possibility of governments illegally spying on their citizens through these technologies?

Thirdly, the COVID-19 crisis management revealed to us the possibility, practiced in some states, that espionage technologies, used for monitoring and surveillance, could be used, in the name of medical security and stopping the spread of outbreaks, to mass surveillance of citizens[2], implicitly generating an interference in the sphere of the right to privacy.

The legislative challenge is extremely complex. Is a pandemic a sufficient reason to legislate for the use of mass surveillance technologies? Such as, for example, the obligation to install the STOPCOVID application on personal smart phones? The French Parliament legislated this obligation in 2020[3].

What is the limit over which the damage of democracy and fundamental freedoms becomes irreversible? If such IT applications are approved for pandemic management (COVID-19), are there sufficient reasons to extend their use to combat terrorism, for example, cyber espionage or hybrid warfare?

Without a clear and responsible regulation, we can witness in the future extreme phenomena, either the non-optimal use of technological resources for risk management (a pandemic, for example), or the "overuse" of technological resources for illegitimate monitoring of citizens (governments or private companies).

COVID-19 and its implications for national security

If until the outbreak of COVID-19 the main paradigm of approaching national security laws sought the balance between civil liberties and national security, the pandemic changed the concepts of reference, this time the discussion being about finding a balance between public health and fundamental freedoms. In France, for example, the legalization of the use of the STOPCOVID application on smart phones is eloquent for the relevance of the new paradigm.

An analysis of the measures adopted or proposed in various countries around the world for the use of mass monitoring technologies for pandemic management reveals that the challenge for national parliaments is extremely complex.

According to the Treaty on the Functioning of the European Union, national security legislation is an area of national sovereignty. Therefore, in the EU area, each state will have to decide on the specific form of transposition of these challenges. From state to state, some technologies will be allowed, others banned. For example, unlike France, in Romania there is no question of legislating the obligation to install the STOPCOVID application on personal smart phones.

In addition to the applications installed on citizens' smart phones, some states, under the motivation of protecting students, have imposed the mandatory wearing of electronic bracelets in schools, used to manage social distance and to issue warnings if a student has a fever[4]. In another state, the idea of implanting chips for students was launched, the motivation being to protect students from the danger of COVID-19[5]. The Spanish company Herta Security is developing a complex facial recognition system in public spaces, including under the conditions of wearing a medical mask[6]. The French company Outsight is developing a laser-based system that will allow the management of social distance in public spaces[7]. Drones or special helmets worn by police officers[8] can be equipped with cameras that scan, in real time, the temperature of people in public spaces. Some of these technologies are, in various states, approved by law and applied. Others are only in the proposal / project stage.

Sooner or later, Parliaments will have to address these issues in each state. The challenge is obvious. Does it regulate or NOT the possibility of using such technologies for the purpose of COVID-19 pandemic management? If so, under what conditions? Who manages such technologies? Who exercises democratic control so that there are no abuses or uses of technology for political, commercial, etc. purposes? If such technologies can be used to save lives in the face of the danger represented by the pandemic (COVID-19), could the same technologies be used to save lives in the face of the terrorist danger? What about saving / protecting critical infrastructures from cyber or hybrid risks? Where is, in this case, the right balance between freedom, the right to privacy, on the one hand, and the protection of public health or the protection

of the lives of citizens, the protection of critical infrastructures (health, energy, communications), on the other?

Another topic related to the impact of the COVID-19 crisis in the field of national security concerns the involvement of the secret services in the national effort to manage a pandemic. In Israel, for example, the secret services have become heavily involved in commercial actions to bring to Israel millions of medical equipment items needed for COVID-19 management, including from countries with which Israel has no diplomatic relations[9], the secret services (Mossad) receiving official congratulations for this involvement[10]. Is such involvement legitimate? What solution will we establish in the Romanian legislation? Who determines what types of trade/economic implications are legitimate or illegitimate? Who controls the possible exceeding of the national security mandate in such a case? Do we prohibit/ allow secret services to conduct commercial activities? To all these questions, the new legislative package will have to find the right answers.

Another topic of public controversy was the information provided by the secret services to policy makers about the dangers of COVID-19. In the US[11] and in the main EU countries, this topic was raised in the public debate: how do we establish, through legislation, the task of the secret services to inform, in advance, policy makers about pandemic risks and how do policy makers use information to generate public measures / policies for the proper management of a pandemic?

The evolution of security risks in recent decades

Because we are living the fourth industrial revolution[12], even more, we are at the beginning of the fifth[13], updating the legislation means, in the simplest form, adapting to the new world defined by virtual and smart technology.

In addition to technological developments, significant influences on new security risks have also had the recent geopolitical developments: the annexation of the Crimean Peninsula by the Russian Federation, political and military developments in the Middle East or North Africa, migration pressures on the EU or the latent tensions in the South China Sea.

Without claiming to be exhaustive and without trying to suggest certain solutions, I have chosen, to exemplify, some of the new security risks, trying to highlight the legislative challenges that are associated with each of these new risks.

Hybrid warfare

Thirty years ago, discussions about a hybrid war would have been predominantly theoretical. Meanwhile, after the Russian Federation annexed Crimea, the hybrid warfare became a real political-military phenomenon. Hybrid attacks are an extremely effective combination of cyber-attacks, actions of special troops without insignia and not assumed by states (the famous "green men" in Crimea, for example), hostile propaganda, fake news campaigns, stimulation of minorities or extremist groups in a region to generate instability and claim certain political goals, use of energy and economic levers, etc.

The objectives pursued by the hybrid warfare aim at social destabilization, the collapse of public confidence in legitimate authorities, social tensions and conflicts, the massive influence of public opinion to generate a "strategic paralysis" of policy makers, meaning the inability to make decisions. The weapons used in hybrid wars are no longer tanks or missiles but cyber "weapons", fake news campaigns, hostile propaganda, energy levers, etc.

In the new national security legislation and, subsequently, in the chapter of the criminal code that defines the crimes against national security, this phenomenon (hybrid war) must be defined separately.

The legislative challenges are many. First, how do we define the enemy in hybrid incidents? More precisely, how do we define, in order to be able to legally frame, such phenomena as hostile propaganda or fake news through social media, coordinated by a hostile state entity? How do we legally frame "green men", not assumed by any state, or mercenaries of armies/private companies[14]? How do we legally define "troll factories" in another state as a risk to national security? How do we establish that an extremist group or a minority is being manipulated by a hostile foreign power to generate local tensions and conflicts? How do we legally define, in terms of a possible instrument of hybrid aggression, the energy security?

Secondly, we will have to assess the extent to which an incomplete or exaggerated definition of these phenomena can lead to abuses regarding

fundamental rights and freedoms. It is very important for the state to have, for example, the necessary tools to counter a fake news campaign orchestrated by a hostile power against its strategic interests. During the COVID-19 pandemic, in the spring of 2020, Romania was the target of such hybrid campaigns. The Minister of Internal Affairs of Romania officially confirmed it[15].

But it is equally important that such tools cannot be used to affect freedom of expression in a democratic society. How do we achieve, through the legislative provisions, both desires, namely how do we find the right balance?

Thirdly, we will need to identify and define the optimal mechanisms for inter-institutional cooperation. More precisely, to establish, through legislation, the distinct but competing responsibilities for the army, police, secret services, border police, gendarmes, etc. For example, on May 10, 2019, a small helicopter, used by cigarette smugglers, crashed in northern Romania[16] in a forest and was found, by chance, 3 days after the crash by some locals. We are obviously wondering how it is possible for a hard device to enter, undetected, in the airspace of Romania? And of course, from the perspective of a possible hybrid aggression, we ask ourselves what would have happened if instead of contraband cigarettes that helicopter introduced "green men" on the national territory? Which institution is responsible for such incidents: the army, the border police, the gendarmerie?

Clearly, the new legislative package will have to legally regulate all these phenomena and situations, including institutional responsibilities for preventing and counteracting them. The case of the helicopter discovered, by chance, on May 10, 2019 is eloquent. No institution has officially assumed this failure and no institution has officially proposed a set of measures to prevent the recurrence of such an incident.

Cyber risks

In the last 2 decades, the development of IT&C has been practically exponential. As a result, the quality of life, social and community development, research, medicine, the financial-banking sectors, transport and infrastructure have undergone developments hard to anticipate 20 years ago.

Undoubtedly, the life of the contemporary man can no longer be conceived outside the Internet and IT technologies. The positive effects are found both at the individual level and at the community and societal level. But in addition to obvious benefits, the development of IT & C technologies also involves a number of risks. The protection of personal data takes on a new dimension in the information age. For example, the medical data of the citizens were kept, 30 years ago, on paper, in the doctors' drawers. Now most patient data is stored and managed electronically. It is obvious that no patient would want his medical data to be accessed by hackers.

Educational systems are evolving. The students' homework are no longer exclusively the classic ones, from the textbook/notebook. The crisis generated by COVID-19 meant that, for several months, the school was run exclusively online. Students received virtual assignments, solved them and virtually submitted the answers. The classroom application[17] is an example. Obviously, no parent would want their children's confidential data on school performance to be accessed by unauthorized persons.

I used these examples to highlight the fact that, in the process of social development, IT technologies have a bivalent nature, both as a factor generating progress and as a vulnerability, a risk to national security or to the interests of communities, families and individuals.

The future is moving us towards smart cities[18] and smart societies. Digitization is undoubtedly the future of administrative systems. The benefits induced are obvious. It is only a matter of time before states manage to go through all the technical steps of digitization. Estonia, from this point of view, is a model[19].

But, in addition to the obvious advantages, the last decade has shown us that the cyber domain can also be used as a strong weapon. If, classically, the military confrontation spaces were the air, the ground and the sea, from the NATO Summit in Warsaw, in 2016, cyber officially became, inside the Alliance, the fourth military confrontation space.

The examples of the last decade are eloquent. In 2010, an innovative cyber virus, Stuxnet, was used to attack the computer systems of Iran's nuclear facilities[20]. The effect was to block the development pace of the Iranian nuclear program. Thirty years ago, only a special forces operation or a classic type of sabotage could have produced such

an effect. But Stuxnet, a computer virus launched from a distance, difficult to identify and attribute, produced the expected military and political effect. The cyber "response" is known as the Shamon virus. In 2012, this virus, Shamon, was launched on the computer systems of the Saudi state company ARAMCO, in the field of oil processing and on some refineries in Qatar. The cyber-attack caused major damage by compromising the data in the attacked computer systems, which generated a substantial slowdown in oil production, requiring a complete reconstruction of these computer systems[21].

Nor are civilian critical infrastructures, such as distribution networks for the population, protected from cyber risks! For example, in April 2020, Israel's water supply systems were affected by a cyber-attack[22]. In the classic military action, for example, in order to destroy the distribution of electricity or drinking water supply of a city, the effective ways were the bomb / missile attack on the network nodes, the attack with special troops to detonate the network.

Cyber weapons have shown that the same thing can be done remotely, without any classic explosions, by simply sending computer viruses. It happened on December 23rd, 2015, in the midst of the hybrid war in Ukraine, when the computer systems of electricity distribution companies were attacked and paralyzed[23]. The politico-military effect was great: the population remained in darkness in the middle of winter.

The major concern for the protection of critical infrastructure is that a cyber-attack can compromise and affect the operation of industrial facilities by attacking voltage, pressure and temperature control systems. From this point of view, thousands of industrial plants around the world are vulnerable, including nuclear and water treatment plants, oil or gas refineries, chemical plants, etc. Similarly, computer systems that manage passenger traffic (airports, railway stations, road traffic management systems, etc.) can be a target for cyber-attacks.

The big problem, in such cases, is the precise identification of the attacker. They usually are hackers that do not assume the facts and that are unrecognized by states, even if they act on command and in the interest of certain states.

It is difficult to define and frame such an attack in national or international law. And especially, the attacker. Because the attacker uses proxy servers, proxy routers, anonymous VPNs. This is, intrinsically, a major challenge for the drafting of new national security laws. How do we legally define and frame such an aggressor?

The development of cyber technologies has revolutionized espionage. If a few decades ago the access to the secret documents of a state entity was made by classical methods, such as "James Bond" or the recruitment of people who had direct access to documents, now IT technologies allow digital[24] espionage, through software or computer viruses, such as Pegasus[25] or even through antiviruses installed for the computer protection[26] of various IT systems. Generally speaking, states / secret services no longer have to send their own "James Bond" on a field mission. Some data can be collected remotely, digitally, identifying and assigning the attack being a difficult process.

Not only classified data of states are a target in cyberspace. Public health system data, banking and financial system data, digital procurement data and, in general, digital government data are vulnerabilities that need to be protected and secured. In 2020, a massive e-mail cyber espionage campaign fraudulently used big companies' names (Romanian Post, Banca Transilvania, DHL, etc.) as bait for users to influence the opening of emails containing spyware, the target being the theft of information from computers belonging to various public institutions in Romania[27].

From a legislative perspective, the main challenge is to find the right balance between, on the one hand, stimulating the digitization process at institutional, community, societal level and, on the other hand, establishing by law the rules and the level of cyber protection, so that digital data are effectively defended and, at the same time, fundamental rights and freedoms are protected.

What additional legislative tools do we offer to cyber defence agencies in order to be effective but, at the same time, not to become abusive, in relation with the citizens? Will we impose by law, as a measure to prevent cyber risks, mandatory rules/ levels of cyber security to various institutions, such as, for example, health insurance companies, public/private hospitals, banking institutions, local public administration, etc.?

Another challenge arises from the need for more efficient regulation of "dark" spaces in the

virtual environment. How do we legally define and frame traffic activities from the dark internet area (trafficking in drugs, weapons and prohibited materials, etc.)? Can server owners who deliberately host specialized sites for cross-border organized crime actions be incriminated or not? The recent case of a cyber bunker in Germany is eloquent[28] and will be an important case for legal regulation trends in the European Union.

Last but not least, will we legislate, in the new package of national security laws, the right of the government, the army or the secret services to cyber-attack the aggressors they face? In November 2019, for example, EUROPOL and the Belgian police cyber attacked hundreds of accounts promoting Islamic State jihadist propaganda[29]. Will we give the permission, in the new legislation, to the Romanian state institutions to carry out cyber-attacks or will we limit the intervention explicitly in the sphere of cyber defence?

Terrorism in the digital age – the phenomenon of self-radicalization on social media networks

Technological development has allowed the emergence of new forms of manifestation of the terrorist phenomenon. A few years ago, states and intelligence agencies knew very clearly who the enemy in the sphere of terrorism was: terrorist organizations/groups, from all over the globe, there was a clear index of them and mercenaries like Carlos "the jackal"[30], who put themselves in the service of the interests of some states or terrorist organizations. The attacks involved hijackings, bombings, gun attacks, and more. Prevention consists in monitoring the organizations /mercenaries, arresting, expelling the attackers, counteracting/annihilating the intentions to carry out the attacks. Obviously, all these classic risks have remained as real as possible and are still valid.

But the development of technology and social media has generated new possibilities for the manifestation of the terrorist phenomenon. If in the past the recruitment and radicalization of those who later actually committed the attacks was done directly, by terrorist organizations, now we have cases of self-radicalization through social media and virtual communication with the leaders of terrorist organizations. Therefore, it is no longer necessary to have an effective meeting between the leaders of terrorist organizations and the persons who, as a result of radicalization, become bombers. As an effect, in such cases prevention is much more difficult to achieve.

In the past, many attacks have been prevented by effectively monitoring the circuit of the explosives, the weapons to be used in the attacks, and the specific activities of terrorist networks / organizations. If a few decades ago bombs or firearms were the main weapons used by terrorists, the attacks in recent years, committed in Europe, have shown that the weapons used can be simple knives[31] or trucks with which the bombers enter the crowd of people on the street, as happened in Nice[32].

A suggestive case for the phenomenon of self-radicalization is the attack on December 6th, 2019, from the military base in Pensacola, Florida. A young Saudi man killed 3 people and injured another 8. The investigation launched, showed that prior to the attack, the young man posted anti-US and anti-Israel messages[33], on social networks.

The legislative challenge is obvious. Could a possible monitoring of the content posted on social media by the attacker have prevented the death of innocent people?

By contrast, on June 6th, 2020, in Germany, the police and the secret services arrested a young Islamophobic man who stated, in a post on social media, that he was going to commit an attack in a mosque, on the model of the Islamophobic attack in New Zeeland from 2019[34]. He failed to commit the attack because the police arrested him, based on the intentions posted in the virtual environment. The weapons with which the attack was to be carried out were found at the young man's home.

Analyzing the two cases, we ask ourselves the legitimate question where is, in such cases, the right balance between prevention and freedom of expression?

Certainly, an over-regulation of the possibilities of prevention would lead to an authoritarian state, to abuses and violations of the right to privacy and opinion, guaranteed by the Constitution! At the same time, life is the supreme human value, the right to life being fundamental! How can governments better protect the lives of innocent citizens who fall victims to theological radicalism without turning into Orwellian-type "Big Brother"?

The pandemic generated by COVID-19 marked a strategic mutation in the activity of terrorist organizations. Specifically, we are witnessing

a significant shift of actions from real space to the virtual environment: jihadist propaganda, the recruitment of new members and followers, the organization of attacks whose target tends to increasingly target cyber-attacks on critical infrastructure. ISIS / DAESH launched, for the first time, in 2020 the online magazine "Security of the supporter", whose content teaches members and followers of the organization how to avoid / circumvent the surveillance of information services in the online environment[35].

An ancient principle seems to retain its relevance even in contemporaneousness: "Laws given in time of peace are largely annulled by war, and laws given in time of war are annulled by peace"[36]. The big challenge is to find a balanced legal form, so that there is good legislation, drafted in peacetime, to maintain peace, democracy, fundamental rights but also to prevent the horrors of war, in this case the horrors of terrorist attacks.

Using drones as a weapon

In recent decades, the development of drone technologies has been spectacular. As a result, governments, private companies or citizens now have access to a diverse range of drones. In addition to the obvious benefits of transport, trades, and the entertainment industry, recent years have shown that drones can also be used as real weapons[37].

A major incident took place in December 2018, in London[38]. Gatwick Airport was blocked for 32 hours, and more than 100,000 passengers were stranded at the airport. The cause of the planes retaining to the ground was generated by unidentified drones that constantly flew over the space close to the airport runways. Although major police and military forces tried to identify the perpetrators of the incident, drones reappeared near the airport whenever an attempt was made to reopen the runway. The immediate solutions launched by the London authorities fell within the scope of operational reactions: the deployment of snipers to immediately shoot down drones, intense interference in that area, to block the possibility of remote drone control, with the risk of affecting other activities in the airport area or the launching of especially trained birds to shoot down unauthorized drones from the runway space.

Another drone incident in 2019 reveals the high potential of this technology to be used as a weapon. On September 14th, 2019, Saudi Arabia's oil industry was attacked by drones, which set fire to the facility[39]. The estimated damage was in the hundreds of millions of dollars and production was partially halted. Although Saudi Arabia has invested heavily in missile defence systems and, as a result, all missile attacks launched by Yemeni Huthi insurgents on Saudi Arabia have been countered, a much cheaper technology, drones, has been used by insurgents with a real success, as an extremely effective weapon, impossible to detect, by radar systems, and to neutralize by activating anti-missile systems.

If 30 years ago there was no question of defining drones as a national security risk, recent incidents are certainly forcing us to think and insert, in the national security legislation, a distinct point regarding drones. In addition to military-type destinations, drones can be successfully used by drug traffickers or arms traffickers, by transnational organized crime networks to transport illegal products across state borders.

Also, images from China, during the COVID-19 epidemic, showed the technical possibilities by which the population is monitored in real time with the help of drones and, at the same time, the population can receive, through megaphones installed on drones, directly and personalized, messages or summonses/instructions of conduct in the social space[40].

Thus, first of all, a legislative challenge will be related to setting the limits within which drones can be used by governments for population surveillance or in public order actions. Where is the right balance between the need for governments to use modern technologies (drones) to prevent criminal or antisocial phenomena, on the one hand, and, on the other, the right to privacy and the protection of fundamental freedoms? Where is the limit over which their use turns into abuses and violations of civil rights and freedoms?

Secondly, although European legislation regulating the use of drones has been improved[41] and in Romania we have a new Aviation Code[42], the challenge for national legislation in the field of security remains: how do we legally define and classify drones among national security risks? How do we protect ourselves from possible drone attacks? What are the institutions responsible for preventing and countering possible drone attacks

on critical infrastructure? How do we manage, through legislation, to protect the legitimate rights of citizens and companies that use drones for civilian purposes, for development? How do we prevent the use of drones for criminal purposes without affecting the development of this industry, through over-regulation?

Influence of election results by hostile state entities

The constitutions of all democratic states enshrine the right of citizens to elect their representatives and decide by referendum in a sovereign manner. For governments, one of the fundamental tests of democracy is the ability to hold free and fair elections/referendums so that the sovereign will of nations is not altered or manipulated by hostile state entities.

Throughout recent history, for geopolitical reasons or to promote strategic interests, there have been situations in which state entities have tried to influence, for their own benefit, the results of electoral processes in the countries concerned.

Democratic states have begun to present official positions[43] and reports[44] on such external interference, and the institutions responsible for defending the Constitution are developing strategies to counter external interference in electoral processes[45].

Commissions of Inquiry of such interference have recently been set up in the United States[46], the United Kingdom[47] or the Russian Federation[48]. This concern is also very current in the European space. We therefore have a motion for a resolution, submitted in October 2019 in the European Parliament, on external electoral interference and misinformation in national and European democratic processes[49].

An official US reaction is conclusive to show the size and the topicality of this type of risk. To prevent external interference in the electoral process, the US officially offers substantial rewards of millions of dollars to anyone who helps identify foreign actors who, at the command of foreign governments, are trying to influence the November 2020 presidential election[50].

30 years ago, for example, the influence of the result of the elections/will of the population in a sovereign state by a foreign (hostile) power could be done by classical means: secret financing of certain parties/leaders, of extreme or minority groups, of some organizations that promoted a certain agenda, the corruption/recruitment of some political leaders or of some opinion formers, etc. The actual results were, in such cases, relatively limited.

Today, IT technologies and the global development of social media networks allow the intentions to influence public opinion and, implicitly, the outcome of elections to be achieved, at least theoretically, remotely.

"Troll factories" can generate and launch in the virtual space real campaigns based on fake news. Computer algorithms and search engines can theoretically direct a series of manipulation/ misinformation messages to a well-targeted audience in a country/region/community.

Controversies over the role that Cambridge Analytica played in the Brexit phenomenon[51] are relevant. Thus, the company Cambridge Analytica was accused of using for political purposes, without consent, the personal data of over 50 million Facebook users[52]. What political parties have failed to achieve, through traditional means (classic election campaign methods), algorithms and software, Cambridge Analytica seems to have succeeded in doing. Specifically, 3,000,000 citizens who never voted were persuaded to go to the polls with more than 1 billion personalized messages sent through social media, based on users' personal data[53].

It is not the purpose of this article to determine whether or not the involvement of Cambridge Analityca was decisive for the success of the "Leave" camp in Brexit. But if we look at the results at the polls, where the difference was in the margin of 2%, and 3 million citizens went to the polls for the first time, some conclusions can be drawn.

The main idea I want to emphasize is that current technology allows the generation of tools to promote election campaigns that did not exist 30 years ago.

Specifically, through the traditional election campaign tools (door-to-door campaigns, distribution of election materials, public events, mobilization of supporters, etc.), available to political parties, it is impossible to generate personalized messages for millions of people! In order to deliver personalized messages to several million people through classic electoral mechanisms, the electoral campaign teams (documentation / creation / distribution) should include thousands

and even tens of thousands of members. And this is impossible for any political party in the European and Euro-Atlantic space.

But for a company that has the necessary software and computer algorithms, distributing personalized messages to millions of people becomes a real possibility.

The great challenge for national security legislation is to define and legally frame such a possibility for a hostile state entity to use such tools to manipulate, in its own interest, the sovereign right to choose of a nation/community and to generate legislative instruments so that any government can prevent such a situation.

In Spain, a Supreme Court judge has launched a judicial inquiry regarding the possible interference, through such instruments, by hostile secret services in the separatist process in the province of Catalonia[54].

How do we define and legally classify such phenomena within the national security risks?

Is there a risk that over-regulation will undesirably affect democracy and freedom of expression in a society? Definitely yes! Which institution should be given the legal responsibility to prevent and counteract such a risk? The Permanent Electoral Authority (PEA), the police, the army, the secret services? Do we need a new institution, specially created, to manage such phenomena? How do we establish, by law, the mechanisms of prevention? Where is the right balance between freedom of expression, freedom of communication, on the one hand, and, on the other, the protection of the nation's sovereign right to choose freely?

Hostile external propaganda and fake news campaigns

In any democratic regime, public support is essential for the consistency and coherence of government policies. All the more so when we talk about policies, projects and interests of a strategic nature. Romania's integration processes into NATO and the EU, at the end of the 1990s and the following decade, had an extremely important public support. The relevance of this support has translated into applied policy projects (legislative amendments and adoptions, public policies, institutional reform projects, etc.) that have made integration possible.

The theory of attitude change, from social psychology, tells us that at the level of public opinion significant changes can occur slowly but progressively, if the incentives to influence public attitudes are constantly transmitted to a target group[55]. A relatively recent example seems suggestive to illustrate this theory: the evolution of public support for EU integration by the population of the Republic of Moldova. If in 2007, in the Republic of Moldova, the supporters of European integration represented 76%, in 2014 only 44% still supported this project[56]. And the election results after 2014 have consecrated this trend.

Obviously, there is a causal complex responsible for reducing public support from 76% to 44%, and hostile propaganda (European integration) is one of the factors[57]. Certainly, the geopolitical beneficiary of this decrease is by no means the Republic of Moldova.

I have presented this example to illustrate the situation where a great geopolitical power can promote and transfer its specific interests in another state through fake news and hostile propaganda campaigns. Although the sociological method of content analysis can reveal relevant correlations between certain geopolitical interests and the actual content of hostile propaganda campaigns, in legislative practice the legal framework and proof of the "guilt" of hostile propaganda prove to be an extremely difficult endeavor. Often the line between information and misinformation, between propaganda and simple promotion (PR) is extremely thin. And the freedom of expression, the independence of the media, the freedom of communication in the virtual space represent fundamental rights that must be constantly defended and strengthened. The problem is that these very democratic principles and values can be exploited, in a professional manner, by the masters of propaganda that are in the service of hostile geopolitical powers.

As a result, a major legislative challenge will be to define this type of security risk and to define the institutional responsibilities for preventing / counteracting this phenomenon. At the same time, the establishment of the limits beyond which such an approach could turn into abuse on free expression or on the independence of the media, will have to be the basis for the elaboration of the new legislative provisions.

The fake news campaigns during the COVID-19 pandemic operated in the USA or the EU are eloquent[58]. The technical mechanism for promoting

a campaign involves the official media of a state, which launches a theme, then thousands of social media accounts (many of them fake) take the message in the languages of international circulation (English, German, French, Spanish, etc.) and massively promotes it on social media networks[59]. The fake news campaign against 5G, during the COVID-19 pandemic, was promoted through thousands of Facebook, Twitter and Instagram accounts, which produced thousands of posts with a huge reach during the state of emergency, with the hashtag # 5Gcoronavirus[60].

Obviously, the "weapon" of fake news aims to generate social instability, disproof and distrust in the legitimate authorities of a state. The ultimate goal is to block strategic decisions that geopolitically disadvantage the hostile state that promotes that fake news campaign.

Recent history reveals that the main method of combating fake news is the consistent education of the "target" population. The Finnish model proved to be, by far, the best[61].

"Finland is considered the European country most resistant to the phenomenon of fake news, as critical thinking is cultivated and stimulated throughout the educational process. Critical approach, interpretation, verification and evaluation of all the information you receive, from wherever it appears, are crucial. Finland's school curriculum is part of a broader strategy conceived by the Helsinki government after 2014, when the country was the target of a fake news campaign launched in Russia. In math classes, for example, students learn how easily statistics can be manipulated. In art classes they can see how easily the message of an image can be distorted, in history classes they analyze the most notable propaganda campaigns, while Finnish language teachers show them how many words can be used to confuse, to induce in error and deceive. Even if they do not read newspapers or watch TV news, students and citizens in general are bombarded daily with hundreds of news on WhatsApp, YouTube, Instagram, Snapchat, etc. The basic goal of the Finnish education system is for students and pupils to ask questions such as: who produced this information and why? Where was it published? What does it really say? What audience is it targeting? What is it based on? Is there evidence that this is the case or is it just someone's opinion? Can it be checked elsewhere?"[62]

Even if the fascination of the Finnish educational model tends to inspire us, the legislative challenge remains. With the exception of education-specific legislation, how do we define and legally classify, in the category of national security risks, hostile propaganda and fake news campaigns coordinated by hostile state entities? Because without an adequate definition and legal framework, any approach is completely useless; it can even become dangerous for the democratic environment! Which state institution receives such legal responsibility? How do we create control mechanisms so that we can avoid abuses on the independent media, freedom of expression or the right to an opinion?

The risk of legal over-regulation is real and can undesirably affect democracy and fundamental freedoms. The boundaries between these categories are extremely thin and history reveals many examples when demarches that started with good intentions were distorted and ended in deplorable abuses and dictatorial regimes.

Development of mass monitoring technologies, SMART networks, crypto currency, and AI (artificial intelligence)

The evolutions of digital technology and artificial intelligence (AI) tend to place us in a new stage, defined as the beginning of the *fifth industrial revolution*[63]. We are living through a period of huge transformations. Computers can work faster, better and more than humans, and integrating AI into this equation brings us to where robots and machines will be able to make decisions. This does not mean that robots will replace us but will be our partners in smart companies.

The future means that we will live in smart homes, we will move with smart means of transport, on a smart type of transport infrastructure, cities will change to become smart, institutions will transform and become smart, and interconnection will be done through smart connections (Smart Grids). It is a type of network that involves human cooperation with the computer and in which computers, based on advanced software, can make decisions. In a SMART city, communication and information are based on advanced technologies. Buildings, public transport systems, administrative and government services, commercial store networks, traffic management, etc. they all are coordinated and controlled by technologies such as AI (artificial intelligence) and IoT (Internet of Things).

Obviously, this technological-industrial revolution will stimulate development and will have positive effects on people's lives. The great legislative challenge is to properly regulate all these developments. Like any technology ever invented, bivalent use (for positive or destructive purposes) will be an explicit option for the user. That is why the legislation must adequately regulate all these situations: to stimulate positive developments and to counteract negative uses. Who protects new SMART cities/buildings from cyber-attacks? Can the IT department of a small town that invests heavily in SMART technologies cope with a possible cyber-attack launched by the "hackers" of a large (unaffiliated) hostile geopolitical power?

The controversies surrounding 5G technologies are eloquent. Are certain 5G devices security vulnerabilities[64]? How do we legally regulate such risks? Because there are new risks, non-existent a few years ago, so not regulated by the legislation in force. In 2019, we witnessed official accusations made by the US regarding the risks that the adoption of certain 5G technologies may present vulnerabilities in digital espionage[65]. Thus, a legislative challenge is to turn assessments, analyzes and statements/allegations of digital espionage risks into effective legal content, on the basis of which we can legally frame such technologies in the area of national security risks and thus have a legal basis for accepting or rejecting certain technologies. Otherwise, arbitrariness will play the dominant role.

Digital technologies have evolved a lot in the last decade. Facial recognition technologies can now be applied to populations of hundreds of millions of people, and in some states such procedures have become mandatory by law[66]. Obviously, governments, the police, the secret services will want the widest possible application of these possibilities, in order to quickly identify a large number of criminals, terrorists, criminals, prosecuted persons, violent criminals, etc.

Facial recognition even when wearing a medical mask, electronic bracelets, software installed on mobile phones (STOPCOVID, for example) are technologies not currently regulated by Romanian legislation. It is the role of the Romanian Parliament to establish, by law, which technologies can be allowed and which cannot, under what conditions they can be adopted and through what mechanisms democratic control is exercised over their use. In this case, the principle of Constitutionality applied in future legislation will have to represent the guarantee that the state institutions do not turn into real "Big Brother" [67]described by George Orwell in "1984" [68].

It is expected that, in the financial field, virtual currency, crypto currency, will occupy, progressively, as much space as possible in domestic and international transactions. LIBRA, for example, is designed to function as a new global payment system[69]. Obviously, it will be a while before the crypto currency plays a decisive role in the global financial system. But the trend is obvious. The question that arises, from a legislative perspective, is whether the regulation of processes involving crypto currency is done exclusively in legislation specific to the financial-banking field. Can we identify national security risks generated by possible speculative attacks using crypto currency as a tool? Or cyber-attacks with the aim of huge frauds? If so, how do we define and legally frame, in the content of the new legislation, the crypto currency among the national security risks?

It is already a common fact to say that AI (artificial intelligence) will revolutionize all aspects of social life, with exponential developments in medicine, transportation, communications, research, industry, entertainment, etc. After the consideration of the computerization, in the specialty literature, as a second literacy of institutions and human communities, it seems that AI is a new, higher level. AI (artificial intelligence) will increase, exponentially, the ability to calculate, analyze information or satellite images. In addition to civilian developments, AI military applications actually generate programs and projects with huge potential. Thus, used in the military and security fields, the role of AI is designed to improve, to prolong the possibilities of the human intellect, not to replace them. AI systems will integrate people and machines into a the partnership, which will lead to improved information gathering, processing and interpretation at higher parameters, improving the level of armies' efficiency, supporting decision-making processes and management of combat actions, but also to an exponential increase in the possibilities of virtual espionage, propaganda and the promotion of strategic interests through virtual tools[70].

Can we avoid the AI phenomenon in the debate on new national security legislation? How will we legally regulate Artificial Intelligence (AI) in general, and how will we define and frame AI in the list of national security risks? Where is the right balance between promoting and supporting AI for economic and social development, on the one hand, and the ability to prevent the use of AI as a weapon against the state, institutions, communities, or citizens, on the other?

Conclusions

The global security environment has changed a lot in recent decades. The general trend was marked by the emergence and development of unconventional, asymmetric and hybrid risks. Thus, the nature of war and aggression in general has changed. The war has not disappeared from the global geopolitical map. Only the forms of manifestation have diversified and become more sophisticated, making the most of the possibilities offered by technology. In the 21st century, a military aggression is no longer necessarily done with tanks, on the model of the 20th century. The aggressor can send a computer virus and the damage caused or the politico-military effect can be similar. If the owners of tanks (heavy military equipment) are relatively simple to establish, in the case of cyber-attacks the identity of the attacker is difficult to prove. Because the attacker usually uses proxy servers, proxy routers, anonymous VPNs.

An air attack is no longer necessarily done with airplanes or missiles, as they are clearly identifiable as belonging to a state entity. It can also be done with drones, whose cost is much lower and membership can be attributed to non-stable entities, of proxy type[71]. And the destruction produced should be just as great. If in the twentieth century states sent their special troops in various operations to attack strategic objectives, in the twenty-first century we have situations in which special troops operate without insignia ("green men" in Crimea and eastern Ukraine) or belong to private security companies, as it is the case in Syria[72], Libya[73] or in other areas of armed conflict[74].

Although the nature of the risks has changed, it is relevant to point out that the importance of classic risks remains high. More specifically, it is necessary for states to develop response and countermeasures for asymmetric and hybrid risks, but it is equally important to modernize their capabilities to counteract classic risks. It would be a great strategic mistake to minimize the importance of classic risks and threats. It would be wrong to invest exclusively in cyber defence, because at some point we might face tanks at the border. Therefore, the challenge for governments is to find a balance in the development of defence capabilities, between old and new, between classic and hybrid.

I tried to highlight the fact that the technological and geopolitical evolutions of the last decades have generated the need to modify the legislation in order to adapt it to the new realities. Recent history in the European and Euro-Atlantic area shows that changes in national security legislation have been made mainly in response to security incidents and terrorist attacks. It happened in the USA (Patriot Act adopted as a reaction to 9/11), France, Germany, Great Britain, Belgium. Basically, the legislative approach in this field was mainly reactive and not proactive.

In Romania we have not had significant security incidents in the last decades. For this reason, neither the public pressure to amend the legislation was high. There were initiatives and projects, but the successive political and electoral contexts were not likely to generate the completion of these legislative projects.

The main idea of this approach lies in the huge challenge that the Romanian Parliament has in the process of legally regulating the new security risks. The integrative concept will have to be the principle of Constitutionality, a principle that obviously represents the essence of any democracy. The need to prevent security risks and protect the lives of innocent citizens must in no way lead to over-regulation that generates abuse and oppressive behavior. History has shown us that the great dictatorial regimes based their existence and consolidation of power on ideologies presented as saving and liberating. It is just that practice was completely opposed to the theory and to the ideologies on which they were built.

The current approach aims to reveal these legislative challenges. Classic security risks remain a constant. It is just that governments have a long experience in dealing with them and parliaments have legislated these phenomena and there is legislative experience in this regard.

When addressing new security risks, legislative experience is extremely limited. We will have to innovate and produce definitions and legal frameworks for unregulated phenomena so far. Troll factories used by a hostile state entity as a weapon against our national interests, technologies that allow mass monitoring (software, applications, electronic bracelets, face recognition systems, etc.), cyber-attacks against critical infrastructures, self-radicalization in the virtual environment are some illustrative examples for the difficulty and complexity of this legislative approach.

As has been the case lately, the debate and adoption of new national security laws may be postponed sine die. In each parliamentary cycle, in the last decades, there were talks about the need to adopt new laws, but the approach remained strictly at the level of intention. It is very possible that in the context of the crisis generated by COVID-19 no one will take this step. Who assumes the legal regulation of the new security risks with all the legislative challenges set out above, especially in the electoral context?

It is possible to remain confined to the same paradigm of non-action. However, as time goes on, technological and geopolitical developments will generate processes and phenomena that are increasingly difficult to prevent and counteract based on legislative instruments developed 30 years ago. Outdated legislation is, intrinsically, a vulnerability.

We will evolve towards the SMART society as we adapt our legislation, mentalities and institutional practices to SMART challenges.

NOTES:

1 *L 51 /1991 – National security law*; *L 14/1992 – Law on the organization and functioning of SRI*; *L 1/1998 – Law on the organization and functioning of SIE*; *L 191/1998 – Law on the organization and functioning of SPP*; *L 92/1996 – Law on the organization and functioning of STS*; *L 535/2004 Law for preventing and combating terrorism*.

2 https://www.newmoney.ro/ce-tehnologii-de-supraveghere-folosesc-tarile-impotriva-coronavirusului-desi-o-parte-din-ele-afecteaza-anumite-drepturi-ale-omului/, accessed on 14.05.2020.

3 http://www.rador.ro/2020/05/28/parlamentul-frantei-a-votat-in-majoritate-pentru-aplicatia-stopcovid-pentru-telefoanele-mobile-smart/, accessed on 14.05.2020.

4 https://www.economica.net/elevii-de-gimnaziu-din-beijing-vor-purta-bra-ari-electronice-care-sa-trimita-avertizari-in-cazul-in-care-au-febra_184227.html, accessed on 14.07.2020.

5 https://adevarul.ro/international/in-lume/benjamin-netanyahu-vrea-cipuri-pielea-elevilor-expertii-securitate-cibernetica-opun-propunerii-1_5eb92e255163ec4271ab4810/index.html, accessed on 14.07.2020.

6 https://universul.net/tehnologii-infioratoare-invadeaza-europa-odata-cu-pandemia-analiza-bloomberg/,accessed on 14.07.2020.

7 *Ibidem.*

8 https://www.mediafax.ro/externe/politistii-cu-casti-de-supraveghere-ne-vor-identifica-si-ne-vor-lua-temperatura-din-mers-se-intampla-deja-in-china-dubai-si-italia-19144065, accessed on 14.07.2020.

9 https://www.mediafax.ro/externe/mossad-a-obtinut-10-milioane-de-masti-zeci-de-mii-de-teste-si-aparatura-medicala-din-surse-necunoscute-19031610, accessed on 18.07.2020.

10 https://www.jpost.com/israel-news/netanyahu-thanks-mossad-chief-for-purchasing-coronavirus-medical-gear-629161, accessed on 18.07.2020.

11 https://www.defenceromania.ro/serviciile-secrete-americane-i-israeliene-ar-fi-aflat-din-timp-de-coronavirus-us-army-neaga-raportul_602787.html, accessed on 18.07.2020.

12 The four great industrial revolutions (referred to in the literature−Industry 1.0 to Industry 4.0): mechanization, electrification, digitization, connectivity.

13 *Industry 5.0: Transforming the world into a SMART one.* The 5th Industrial Revolution will focus on the relationship between man and computer, the Internet of Things and smart grids.

14 Private armies, composed of mercenaries (usually former members of the special forces of the police, army, secret services) are a new way in which some governments want to achieve strategic goals without being officially involved in various conflicts; https://monitorulapararii.ro/fortele-hibride-mercenari-armate-private-1-21023, accessed on 18.07.2020.

15 https://www.capital.ro/vela-sa-fim-responsabili-sa-nu-credem-ca-virusul-nu-exista.html, accessed on 18.07.2020.

16 https://www.digi24.ro/stiri/actualitate/evenimente/un-elicopter-sovietic-care-zburase-clandestin-in-romania-a-fost-gasit-intamplator-la-patru-zile-de-la-prabusire-1128328, accessed on 18.07.2020.

17 https://www.eduapps.ro/aplicatii-educatie/classroom/, accessed on 18.07.2020.

18 https://www.wall-street.ro/articol/Turism/230215/10-orase-smart-din-lume-transformate-ireprosabil-de-tehnologie.html#gref, accessed on 18.07.2020.

19 https://economie.hotnews.ro/stiri-it-22098274-estonia-ajuns-atat-departe-digitalizarea-serviciilor-incat-poti-ajunge-doar-trei-ori-viata-semnezi-hartii-diversele-autoritati.htm, accessed on 18.07.2020.

20 https://monitorulapararii.ro/atacurile-cibernetice-permanent-in-umbra-conflictelor-din-orientul-mijlociu-1-28373, accessed on 18.07.2020.

21 *Ibidem*.

22 https://www.mediafax.ro/externe/atac-cibernetic-masiv-in-israel-exista-suspiciuni-ca-ar-fi-fost-lansat-de-iran-19163989, accessed on 18.07.2020.

23https://www.agerpres.ro/sci-tech/2016/02/12/atacul-cibernetic-ce-a-intrerupt-furnizarea-electricitatii-intr-o-regiune-a-ucrainei-a-fost-executat-din-rusia-17-06-10, accessed on 18.07.2020.

24 https://monitorulapararii.ro/pegasus-spionaj-prin-intermediul-telefonului-mobil-1-28477, accessed on 18.07.2020.

25 https://en.wikipedia.org/wiki/Pegasus_(spyware), accessed on 18.07.2020.

26 https://www.digi24.ro/stiri/sci-tech/lumea-digitala/spionii-israelieni-au-descoperit-ca-rusia-folosea-kaspersky-pentru-spionaj-809017, accessed on 18.07.2020.

27 https://universul.net/alerta-campanie-masiva-de-spionaj-prim-email-nume-de-mari-companii-folosite-ca-momeli/, accessed on 18.07.2020.

28 https://www.thelocal.de/20190927/germany-cracks-cyber-bunker-hosting-darknet-sites, accessed on 18.07.2020.

29 https://romanialibera.ro/international/justitia-belgiana-zadarniceste-propaganda-isis-prin-atacuri-cibernetice-815216

30 https://ro.wikipedia.org/wiki/Carlos_%C8%98acalul, accessed on 18.07.2020.

31 https://www.digi24.ro/stiri/externe/incident-de-natura-terorista-la-londra-un-barbat-a-injunghiat-mai-multe-persoane-pe-strada-1254062, accessed on 18.07.2020.

32 https://ro.wikipedia.org/wiki/Atentatul_de_la_Nisa_(2016), accessed on 18.07.2020.

33 https://stirileprotv.ro/stiri/international/autorul-atacului-de-la-pensacola-era-saudit-ce-a-publicat-acesta-pe-retele-sociale.html, accessed on 18.07.2020.

34 https://www.news.ro/externe/plan-atac-vizand-musulmani-dejucat-germania-tanar-arestat-dupa-s-laudat-internet-vrea-comita-atac-islamofob-cel-christchurch-zeelanda-arme-confiscate-domiciliul-suspectului-hildesheim-fisiere-192240520800202006121938490 2, accessed on 18.07.2020.

35 https://islamro.com/topic/618-daesh-public%C4%83-primul-num%C4%83r-al-unei-reviste-dedicate-securit%C4%83%C8%9Bii-cibernetice/?tab=comments#comment-975, accessed on 18.07.2020.

36 Titus Livius, *Istoria Romei de la întemeierea cetății – Enciclopedia înțelepciunii*, Editura Rossa, p. 108.

37 https://monitorulapararii.ro/epoca-razboaielor-dronelor-aeriene-s-a-instalat-definitiv-1-31794, accessed on 18.07.2020.

38 https://www.hotnews.ro/stiri-international-22877928-haos-aeroportul-gatwick-inchis-peste-17-ore-din-cauza-unor-drone-neidentificate.htm, accessed on 18.07.2020.

39 https://www.mediafax.ro/externe/atacuri-cu-drone-in-arabia-saudita-doua-instalatii-petroliere-sunt-afectate-de-incendii-masive-insurgentii-huthi-din-yemen-revendica-atentatele-video-18398347, accessed on 18.07.2020.

40 https://www.digi24.ro/stiri/externe/autoritatile-ii-ur maresc-cu-drona-pe-chinezi-si-ii-someaza-sa-poarte-masca-bunico-nu-te-mai-holba-du-te-si-spala-te-pe-maini-1254243, accessed on 21.07.2020.

41 On 26 June 2018, the Council adopted new proportionate and risk-based rules that will allow the EU aviation sector to grow and become more competitive. The new rules also apply to the registration threshold for drone operators: they should be registered if their drones can transfer a kinetic energy of more than 80 joules to the impact with a person, https://www.consilium.europa.eu/ro/policies/drones/, accessed on 21.07.2020.

42 http://legislatie.just.ro/Public/DetaliiDocument/223897, accessed on 21.07.2020.

43 https://www.g4media.ro/marea-britanie-acuza-rusia-ca-a-incercat-sa-se-amestece-in-alegerile-parlamentare-din-2019-achizitionand-ilegal-si-difuzand-online-documente-sensibile-referitoare-la-acordul-de-liber-schimb-cu-statel. html, accessed on 21.07.2020.

44 https://www.stiripesurse.ro/democratiile-occidentale-o-resursa-imensa-pentru-rusia-kremlinul-a-incercat-sa-intervina-si-in-referendumul-pentru-independenta-scotiei_1487574.html, accessed on 21.07.2020.

45 https://www.stiripesurse.ro/avertismentul-nsa-cu-privire-la-alegerile-americane-vom-actiona-atunci-cand-vom-vedea-ca-adversarii-nostri-incearca-sa-se-amestece_1487511.html, accessed on 21.07.2020.

https://www.stiripesurse.ro/serviciu-secret-detoneaza-bomba-china-rusia-si-iranul-incearca-sa-influenteze-rezultatul-alegerilor-din-sua_1488962.html, accessed on 21.07.2020.

46 https://www.euractiv.ro/extern/departamentul-justitiei-a-deschis-o-ancheta-penala-in-cazul-investigatiei-privind-ingerintele-ruse-16368, accessed on 21.07.2020.

4 https://www.stiripesurse.ro/democratiile-occidentale-o-resursa-imensa-pentru-rusia-kremlinul-a-incercat-sa-intervina-si-in-referendumul-pentru-independenta-scotiei_1487574.html, accessed on 21.07.2020.

48 https://www.caleaeuropeana.ro/duma-de-stat-a-rusiei-infiinteaza-o-comisie-de-ancheta-a-ingerintelor-externe-in-favoarea-protestelor-de-la-moscova/, accessed on 21.07.2020.

49 http://www.europarl.europa.eu/doceo/document/B-9-2019-0108_RO.html, accessed on 21.07.2020.

50 August 5, 2020, US Secretary of State: "The United States offers a reward of up to $ 10 million for information that allows the identification or location of any person who, acting on the orders or under the control of a foreign government, intervenes in the US elections", https://www.g4media.ro/mike-pompeo-sua-ofera-o-recompensa-de-10-milioane-de-dolari-pentru-arestarea-oricarei-persoane-care-intervine-in-alegerile-din-noiembrie.html, accessed on 21.07.2020.

51 https://www.digi24.ro/stiri/externe/ue/cum-a-influentat-cambridge-analytica-referendumul-privind-brexit-902773, accessed on 21.07.2020.

52 *Ibidem*.

53 https://www.imdb.com/title/tt8425058/, accessed on 21.07.2020.

54 https://ziaristii.com/au-prins-spionajul-rus-implicat-haosul-din-catalunya-si-destabilizarea-europei-serviciile-secrete-din-ue-confirma-mana-rusiei-actiuni-grave-pe-continent/, accessed on 21.07.2020.

55 Cognitive fluency and attitudinal change mechanisms, Andrei Holman, *Social Psychology*, Issue 10 / 2002, pp. 90-107.

56 http://www.viitorul.org/files/4392299_md_studiu_informa.pdf, accessed on 21.07.2020.

57 http://www.ziare.com/europa/moldova/alegeri-la-chisinau-fara-stat-de-drept-libertate-de-exprimare-si-

deschidere-catre-lume-nu-vom-avea-nici-integrare-europeana-nici-unire-cu-romania-interviu-1551002, accessed on 21.07.2020.

58 https://www.digi24.ro/stiri/externe/ue/document-rusia-desfasoara-o-semnificativa-campanie-de-dezinformare-in-ue-cu-privire-la-coronavirus-1277347, accessed on 21.07.2020.

59 https://www.state.gov/briefing-with-special-envoy-lea-gabrielle-global-engagement-center-on-disinformation-and-propaganda-related-to-covid-19/, accessed on 21.07.2020.

60 https://www.nytimes.com/2020/04/10/technology/coronavirus-5g-uk.html, accessed on 21.07.2020.

61 http://m.ziare.com/media/finlanda-incepe-lupta-cu-fake-news-din-scoala-primara-si-da-rezultate-1595955, accessed on 21.07.2020.

62 http://m.ziare.com/media/finlanda-incepe-lupta-cu-fake-news-din-scoala-primara-si-da-rezultate-1595955, accessed on 21.07.2020.

63 Industry 5.0 transforming the world into a Smart one. The 5th Industrial Revolution will focus on the relationship between man and machine.

64 https://www.ft.com/content/8b48f460-50af-11e9-9c76-bf4a0ce37d49, accessed on 21.07.2020.

65 https://www.mediafax.ro/economic/avertismentul-sua-in-legatura-cu-huawei-si-tehnologia-5g-ei-vor-doar-sa-fure-secrete-de-stat-18678540, accessed on 21.07.2020.

66 https://www.mediafax.ro/life-inedit/china-introduce-recunoasterea-faciala-obligatorie-pentru-utilizatorii-de-telefoane-mobile-18637109, accessed on 21.07.2020.

67 Fictional character, illustrating dictatorial, totalitarian tendencies, https://www.britannica.com/topic/Big-Brother-fictional-character, accessed on 21.07.2020.

68 George Orwell, *1984 Nineteen Eighty-Four*, Penguin Books Ltd, 1991.

69 https://libra.org/en-US/, accessed on 21.07.2020.

70 https://monitorulapararii.ro/inteligenta-artificiala-in-intelligence-si-nu-numai-1-28414, accessed on 21.07.2020.

71 https://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1701&context=jss, accessed on 21.07.2020.

72 https://monitorulapararii.ro/razboaiele-din-siria-si-afganistan-vor-fi-privatizate-1-11282, accessed on 21.07.2020.

73 https://www.digi24.ro/stiri/externe/mapamond/raport-onu-cum-lupta-armata-privata-a-lui-putin-in-libia-de-partea-fortelor-rebele-1303476, accessed on 21.07.2020.

74 https://www.g4media.ro/mercenarii-rusiei-ce-sunt-si-cum-actioneaza-micile-armate-private-comandate-de-moscova-cazul-wagner-sau-cum-a-decazut-cea-mai-mare-companie-rusa-de-securitate.html, accessed on 21.07.2020.

REFERENCES

Buzan Barry, *People State and Fears*, Brighton, Harvester Press, 1983.

Fox C. Amos, *Conflict and the Need for a Theory of Proxy Warfare*, https://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1701&context=jss

Fridman Ofer, Kabernik Vitaly, Pearce C. James, *Hybrid Conflicts and Information Warfare: New Labels, Old Politics*, 1st Edition, 2018.

Haacke Jürgen, *Asean's Diplomatic and Security Culture. Origins, development and prospects*, Antony Rowe Ltd., Chippenham, Wiltshire, Great Britain, 2003.

Hoffman G. Frank, *Conflict in the 21th Century: the Rise of the Hybrid Wars*, https://www.potomacinstitute.org/images/stories/publications/potomac_hybridwar_0108.pdf

Holman Andrei, "Cognitive fluency and attitudinal change mechanisms", *Social Psychology (Psihologia socială)*, Issue 10/2002, https://www.ceeol.com

Iancu N., Fortuna A., Barna C., Teodor M., *Countering Hybrid Threats: Lessons Learned from Ukraine* (NATO Science for Peace and Security), 2016.

Micossi Stefano, Tosato Gian Luigi, *The European Union in the 21st Century. Perspectives from the Lisbon Treaty*, Center for European Policy Studies, Brussels, 2009.

Orenstein A. Mitchell, *The Lands in Between: Russia vs. the West and the New Politics of Hybrid War*, 1st Edition, 2019.

Răducanu Gabriel, Anastasiei Traian, *Challenges To Global Security*, http://www.afahc.ro/ro/revista/2017_1/17-GabrielRaducanu,TraianAnastasiei.pdf

Dr. Russell W. Glenn, *Thoughts on "Hybrid" Conflict"*, https://smallwarsjournal.com/jrnl/art/thoughts-on-hybrid-conflict

Stowell Joshua, *What is Hybrid Warfare?*, https://globalsecurityreview.com/hybrid-and-non-linear-warfare-systematically-erases-the-divide-between-war-peace/

Titus Livius, *Istoria Romei de la întemeierea cetății – Enciclopedia înțelepciunii*, Editura Roossa, 2013, https://www.newmoney.ro/

http://www.rador.ro/

https://www.economica.net/

https://adevarul.ro/

https://universul.net/

https://www.defenceromania.ro

https://www.capital.ro/

https://www.eduapps.ro/

https://www.wall-street.ro/

https://www.agerpres.ro/
https://en.wikipedia.org/
https://www.thelocal.de/
https://romanialibera.ro/
https://www.news.ro/
https://islamro.com/
https://monitorulapararii.ro/
https://www.hotnews.ro/
https://www.mediafax.ro/
https://www.digi24.ro/
https://www.consilium.europa.eu/
http://legislatie.just.ro/
https://www.g4media.ro/
https://www.stiripesurse.ro/
https://www.euractiv.ro/
https://www.caleaeuropeana.ro/
http://www.europarl.europa.eu/
https://www.imdb.com/
https://ziaristii.com/
https://www.state.gov/
https://www.nytimes.com/
https://www.ft.com/
https://libra.org/en-US/

10.12753/2284-9378-20-33

ROMANIA'S PLACE AND ROLE ON COHEN'S MODEL OF COOPERATIVE SECURITY

Commander Valentin-Cătălin VLAD, PhD Candidate *

Romania's desire to secure its security guarantees at regional and international level has been permanently crystallized at conceptual and executive level through its national defence strategies, as well as through the sustained contribution the Romanian Armed Forces have had in the last two decades supporting UN, NATO or EU efforts for ensuring regional and international security and stability.

Consequently, Romania has joined the states that want not only to benefit, but also to actively contribute to ensuring international security within the framework defined by international treaties and conventions. In this regard she has steadily sought to calibrate its own strategies for defence on the conceptual footing of streamlining the process of international security, stability and prosperity in order to outline, secure, credit and legitimize its own position in this process, both regionally and internationally.

In the context defined by the presence of increasingly diverse challenges in the international security environment, Cohen's model might represent for Romania an opportunity to advance the idea of initiating and developing legitimate security communities through regional cooperation within the main Euro-Atlantic maritime basins, so as to streamline the process of ensuring international security.

Keywords: regional security; security communities; regional cooperation; regional stability.

Directly interested in improving regional and international security, Romania has affirmed and supported through its own national defence strategies and concepts, developed since joining the Partnership for Peace (1994), NATO (2004) and the European Union (2007), the intention to be an active part in the Euro-Atlantic and multinational efforts to streamline allied and international security.

In this manner, once inscribed on the orbit defined by the values and interests promoted by the Euro-Atlantic structures (NATO, EU), Romania has subscribed conceptual and actional to the allied or international collective security and defence commitments, building step by step a credible and legitimate profile, of a nation capable of fully honoring its security commitments at international level, and in this sense the last two national defence strategies are eloquent being developed under the mottos "A strong Romania in Europe and in the world" [1], respectively "Together, for a safe and prosperous Romania in a world marked by new challenges" [2].

Romania's actions have constantly gained relevance from the perspective of benefiting from collective security measures, but also of permanent contributor to international security and stability, especially after the events recorded in the Black Sea region in spring 2014 when Russia annexed Crimea.

Thus, aiming to intensify the security measures on the eastern Euro-Atlantic flank, the participations of the Romanian Armed Forces in allied or multinational operations and actions carried out in theaters of operations such as Afghanistan, Gulf of Aden, Iraq, Libya, Mediterranean Sea or Euro-Atlantic vital security environment, were completed for the first time in the history by permanently or temporarily hosting of allied command and control or collective defence capabilities on Romanian's soil or by assuming the command over the Group Permanent NATO Mine Action No. 2 (Standing NATO Mine Counter Measures Group 2 – SNMCMG.2) for the first semester of 2020.

Romania's commitment to Euro-Atlantic and international security

Unquestionably, the aggression shown by Russia since 2008 (Russian-Georgian conflict[3]) materialized with the incorporation and militarization of Crimea in 2014 has induced concern among the international and Euro-Atlantic community, including the three NATO allies in the Black Sea – Bulgaria, Romania and Turkey especially when the Russian military capabilities

** Romania's Navy Staff*
e-mail: *valentin.vlad@navy.ro*

were repositioned less than 250 nautical miles from the eastern Euro-Atlantic flank. At the same time, these actions led to a strong wave of solidarity and reinsurance of collective defence guarantees among the Alliance.

Intended not to escalate this tense situation in the Black Sea region, Allied solidarity has always manifested itself in full legitimacy and international credibility, materialized on the one hand by the immediate intensification of the Allied air, naval and ground regional presence and on the other by launching a strategic and operational planning process that has analyzed the regional security environment and set out the optimal course of action to strengthen Allied collective defence in full accordance with international security and stability.

Consequently, Romania's sustained efforts to Euro-Atlantic and international security and stability, undertaken since the Partnership for Peace phase of the early 1990s, have objectified in the largest security guarantees in Romania's history by the immediate deployment of air (American, British, Canadian, Italian, allied) and maritime (Standing NATO Maritime Group 2 – SNMG-2 and Standing NATO Mine Counter Measures Group 2 – SNMCMG-2) permanent capabilities in the Black Sea region and by integrating national capabilities into them, both in training and in Allied standing missions to ensure early warning and maintain the security of riparian allies.

Thus, in maritime terms, the dynamics of the deployments of the Standing Naval Groups in the Black Sea was accentuated to 2 - 3 regional activations a year, but in full consideration of the Montreux Convention[4] provisions (not more than 21 consecutive days and up to 30,000 tdw – deadweight), which has significantly contributed to maintaining a continued presence and a high level of international legitimacy and credibility for all specific NATO military actions in the Black Sea basin.

In terms of air support, the initial Allied deployment was also proportional to the situation created since 2014, being at a high level and supported by the rotational deployment of military fighter jets at Mihail Kogalniceanu and Câmpia Turzii Air Bases for NATO Air Police[5] missions, as well as by performing strategic, operational and tactical air surveillance and patrol missions with surveillance aircrafts (P3 Orion, P8 Poseidon) or AWACS of Canada, Italy, Great Britain, the United States of America or NATO.

The tailored Forward Presence (tFP[6]) of Allied Air and Maritime Forces on the Euro-Atlantic South-East side has been strengthened by the Assurance Measures (AM[7]) approved by the North Atlantic Council (NAC), which involved the deployment of the Multinational Brigade in Craiova, but especially the establishment for the first time Romania's territory of allied command, control and integration structures, such as the Multinational Division Command for the South-East (HQ MND SE) or the Integration Unit of Allied Forces (NFIU) in Bucharest.

Another important component of the Allied collective defence system hosted by Romania is represented by the Deveselu[8] NATO's Aegis Ashore Ballistic Missile Defence site, which became operational on May 12, 2016, as an integral part of the NATO Ballistic Missile Defence (BMD NATO).

Beneficiary of the measures of ensuring the allied collective defence, Romania proved to be equally a security provider by respecting all the collective security commitments assumed and consequently the Romanian Armed Forces continued to contribute significantly on air, sea and land to ongoing allied or multinational training/ exercises and operations in the Euro-Atlantic and international space, such as the Resolute Support Mission in Afghanistan (RSM), the Kosovo Peacekeeping Operation (KFOR), the Mediterranean Sea Guardian Operation (OSG), NATO activity to combat illegal migration from the Aegean Sea (AEG) or the NATO mission in Iraq (NMI).

In addition, in the first semester of 2020, Romania has consolidated its status as a credible security provider at NATO level by assuming, for the first time in history, the command of the Standing NATO Mine Counter Measures Group no. 2 (SNMCMG-2). Thus, the Romanian Naval Forces made available to the Alliance the commander and the core of the group's staff (14 Romanian officers and petty officers, 1 Spanish officer, 1 Turkish officer, 1 German officer), together with the commanding ship, the Minelayer "Vice Admiral Constantin Balescu" (274), on board which the group's command conducted its specific actions to

ensure the ability to fight and react immediately in the Euro-Atlantic maritime area (Black and Mediterranean Seas) within the restrictive tactical framework imposed by the symmetric and asymmetric threat level, but especially by the presence of the pandemic caused by the SARS-CoV-2 virus.

Romania's subscription on the Cohen's cooperative security model

Addressing the international community's concern for ensuring international stability and security Richard Cohen proposes a model on which security communities could be initiated and developed through regional cooperation in order to streamline the security process at the Euro-Atlantic and international level.

The model proposed by Cohen also known as *the four-rings model*[9] because it consists of four concentric rings that subscribe to international legitimacy and credibility by promoting individual security, collective security, collective defence and international stability as recognized and guaranteed by the provisions of the Charter of the United Nations[10] (Figure 1).

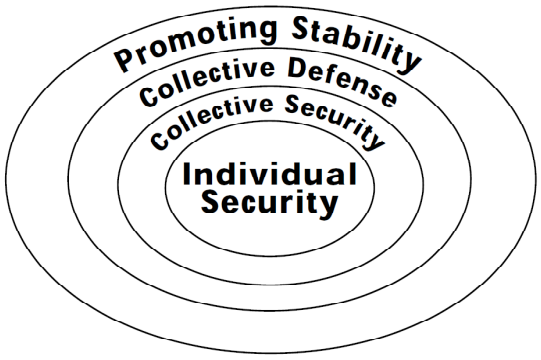


Figure 1 *The "four-ring model" of cooperative security*[11]

Individual security is at the core of the model and gives its legitimacy and credibility by promoting and guaranteeing fundamental human rights, *collective security* aims to maintain peace and stability of the area of common interest while *collective defence* allows collective action against external aggression and *promoting stability* to a security community and its vicinity completes the comprehensive approach to security issues through cooperation on political, economic, diplomatic or military coordinates.

Relying on the fact that its model promotes internationally recognized individual and collective rights, freedoms and obligations and intending to propose it as a platform for cooperative security communities, Cohen analyzed how the main international organizations – the UN, OSCE, EU, NATO, orbit the rings of individual and collective security, collective defence and the promotion of international stability, concluding that *"NATO is currently the only working model of Cooperative Security"* [12] due to the fact that the remaining three organizations do not comprehensively tackle the collective defence (Figure 2).

Noticing the viability of the model for calibrating security communities through international cooperation under the acceptance of Taylor's theory that a security community "needs to be small because its universality is impossible"[14], we might advance the idea of sizing security communities through cooperation at the regional level so that they find their effectiveness while considering and harmonizing regional values, needs, challenges and limitations with the international ones.

Romania's inclusion in the orbit of the four rings of the security model through cooperation is described first of all by Romania's unconditional availability towards regional and international cooperation[15] within the framework defined by international treaties, conventions and laws, secondly by the membership of all four international organizations, already framed by Cohen on the orbit of the model, and thirdly by full consideration for the freedoms, rights and individual and collective democratic values assumed, valued and promoted by the Romanian people and leadership.

At the same time, by placing the individual as focal point of its internal and external security approach, Romania fully subscribes to the core of the four rings model, and in this sense the latest national defence strategy views Romania as "the state that works for every citizen, having its institutions working for country development, for promoting and guaranteeing real democracy, citizen's rights and freedoms in order to ensure the development of society and the assertion of the country"[16].

Subscribing to regional cooperation initiatives such as *Bucharest 9 (B9)* [17] or the *Three Seas Initiative (3SI)*[18] only strengthens Romania's interest, credibility and responsibility to honor its commitments and to actively contribute to security through regional and international cooperation.

Conclusions

According to the last two national defence strategies and its active role within the initiatives, operations and actions carried out in the last three decades, Romania has affirmed and confirmed a firm intention and willingness to legitimately and credibly contribute to allied and multinational community efforts for Euro-Atlantic and international security, stability and prosperity.

The increasingly various challenges exposed to the international security environment denote the need for a continuous efficiency and adaptation of the process of ensuring international security, stability and prosperity in a responsible, cooperative and transparent approach.

The establishment of maritime security communities through regional cooperation within the main Euro-Atlantic sea basins based on Cohen's model could be a solution available to Romania in order to strengthen its role as a security provider for the Black Sea basin, within a more legitimate, credible and efficient wide international security process.

Therefore, the circumscription of Romania to all four rings, combined with the security guarantees given by the Euro-Atlantic membership, with the legitimacy and international conceptual and actionable credibility and especially with the intention and willingness to consolidate its position as a pole of stability in the Black Sea region[19], to honor its commitments and to actively contribute to international security, offers Romania the prospect of advancing Cohen's model for the initiation and development of security communities through cooperation within the main Euro-Atlantic maritime basins (Black Sea, Baltic Sea, Northern Sea, Mediterranean Sea, Atlantic Ocean, Arctic waters) in order to revitalize and streamline the international security process.

Institution	*Ring One: Individual Security*	*Ring Two: Collective Security*	*Ring Three: Collective Defense*	*Ring Four: Promoting Stability*
UN	Yes?	Yes?	No	Yes?
OSCE	Yes?	Yes?	No	Yes?
EU	Yes	Yes	No	Yes?
NATO	Yes	Yes	Yes	Yes

Figure 2 *Institutionalizing Cooperative Security*[13]

NOTES:

1 *Strategia Națională de Apărare a Țării pentru perioada 2015 - 2019*, Administrația Prezidențială, 2015, p. 1, https://www.presidency.ro/files/userfiles/Strategia_Nationala_de_Aparare_a_Tarii_1.pdf, accessed on 01.07.2020.

2 *Strategia Națională de Apărare a Țării pentru perioada 2020-2024*, Administrația Prezidențială, 2020, https://www.presidency.ro/files/userfiles/Documente/Strategia_Nationala_de_Aparare_a_Tarii_2020_2024.pdf, accessed on 07.07.2020.

3 Iulian Chifu, Monica Oproiu, Narciz Bălășoiu, *Războiul ruso-georgian*, Curtea Veche Publishing House, Bucharest, 2010, https://www.academia.edu/3624787/Razboiul_ruso_georgian, accessed on 05.07.2020.

4 *** *Convenția privind regimul strâmtorilor Mării Negre din 20.07.1936*, https://lege5.ro/Gratuit/g42dsnrw/conventia-privind-regimul-stramtorilor-marii-negre-din-20071936, accessed on 05.07.2020.

5 *Air policing: securing NATO airspace*, NATO, 16 May 2018, https://www.nato.int/cps/en/natohq/topics_132685.htm, accessed on 05.07.2020.

6 *** *NATO – Informații generale*, MAE, june 2020, https://www.mae.ro/node/5337, accessed on 05.07.2020.

7*** NATO Assurance Measures, SHAPE, 2020, https://shape.nato.int/nato-assurance-measures, accessed on 06.07.2020.

8 *** *Naval Support Facility Deveselu*, https://www.cnic.navy.mil/regions/cnreurafcent/installations/nsf_deveselu.html accessed on 06.07.2020.

9 R. Cohen, M. Mihalka, *Cooperative Security: New Horizons for International Order*, The Marshall Center Papers, No. 3, 2001, http://www.marshallcenter.org/MCPUBLICWEB/mcdocs/files/College/F_Publications/mcPapers/mc-paper_3-en.pdf, accessed on 3 decembrie 2017.

10 *UN Charter*, ONU, https://www.un.org/en/charter-united-nations/, accessed on 06.07.2020.
11 R. Cohen, M. Mihalka, *op.cit*., p. 10.
12 *Ibidem*, p. 16.
13 *Ibidem*, p. 15.
14 Michael Taylor, *Community, Anarchy, and Liberty,* Cambridge University Press, New York, 1982, pp. 167-168.
15 *** *Strategia Națională de Apărare a Țării pentru perioada 2020-2024*, *op.cit.* pp. 13, 21.
16 *Ibidem*, p. 4.
17 *** *Declarație comună a miniștrilor de externe din statele Formatului București 9 (B9)*, MAE, 2017, https://www.mae.ro/node/43571, accessed on 06.07.2020.
18 *3 Seas Initive Summit*, 2020, http://three-seas.eu/about/, accessed on 03.07.2020.
19 *Strategia Națională de Apărare a Țării pentru perioada 2020-2024*, pp. 5-7.

REFERENCES

*** AAP 6, *NATO Glossary Of Terms And Definitions* (English and French) Edition 2019, https://nso.nato.int/nso/ZPUBLIC/_BRANCHINFO/TERMINOLOGY_PUBLIC/NON-CLASSIFIED%20NATO%20GLOSSARIES/AAP-6.pdf

*** *A "comprehensive approach" to crises*, NATO, 2016, https://www.nato.int/cps/en/natolive/topics_51633.htm.

*** *A framework for enhanced international maritime security cooperation and awareness, CJOS COE, 2011*, http://cjoscoe.org/docs/MSA_Strategic_Framework_V1.0.pdf

*** *Air policing: securing NATO airspace*, NATO, 16 mai 2018, https://www.nato.int/cps/en/natohq/topics_132685.htm

*** *Allied Maritime Strategy – A theory for success?, Kiel International Seapower Symposium Conference Report*, 2018, https://www.kielseapowerseries.com/files/ispk/content/KISS18/KISS2018_final_Web.pdf

*** *Alliance Maritime Strategy*, NATO, 2011, https://www.nato.int/cps/ua/natohq/official_texts_75615.htm

*** *Convenția privind regimul strâmtorilor Mării Negre din 20.07.1936*, https://lege5.ro/Gratuit/g42dsnrw/conventia-privind-regimul-stramtorilor-marii-negre-din-20071936

*** *European Union Maritime Security Strategy*, EU, 2014, https://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2011205%202014%20INIT

*** *NATO Assurance Measures, SHAPE*, 2020, https://shape.nato.int/nato-assurance-measures

*** *NATO – Informații generale*, MAE, iunie 2020, https://www.mae.ro/node/5337

*** *Naval Support Facility Deveselu*, https://www.cnic.navy.mil/regions/cnreurafcent/installations/nsf_deveselu.html

*** NATO, https://www.nato.int/nato-welcome/index.html

*** *Strategia Națională de Apărare a Țării pentru perioada 2015 - 2019*, Administrația Prezidențială, 2015, https://www.presidency.ro/files/userfiles/Strategia_Nationala_de_Aparare_a_Tarii_1.pdf

*** *Strategia Națională de Apărare a Țării pentru perioada 2020-2024*, Administrația Prezidențială, 2020, https://www.presidency.ro/files/userfiles/Documente/Strategia_Nationala_de_Aparare_a_Tarii_2020_2024.pdf

*** *Tratatul Nord-Atlantic*, NATO, Washington DC, 1949, http://www.mae.ro/sites/default/files/file/pdf/TRATATUL%2520NORD-ATLANTIC.pdf

*** *UN Charter*, ONU, https://www.un.org/en/charter-united-nations/

*** *United Nations Convention on the Law of the Sea (UNCLOS)*, UN, 1982.

*** *3 Seas Initive Summit*, 2020, http://three-seas.eu/about/

*** *Declarație comună a miniștrilor de externe din statele Formatului București 9 (B9)*, MAE, 2017, https://www.mae.ro/node/43571

Adler E., Barnett M., *Security Communities*, Cambridge University Press, 1998.

Chifu Iulian, Oproiu Monica, Bălășoiu Narciz, *Războiul ruso-georgian*, Curtea Veche Publishing House, Bucharest, 2010, https://www.academia.edu/3624787/Razboiul_ruso_georgian

Cohen R., Mihalka M., "Cooperative Security: New Horizons for International Order", *The Marshall Center Papers*, No. 3, 2001, https://apps.dtic.mil/dtic/tr/fulltext/u2/a478928.pdf

Deutsch K.W. *et al*., *Political Community and the North Atlantic Area: International Organization in the Light of Historical Experience*, Princeton University Press, 1957.

Drent M., *The EU's Comprehensive Approach to Security: A Culture of Co-ordination?*, Studia Diplomatica, 2011, LXIV-2, https://www.

clingendael.org/sites/default/files/pdfs/20111000_sd_drent_approach.pdf

Feldt L., Dr. Roell P., Thiele R.D., "Maritime Security – Perspectives for a Comprehensive Approach", *ISPSW Strategy Series: Focus on Defence and International Security*, No. 222, 2013, https://www.files.ethz.ch/isn/162756/222_feldt_roell_thiele.pdf

Fransas A., Nieminen E., Salokorpi M., *Maritime Security and Security Measures – Mimic Study in the Baltic Sea Area*, Kymenlaakso University, Kotka, Finland, 2013.

Pirozzi N., *The EU's Comprehensive Apprroach to Crisis Management*, DCAF Brussels, EU Crisis Management Papers Series, june 2013.

Stohs J., Dr. Bruns S., "Maritime Security in the Eastern Mediterranean", *Kiel International Seapower Symposium 2017*, Kiel, 2017.

Taylor Michael, *Community, Anarchy, and Liberty*, Cambridge University Press, New York, 1982.

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-34

MILITARY POWER CENTERS WITH ACTIVE MANIFESTATION IN THE EASTERN EUROPEAN INSECURITY AREA

Lt.Col. Valentin PETRESCU, PhD Candidate*
Col. (ret) Prof. Ion BĂLĂCEANU, PhD**

The illegal annexation of the Crimean Peninsula, the support of Eastern Ukraine's instability and the Russian Federation's actions aimed at restoring the ex-Soviet sphere of influence, driving away Europe from the US, bring the Eastern European area to public attention and generate a resettlement of regional and global power centers. Within this context, the Eastern European region has become the site of direct and indirect confrontations between the world's dominant military power centers (NATO, USA and the Russian Federation), in order to achieve a stable balance of power in the Black Sea region.

Keywords: power centers; the Eastern European area; military power; stability; insecurity.

The Eastern European area, as part of the Euro-Atlantic area, is located in a "clash of civilizations" region, and represents a real mosaic of peoples, religions and cultures; from this point of view it has been, is and will be a region that gives rise to controversies among the great powers of the world. Therefore, it continues to this day "to be the scene of confrontation of the interests for control, access and major influences of the great world geopolitical actors, which give multipolarity to the international relations"[1].

The change of the communist regime in the countries located in this area has changed the existing balance of power and has led to a resettlement of regional and global centers of power. Moreover, the political environment has undergone important changes, most states moving from authoritarianism to democracy, and within this context, we have seen an increase in the influence of supranational entities and the emergence of competing centers of power, with active manifestation in the Eastern European's area of insecurity.

The Russian Federation – the main actor in the Eastern European arena

The Russian Federation, the largest country in the world, occupies an important place in the international arena due to its strategic position, on two continents, and due to the existence of important mineral and energy resources on its territory. Throughout its existence, Russia has been subjected to several attacks by the great powers of the time, and this might have caused the birth of the "fear of being conquered" and the need to have a safe space ensuring the necessary time to react.

The expansion of NATO and the European Union towards Eastern and South-Eastern Europe led to a series of negative reactions from the Russian Federation, which, with Vladimir Putin's coming to power, pursued an aggressive foreign policy towards the two major organizations, determined by Kremlin's strong desire of leadership to reaffirm its status as a world's superpower and to restore the sphere of influence that the former USSR had.

Although immediately after USSR's disintegration, the Russian Federation had a defensive position and a *soft power* behavior, due to problems mainly of an internal nature, later it switched to offensive actions and a *hard power* behavior, focusing politically and economically, on the ex-Soviet region. In very short time, the Russian Federation moved from a Western-oriented policy based on cooperation and the use of non-military tools to an anti-Western policy based on threats, involving the use of military power to achieve its international goals.

Understanding very well what military power represents for a state, the Russian Federation has been continuously concerned with the development

*"Carol I" National Defence University
e-mail: *valipetrescu23@yahoo.com*
**"Carol I" National Defence University
e-mail: *balaceanugion@yahoo.com*

of its military capabilities, being permanently in competition with its great rival and main ideological opponent – the USA. Thus, the Russian Federation focused on developing its intelligence, space and, last but not least, the nuclear component of its military power. Basically, today the Russian Federation is the second largest military power in the world[2] and has the largest arsenal of ballistic and cruise missiles in the world, which gives it the opportunity to project its military power anywhere in the world. Moreover, the Russian Federation has become one of the leading exporters in the field of defence (second in the world after the US[3]), supplying weapons and military equipment worldwide, but especially in the crisis outbreaks of the Middle East, the main market for the global level.

Russia's military actions over the past 20 years (the Second Chechen War, the Georgian War, the illegal annexation of Crimea and the destabilizing actions in Eastern Ukraine) reinforces the hypothesis that the Russian Federation intends to regain its sphere of influence and to become again one of the main actors at the table of international negotiations. They received a weak response from international organizations, which encouraged the Russian Federation to continue its actions in areas of strategic importance, some of which were specific to the Cold War period (unauthorized entry into the airspace of other states, military ships that monitors / accompanies ships of other states, etc.), and others from the sphere of asymmetric and / or hybrid warfare (cyberattacks, electoral interventions, fake news, etc.). By annexing the Crimean Peninsula and supporting instability in Eastern Ukraine, the Russian Federation challenges the existing world order and indirectly calls for the relocation of the world's dominant centers of power, including a privileged place for international decision-makers.

In most cases where the Russian Federation has carried out classical military actions, they have been accompanied or preceded by asymmetric/hybrid actions that are less visible and cannot be proven and amended by international law, which aimed to "destabilize the government and the opponent's main institutions, thus creating chaos and power vacuum"[4]. The successful use of hybrid operations in Ukraine has allowed Russia to expand its scope, carrying out a series of actions specific to the cyber, information, political and even economic warfare, aimed at NATO Eastern flank states, especially the Baltic countries. In addition, the use of the *hybrid war* model against NATO's Eastern flank states allows Russia to test Article 5 of the Alliance Treaty without starting a major conflict with it.

In addition to the military actions carried out, the Russian Federation has also undertaken a series of blackmail actions against European countries, being well known that most of them are dependent on the supply of Russian gas (the share of Russian gas represents over 40% of EU gas imports). Russia is using this dependency to destabilize Eastern European countries, offering significant price reductions to countries such as Bulgaria (a reduction of about 40%[5]) and facilities to countries such as Hungary, which will benefit from Russian gas through the Turkstream pipeline (pipeline bypassing Ukraine and Romania) since 2021.

Another step taken by the Russian Federation is to attract the great European powers (Germany and France) to its side, offering natural gas directly from Russia (NordStream 2 pipeline), by avoiding states such as Ukraine, Poland or Romania, which are in tense relations with Russia and which strictly follow the sanctions imposed by the European Union. Thus, by carrying out the NordStream 2 project, Germany will benefit from a double amount of Russian gas directly from the source, and in this context France will align itself in the policy of rapprochement with the Russian Federation (despite sanctions imposed on Russia, France continues to maintains a very good bilateral relationship, the two states having common interests). The proximity of the two major European powers to the Russian Federation threatens the existing stability at the level of the Alliance and the EU, especially since there are other states that have a positive attitude towards the Russian Federation (Hungary and Italy).

Through these actions, Russia seeks to destabilize the European security environment by dividing EU Member States into two categories: states that are in favor of maintaining sanctions imposed on the Russian Federation and states that are in favor of canceling them and resuming cooperation with Russia, especially because of the benefits received. The instability created allows Russia to continue its planned actions unhindered, in order to maintain control over the Eastern European operational environment and to influence the states bordering the Black Sea. In this context, disregarding NATO and EU warnings, Russia

continues to strengthen its military presence on its western flank, by deploying forces and means near the border of the Baltic countries, and conducting large-scale exercises in the mentioned regions of NATO vicinity, as well as by deploying high-performance weapons systems (some of them with nuclear capabilities) in the Crimea and the Kaliningrad region.

The referendum held in Russia from June 25th to July 1st, 2020, a referendum to amend the constitution, validated by the Central Electoral Commission of the Russian Federation, will allow the current president, Vladimir Putin, to continue running and remain in office until 2036[6]. This allows the Kremlin government, led by President Putin, to continue its expansionist policy and achieve its internationally set goals. In these circumstances, we believe that the states on the Eastern flank of NATO, the country under Soviet influence for many years, are in danger because the Russian Federation will continue to manifest itself at the whole geostrategic level, continuing to carry out various actions, from those specific to information and cyber warfare, to those of energy blackmail. Although a major military conflict between Russia and NATO is unlikely at this time, it should not be ruled out, and NATO-backed countries on the Eastern flank of the Alliance should prepare for such a scenario.

NATO and the USA – key role in maintaining Eastern European regional stability

Following the illegal annexation of the Crimean Peninsula by the Russian Federation, considered "the most important event on the European scene in recent times"[7] and the strongest action to challenge world order, NATO has moved to a series of measures aimed at limiting the destabilizing actions of the Russian Federation addressed to the Eastern European security environment and strengthening the Eastern flank. Thus, after the summit in Wales (2014) the decision was taken to strengthen the military power of the countries on the Eastern flank of NATO through a series of measures as follows:

- 4 (four) multinational fighting groups were set up in the Baltic countries and Poland, an area of strategic interest on the border with the Russian Federation;
- NATO's Rapid Response Force (NRF), a force created in 2003 (declared operational since 2006), was significantly increased in order to have an immediate response in the event of a collective defence crisis, from 13,000 to about 40,000 soldiers from all categories of forces existing within the Alliance[8];
- multinational command structures were established in Poland and Romania (army corps level in Poland and division level in Romania);
- a decision to create a Very High Readiness Joint Task Force (VJTF) was taken, "that would be able to deploy contingents within a few days of any challenge that might arise"[9];
- 8 NFIUs (NATO Force Integration Unit) were set up to facilitate the rapid preparation and deployment of VJTFs along the Eastern flank.

Two years later, amid growing tensions between NATO and Russia, at the summit in Poland, new measures were taken to strengthen the Eastern flank by increasing the military presence in the area (increasing the number of air, naval and ground forces present in the Eastern flank, which also included the deployment of four battalions in the Baltic countries and Poland, as well as intensification of multinational exercises in the Eastern European space) and by operationalizing the missile defence system, initially developed by the US and later handed over under NATO command. Moreover, NATO imposed other additional measures, of which the Air Police Combat Service is of particular importance, designed to detect, track and identify all Russian Federation aircraft that repeatedly violate NATO airspace.

Another collective defence capability developed by NATO, as a result of the hybrid/asymmetric actions carried out by the Russian Federation in the Eastern European region, is cyber defence. This has become a priority for the Alliance and for most states on the Eastern flank that do not want to follow the example of Estonia (2007), when the banking and public emergency system was paralyzed, or Georgia (2008), when the communications system was paralyzed and the Georgian army no longer had the capacity to react, thus allowing Russian troops to invade the country. In addition, the cyber-attacks launched on Ukraine (2014) demonstrated the military nature of these actions, by involving specialized military units, which carried out offensive actions resulting in "temporary or permanent effects, decommissioning of capabilities, degradation or

blocking the functionality or access of opponents to information stored in their own systems"[10].

NATO does not want such episodes to be repeated with any of its member states and therefore invests heavily in the creation and development of military structures, which in cooperation with the private sector companies in the field, will be able to counter these attacks/threats. In the near future, we will certainly discuss the operationalization of NATO cyberspace, the synchronization and coordination of cyber actions with traditional military operations and their integration into the planning and decision-making process.

NATO is currently making considerable efforts to achieve a credible defence that involves an effective combination of an allied presence on the Eastern flank and an increase in the military power of the states in the area. These NATO efforts are also supported by the EU, an economic and political organization that has imposed a series of economic sanctions on the Russian Federation, sanctions that were intended to be a peaceful way to resolve differences between Russia and the West, but which did not determine the Russian Federation to abandon its expansionist plans and its intention to move Europe away from the US, which would allow it to have a greater political, economic and military influence over Eastern Europe and even Central Europe.

However, NATO remains open to dialogue with the Russian Federation, through the NATO-Russia Council (NRC), the dialogue between the two major military powers being considered the optimal solution at this time to resolve any differences and ensure a climate of stability in Eastern Europe. The two centers of military power must find solutions to avoid escalating existing tensions and create a stable security environment in the Eastern part of the European continent.

NATO's efforts to strengthen the Eastern flank have been complemented by US initiatives to make Europe a reliable partner in its foreign policy. Through *the European Reinsurance Initiative*[11] and later through *the European Deterrence Initiative (EDI)*[12], the US has deployed an impressive number of forces and means across Europe to strengthen the defence of allied and partner states on the Eastern flank of NATO. The presence of American forces on the European continent is a guarantee of security and stability in this area, the US being the largest military power in the world, the only one able to deal with a military conflict against the Russian Federation.

The US commitment to maintaining stability on the European continent is very serious. In addition to ensuring a permanent presence in Europe (rotating system, approximately 9,904 US troops[13]), the US intends to invest in existing infrastructure in countries on the Eastern flank of NATO, allocating large sums for the modernization of air bases and training centers in the area. Of the approximately $ 264 million planned for 2021[14], a significant amount (approximately $ 130.5 million) is earmarked for the modernization of the air base at Câmpia Turzii (Cluj County), a base that is planned to become "a key point for US military air force operations in South-Eastern Europe"[15] and a hub for Allied forces in the Black Sea region. Moreover, the USA intends to deploy on this basis a number of unmanned fighter jets / drones of the MQ-9 Reaper type, intended mainly for research and surveillance missions, but with the possibility of being used for ground operations (the MQ-9 Reaper drone was used for the "Soleimani" operation, in which AGM-114 Hellfire air-to-ground missiles were launched).

The strategic partnerships concluded by the USA and the first two major military powers on the Eastern flank of NATO, Poland and Romania, strengthen the US commitment to security and stability in the area, as well as the US concern for increasing the military power of the two states on the Eastern flank which through the promoted foreign policy, represent two "outposts" against the Russian Federation's "divide and conquer" type policy.

By ensuring a balanced presence on the Eastern flank, the US and NATO maintain their 2014 commitment to discourage potential risk factors for the Eastern European security environment and to stop the hegemonic ambitions of Russian President Vladimir Putin. The actions of the two major centers of military power are primarily aimed at continuously discouraging the Russian threat and defending against Russian neo-expansionism. Within this context, collective defence is and will remain the mainstay of the Alliance, with NATO's Eastern flanking states continuing to receive support and assistance to ensure a strong and stable flank, able to meet future challenges from destabilizing and expansionist powers.

The Eastern European countries part of NATO and EU, which are the first line of defence in the event of an attack by the Russian Federation or other Middle Eastern states, are making considerable efforts to increase their military power, increase defence funds/spending and deploy extensive programs for modernization and endowment of the armed forces. Achieving modern military capabilities is a major challenge for NATO's Eastern flank countries, most of which are developing countries with a modest economic and military force, but which are aware of the danger coming from the East.

In conclusion, both the US and NATO will continue to act, by all available means, to maintain a climate of peace and stability in the European region and to reconfigure the balance of power in the Eastern European insecurity area. It is obvious that the countries on the Eastern flank of NATO will not be able to cope alone with an aggression from the Russian Federation, without the support of NATO and the great European powers. In addition, without a substantial US commitment to Europe, in return for Russia's aggressive intentions, the situation could at any time escalate into a major regional conflict that would have a direct impact on NATO member states on its Eastern flank.

NOTES:

1 Florin-Eduard Grosaru, *Europa de Sud-Est complexul regional de securitate european în care se perpetuează conflicte înghețate*, Technical and Editorial Center Publishing House of the Romanian Army, Bucharest, 2013, p. 12.

2 https://www.globalfirepower.com/countries-listing.asp, accessed on 12.07.2020.

3 https://www.sipri.org/databases/financial-value-global-arms-trade, accessed on 12.07.2020.

4 Marius Moldovan, Ion Bălăceanu, *Reconfigurarea balanței de putere militară în zona estică de interes strategic a României,* "Carol I" National Defence University Publishing House, Bucharest, 2018, p. 144.

5 https://financialintelligence.ro/bulgaria-obtine-o-reducere-de-40-a-pretului-gazelor-naturale-importate-din-rusia, accessed on 12.07.2020.

6 https://www.forbes.ro/referendum-rusia-vladimir-putin-ramane-la-kremlin-pana-2036-172802, accessed on 12.07.2020.

7 Marius Moldovan, Ion Bălăceanu, *op.cit.*, p. 93.

8 https://www.agerpres.ro/documentare/2018/10/15/documentar-forta-de-reactie-rapida-a-nato-15-ani-de-la-infiintare--191841, accessed on 13.07.2020.

9 *Ibidem*.

10 Bogdan Dumitrescu, *Operaționalizarea spațiului cibernetic – de la securitate cibernetică la succes operațional,* Romanian Military Thoughts Magazine, no. 1, Romanian Military General Staff, 2019, p. 61.

11 https://ro.usembassy.gov/ro/eucom-anunta-planul-de-implementare-initiativei-de-reasigurare -europeana, accessed on 14.07.2020.

12 https://en.wikipedia.org/wiki/European_Deterrence_Initiative, accessed on 14.07.2020.

13 https://fas.org/sgp/crs/natsec/IF10946.pdf, accessed on 14.07.2020.

14 *Ibidem.*

15 https://www.g4media.ro/document-armata-sua-vrea-sa-transforme-baza-de-la-campia-turzii-in-hub-nato-la-marea-neagra-cu-o-investitie-uriasa-de-130-de-milioane-de-dolari-in-2021.html, accessed on 15.07.2020.

REFERENCES

Grosaru Florin-Eduard, *Europa de Sud-Est complexul regional de securitate european în care se perpetuează conflicte înghețate,* Technical and Editorial Center Publishing House of the Romanian Army, Bucharest, 2013.

Dumitrescu Bogdan, *Operaționalizarea spațiului cibernetic – de la securitate cibernetică la succes operațional,* Romanian Military Thoughts Magazine, no. 1, Romanian Military General Staff, 2019.

Moldovan Marius, Bălăceanu Ion, *Reconfigurarea balanței de putere militară în zona estică de interes strategic a României*, "Carol I" National Defence University Publishing House, Bucharest, 2018.

Postolache Mihaela, *Echilibrul de putere și mediul de securitate din regiunea extinsă a Mării Negre la începutul secolului XXI, Echilibrul de putere și mediul de securitate*, "Carol I" National Defence University Publishing House, Bucharest, 2011.

Roman Daniel, Nicolaescu Constantin, *Mediul de securitate actual-realități și perspective*, Bulletin of "Carol I" National Defence University, December, Bucharest, 2017.

https://www.globalfirepower.com

http://www.nato.int

https://www.agerpres.ro

https://www.forbes.ro

https://financialintelligence.ro

10.12753/2284-9378-20-35

ASPECTS REGARDING THE USE OF ACTIVE SENSORS IN SURVEILLANCE MISSIONS

Col. Adv.Instr. Pătru PÎRJOL, PhD*

Recent military conflicts have highlighted the importance of understanding the battlefield in order to maintain the initiative of organic forces while conducting combat operations. Active sensors placed on space and airborne platforms ensure ground surveillance and provide information for drafting the real images of the areas under surveillance. Information from active sensors represents the support for the decision-making processes and combat actions for all forces so that the enemy will be neutralized.

Active sensors are used by civilian actors to understand the processes and the natural phenomena on our planet, to determine their impact on human society, to identify and monitor the natural and manmade changes on the environment as well as to monitor the impact of human activity on the environment.

Keywords: air surveillance; radar; active sensors; syntetic aperture radar; inverse syntetic aperture radar; air threats; air surveillance systems.

In 1904 the German Federal Bureau of Inventions and Innovations issued the patent nr.165 546/1904 to the engineer Christian Hülsmeyer from Düsseldorf for the practical method publicly demonstrated in 1904 at Köln regarding the detection of metal objects placed at a distance with the use of electric waves (electromagnetic). The patent did not produce immediate impact, on the one hand, due to the lack of technical support for the development of equipment to detect metal bodies from a distance and, on the other hand, because the importance and the role it was meant to play in the development and modernization of human society was not foreseen by the intellectual elite from the early 20th century[1].

The First World War marked the beginning of the confrontations in the air environment, the aircraft being confirmed as the main combat means to gain control over the airspace in the theater of operations. In order to meet this goal, technical innovations transformed the aircraft into an effective combat means, capable of destroying the enemy's combat formations in the depth of the battlefield. More than that, the possibility to get undetected in the adversary's territory and attack his economic targets, which were relevant due to their military potential, resulted in the identification of technical and managerial solutions to ensure the discovery of air assets so that their minimal measuring range provided the necessary time for the protection of the targeted objective.

The technical support from that period was not sufficient to build the radar. The technology used for the detection of aircraft consisted of passive, optical and acoustical, surveillance means which were the only means capable of providing information for the conduct of air defence operations against air attacks. Together with the aforementioned technical innovations, new concrete measures were implemented in order to create specialized structures to ensure the organizational framework needed to conduct activities to localize and identify air means, called *air surveillance and warning structures*. Basically, the air surveillance systems built by conflicting state where created based on similar concepts which involved the concentration of effort in the area of operations while in the depth of the territory surveillance was performed on the possible enemy lines of attack in order to protect objectives that were important to the war effort. The impact of the air surveillance system was demonstrated soon by the increase in the number of aircraft lost by the belligerent states compared to the same period before its use[2].

The period between the wars was characterized by advancement in the scientific and technological field which led to the development of transmitters that were powerful enough to ensure the detection of metal bodies at great distances with the help

***"Carol I" National Defence University**
e-mail: *petpirjol@gmail.com*

of electromagnetic waves. This technological breakthrough resulted in the building of radar and of air surveillance systems meant to detect better the air attack means of the enemy.

The Second World War confirmed the importance of radar in air defence, underlining its role in the airspace to provide data for conducting air missions. Permanent surveillance of the airspace led to the discovery and sound identification of threats by both adversaries according to the way in which combat was performed, thus giving them the necessary time to identify a response method and counteract the air enemy.

The end of the Second World War triggered the harsh competition between the two military powers, the USA and the USSR, to develop air surveillance systems to correspond in terms of their possibilities of detection to the evolution of the aircraft. At the same time, air surveillance systems were designed as the main element of a more complex system, meant to counteract the main threat to the air environment represented by ballistic and cruise missiles, and were created as the main source of information to meet this purpose. The diversity of threats from the airspace resulted in intensified scientific research to identify and develop new radar technology to ensure detection, that was superior to the currently used radars, as well as to identify new scientific principles and methods to detect threats in the air, land and maritime environment. A product of this research is remote sensing, which represents "a number of technologies used to analyze from a distance data regarding objects or phenomena"[3], from the earth or the outer space. Remote sensing as a method of detection can be passive or active.

Passive remote sensing uses a large variety of passive sensors meant to collect, analyze and process the electromagnetic waves generated by natural or artificial sources, which are picked up directly or reflected by an object on the ground and which contribute to shaping its image after their processing.

Active remote sensing uses specialized equipment meant to detect objects and phenomena with the help of electromagnetic waves generated artificially. These electromagnetic waves are reflected by the detected bodies and phenomena, the data obtained, and the images created with their help being based on physical applications and methods that are different to the ones of passive remote sensing. The specialized equipment used in remote sensing are the radar and the lidar. Regardless of the equipment used to artificially generate electromagnetic waves, the data obtained are processed and analyzed from in terms of their quantity and quality, thus obtaining the accurate image of the objects and phenomena under surveillance.

Surveillance through remote sensing is performed by passive and active sensors mounted on space, land or sea platforms, and the information obtained from them contributes to shaping the real image of the objects and phenomena in order to identify them rapidly. In this respect, in order to obtain an objective and clear representation of the elements from the area of interest sensors have to be placed at a certain altitude from the object in question, an important role being thus paid by space and airborne platforms which can fulfill this requirement.

The Cold War, that started after the Second World War between the two military powers, the arms race between the USA and the USSR, the accelerated development of nuclear capabilities and of their air carriers (ballistic missiles, cruise missiles, aircraft) led to the increased preoccupation of these states to create space surveillance systems. These preoccupations materialized in research and development programs to build space platforms (satellites, space shuttles, space station, etc.) to be used in surveillance and early warning missions. The possibility to use remote sensing sensors onboard space platforms for civilian purposes to detect phenomena, calamities or natural/ or man-made disasters, and to monitor them and determine their impact on the population from the area they affect, contributed to accelerating the development of space programs. Amongst the platforms that developed rapidly there is the satellite which carry surveillance sensors onboard. Relevant satellite development programs are the following: *Landsat program* (developed by the United States), *IRS program* (developed by India), *SPOT program* (developed by France), *ERS program* (European Union), *COSMOS program* (developed by the former URSS and continued by the Russian Federation).

Another category of platforms that ensure, the same as the space ones, the surveillance of large

areas with no influence from the local landscape are the airborne ones. Airborne platforms used to this end are the following: aircraft, helicopters, airships and UAVs.

The sensors mounted on airborne or space platforms have similar technical characteristics, the differences being represented by the additions imposed by the environment in which they function, respectively the air or space one. Surveillance sensors onboard these platforms will use active and passive remote sensing to obtain data about objects and phenomena from the earth's surface. In this article, we will present the characteristics and importance of sensors with active remote sensing, stressing the importance of information provided by the sensors for shaping the real image of the area of interest.

Conflicts in the last decades have pointed out the role of the air forces in conducting military actions and in reaching the end state of war. Fulfilling the missions of the air force involves the synergetic actions of military structures which have had a major impact on the way in which military actions are conducted on the battlefield. The conclusions drawn from the analysis of these conflicts has convinced the military powers of this century that it is necessary to develop and implement new technologies to achieve air force superiority over a potential enemy. In this respect, air forces will be provided with weapons systems with highly disruptive potential, with powerful impact on the conduct of violent military actions[4].

These conflicts have highlighted the importance of sensor networks used to discover threats and provide information for their neutralization. Scientific and technological evolution has created the framework for building sophisticated networks capable of meeting the superior requirements of surveillance, while also being adapted to the modern battlefield. In the case of the air force, the complexity of the battlefield led to the integration of sensors in a unique system capable to provide the permanent surveillance of the airspace. The importance of this system is highlighted by its position of information provider regarding the threats detected in the airspace. This influence on military actions will contribute in the future to establishing the identification as an important factor in building the air power of a state. The role of the system of sensors was mentioned by the American general Harry H. Arnold who stated that "the first essential of the airpower necessary for our national security is preeminence in research"[5].

The technological evolution of the air attack means of the enemy will impose as a necessity to adapt the air surveillance system to the new requirements of the operational environment. Improving the air surveillance system involves structural dynamics which is meant to reduce the impact generated by the development of the enemy's air attack means. At the same time, research and development efforts have to be made to create sensor systems with superior technological characteristics to allow the detection, tracking and identification of enemy's the air means. Among these sensors, an important role is played by the radar as the main means of airspace surveillance. The data provided by the system are transmitted to the processing centers where, after their analysis, they will build the real image of the airspace in the area of interest. Surveillance possibilities are dependent on the technical and tactical characteristics of radars and on the independent technological aspects such as the characteristics of the landscape in the area where the radar is located, placement towards the surveilled area and the type of platform on which they are mounted. From its creation, the radar has been the technical means with which the world states built surveillance and early warning systems capable to detect threats to national security in the airspace.

The advancement in science and technology contributed to this leapfrog in radar building. The diversity of detection means made them to be used in a number of military and civilian fields, which were difficult to anticipate even by the scientists and engineers that had built these systems. The number of radar applications for the civilian area resulted in its use in remote sensing. The radar for civilian applications, respectively remote sensing, uses wavelength that correspond to the microwaves because they propagate better in the atmosphere regardless of the existing conditions. In this field, the radar is used to obtain the images of the terrain as a result of the bodies on the ground surface reflecting electromagnetic waves, results which are used to create the maps, plans, or the images of the area under surveillance.

In this paper, we will approach the active sensors used in remote sensing and we will present

their military and scientific importance. Active sensors can be grouped in the following categories: real aperture radars (side-looking airborne radars, scatterometres, altimeters, weather radars) and synthetic aperture radars[6]. Among the active sensors used in remote sensing we will discuss the side-looking airborne radar and the synthetic aperture radar.

Side-looking airborne radar, SLAR[7], is an active sensor mounted on airborne platforms. Aircraft has under its fuselage a fixed, long and thin antenna, which emits beams of electromagnetic waves side looking the direction of flight, scanning the earth's surface through the linear movement of the aircraft that carries it.

The first radars for ground surveillance used to scan the earth's surface by rotating the antenna, but the resolution of the images obtained as such was poor because of the limitations imposed by the constructions of the antennas. SLAR contributed to eliminating the aforementioned limitations, thus obtaining images of earth's surface with finer resolution. Until the 7th decade of the last century, the advancement in technology permitted the building of SLARS which functioned at 35 GHz and demonstrated, through the quality of the images provided, the potential of this sensor as an instrument of Earth observation[8].

The use of radars on space-based platforms was first intended to facilitate the docking of space ships at space stations and laboratories under safety conditions. Later on, radars were used on scientific missions (the study of Titan, of planet Venus, observations of earth's surface, etc.), but also for military purposes as a provider of high-resolution images.

SLAR provides a narrow directive characteristic, horizontally and a large one, vertically, which creates the image through the airplane movement, the illumination time length of the earth's surface depending on the speed of the airborne platform, the distance between the radar and the illuminated object and the width of the diagram on the horizontal axis.

Images provided by SLAR are obtained through an impulse of electromagnetic energy directed towards the earth's surface, which is illuminated under an oblique angle, thus allowing the clear visualization of objects or different structures or geological formations, in comparison to the images obtained from conventional aerial photos or the images obtained with the sensors onboard satellites. The recording of data provided by SLAR was performed differently according to the technological possibility that existed at a certain moment; so, initially, data was recorded on film with the help of cathodic tubes, later on, with the advancement in digital means, the recording was performed digitally, data being stored after having been transformed into digital data with the help of an analogue-digital converter.

Resolution of SLAR depends on the length of the impulse emitted and on the width of the directivity diaphragm of the radar. The length of the impulse determines the spatial resolution of SLAR (the ability to separate the pixels of the image perpendicular to the direction of flight) in the direction of its propagation. The capacity to detect the ground objects is influenced by the length of the impulse and the value of the incidence angle, the images with good resolution being conditioned by the generation of short length impulses. The resolution on the azimuth is determined by the width of the directivity diagram on horizontal axis, by the height at which the airport platform is located and by the physical dimensions of the antenna. In order to obtain very good azimuthal resolution, the antenna has to be of large dimensions, so it is necessary to compromise the dimensions and the height at which the airborne platform is located in order to obtain detailed images of the earth's surface illuminated by the radar. The large dimensions of antennas make them unusable onboard space platforms due to the high cost of launching them into space, so, in this case, the synthetic aperture radars are preferred because they need a smaller antenna in order to obtain a better resolution on azimuth.

The active sensors which use microwaves for detection, illuminating the area of interest using diaphragms with synthetic aperture, can be divided as follows[9]:

- synthetic aperture radars (SAR[10]);
- inverse synthetic aperture radars (ISAR[11]);
- interferometric synthetic aperture radars (InSAR[12]).

The synthetic aperture radar is a type of SLAR, actually its technological development, which is designed to generate maps or images of the areas on the earth's surface illuminated by the

electromagnetic beam emitted by it. The synthetic aperture improves the resolution on azimuth of the radar and compared to SLAR this resolution would correspond to a larger antenna.

The concept of synthetic aperture radar was introduced in 1951 by Carl Wiley, for the Goodyear company from the United States, and it represented a significant advancement in radar technology. In Europe, the first studies were conducted in France in 1960 while the first experimental flight took place in 1964[13].

The use of SAR into the outer space began in 1978 when on 26th July NASA launched the SEASAT satellite which had onboard an L-band SAR. The first Soviet S-band SAR was placed on KOSMOS 1870 satellite on 25th July 1987 and in 1991, 16th July, the first European remote sensing satellite ERS-1 was put into orbit having a C-band SAR onboard[14].

SAR represents a coherent radar system placed on airborne platforms which uses the flight of the platform to simulate a large antenna in order to obtain high resolution images. From the elements presented above we can deduce the advantage offered by SAR in terms of high-resolution images, but also its dependency on the platform trajectory, meaning that it is mandatory to keep straight trajectory and constant speed during the whole surveillance period of time.

Mounting a SAR onboard space platforms and its operation in orbit involves great expenses. The benefits offered by SAR on a space platform and the fine quality of images it provides justify these costs. This type of SAR has the following advantages compared to other categories of sensors mounted on space platforms:

- possibility of surveillance and detection under any weather conditions;
- possibility of surveillance and detection at night;
- possibility of detection of certain phenomena that cannot be detected with other categories of sensors;
- global coverage, repeated according to the flight parameters of space platforms;
- possibilities of long-term surveillance of the areas of interest[15].

In the last decades, the progress of SAR building technology regarding radar electronics and the digital processing of data has contributed to improving the performance of these surveillance systems. SAR's high potential made it to be used on numerous remote sensing military and civilian missions thus ensuring the collection of high-resolution data in areas that are difficult to observe with the use of other sensors. An example, in this respect, is the German satellite TerraSAR[16] and the Italian satellite COSMOS SkyMed Second Generation[17] which have on board SAR with a minimum resolution of 0.25 m and respectively of 0.8 m according to the dimensions of the area under surveillance.

The civilian surveillance missions which use SAR are the following: oceanography, hydrology, weather changes, seismology, agriculture and forestation, urban areas, etc.

The inverse synthetic aperture radar is a version of SAR which detects targets from the area of interest without the movement of the radar, this having a fixed position, while the synthetic aperture of the radar is created by the movement of the target. ISAR possesses the advantage of permanently maintaining under surveillance a certain area of interest so it is used from the operational point of view to detect vessels, aircraft and space objects[18].

ISAR can be used to complete the image data provided by other sensors such as passive optical sensors or active systems based on the detection with the use of laser in case of bad weather conditions which may influence their possibilities of detection.

ISAR's are used frequently onboard aircraft which execute marine patrol missions to provide high quality images which allowed them to detect maritime vessels, military or civilian aircraft, missiles, while other radars provide only data about these objects without being able to identify them.

On space missions ISAR is used to provide images of the asteroids from the solar system giving the scientific community precious information on their shape and trajectory.

The interferometric synthetic aperture radar was developed by Jet Propulsion Laboratory to detect ocean streams or moving targets.

Later developments of radar made it possible to determine the height, so it was used for the precise measurement of different landscapes. Interferometric synthetic aperture radar has two antennas that receive the reflected electromagnetic impulses which combine the changes that appear

with greater precision. Radar interferometry measures the differences of phase between two radar echoes associated with the same image pixel, but measured by two different systems along different directions with the two antennas onboard the surveillance platform. In other words, SAR interferometry is based on a combination of two SAR images of the same area or target obtained from slightly different points, thus resulting a new image called interferogram.

The positioning of antennas on the carrier platforms is performed according to the missions they have to fulfill, so for detection and analysis of movement targets the, InSAR antennas are positioned horizontally on the carrier platform along a line that is parallel to the ground so that the echo signal from a Moving Target is different from the one received from a fixed target. Antennas mounted vertically on the carrier platform receive echo signals reflected by a target, so InSAR is used in this configuration to determine the height of the terrain from the illuminated area. In practice, there are two constructive variants of InSAR, respectively with two antennas on the same platform or with just only one.

InSAR with one antenna onboard the carrier platform has a simple configuration, but the creation of the image using interferometry involves passing twice over the area under surveillance. In order to obtain a precise image of the area one must know with great precision the position of the antenna to be able to overlap the images obtained after two fly-bys. It can be inferred that a major problem of this type of InSAR is wind velocity which can modify the platform's trajectory (if there is an airborne platform) and implicitly the image of the area under the radar surveillance[19].

InSAR with two antennas onboard the carrier platform is a more costly configuration due to the two antennas, two receiver channels and the two sets of analogue-digital converters. Obtaining the image of the scene through interferometry is a simple task, at one fly-by, because the two images that have to be overlapped are obtained by the simultaneous collection of data and the real time processing[20].

InSAR has a multitude of civilian and military applications because the information provided results in precise images of the areas under surveillance. Among the civilian applications that use this type of radar we should mention first the space ones of mapping the planets which are in Earth's proximity, even if later on this activity was extended to our planet as well. The data obtained in case of the Earth are used to detect the movements of the ground due to earthquakes, in the study of volcanoes to determine the changes of the earth's crust associated with volcanic eruptions, changes in the distribution of magma, monitoring landscape, monitoring the glacier structure, changes in ice dynamics, monitoring the highways, railways, elements that are specific to urban development, etc. In the military field, an important role is played by this radar in creating highly precise topographic maps, in the detection of important military objectives from the enemy territory, in determining precise target location, etc.

From the military point of view, SAR, regardless of its variants, is a source of extremely valuable data which, when processed, provide the necessary information support for creating detailed and more precise maps of the areas in question, including the urban ones, for detecting and determining the category and characteristics of combat means as well as the timely identification of enemy's intended actions.

Knowing the operational situation on the battlefield is the key to its dominance. Obtaining detailed and precise images will contribute to increasing the level of adaptability to the battlefield. If the commander knows the location of the enemy, his forces and weapons systems he will have an excellent tactical advantage which will take the form of the detailed planning of actions and the increase in the efficiency of his command and the actions of his troops. SAR potential to obtain very precise data will result in accurate operational images which will contribute to gaining information supremacy over the enemy. In this respect, the adaptability of organic troops will increase when it comes to existing situations and the requirements of the battlefield, imposing his own combat manner to the enemy and thus maintaining the initiative during conflict. More than that, the advancement in information and communication technology has created a powerful bond between information and action. In this respect, the information support for all the battlefield structures will ensure the coordination of actions against the enemy.

The threats from the air environment are a permanent danger to state security being a factor

that has determined the great powers to take action and create a complex surveillance system, capable of discovering threats in any part of the globe. SAR is a more recent sensor which became an important element in surveillance systems being able to provides the accurate image of the areas of interest, effect that will contribute to combating and neutralizing threats. In this respect, surveillance in and from the air with the help of a large variety of sensors mounted onboard airborne platforms will be a permanent mission that will ensure the detection and identification of the elements on the earth or sea surface as well as the small air means that fly at low altitudes. The data provided will give the real time image of the area of interest thus providing the information support that is necessary for the decision-making process and the military command at all levels.

In conclusion, we can state that active sensors mounted on airborne or space platforms are useful tools for the surveillance of the earth's surface. The capacity of these sensors to determine with great precision the changes at the level of earth's crust and identify the early signs of a natural phenomenon with impact on human activity in the area where it produces is actually the main reason for its intensive use in surveillance missions. The data provided contribute not only to understanding natural phenomena, changes produced due to human activity, but also to monitoring and determining the impact of human activity on the environment and to identifying the pathways of sustainable development with reduced impact on it. As far as the military environment is concerned, these sensors will ensure the knowledge of the battlefield, providing the commanders with relevant information for the decision-making process, for striking the enemy's objectives at the right time, for obtaining and maintaining information superiority and, last but not least, for dominance of the battlefield by obtaining and maintaining the initiative of decision and action while conducting military operations.

NOTES:

1 Eugen Teodorescu, Visarion Neagoe, Ioan Munteanu, *Supravegherea aeriană-de la mitolocație la radiolocație*, Sylvi Publishing House, Bucharest, 2001, p.26.

2 Eugen Teodorescu, Visarion Neagoe, Ioan Munteanu, *op.cit*., pp. 32-43.

3 *Dicționarul explicativ al limbii române*, Univers Enciclopedic Publishing House, Bucharest, 1998, p. 1080.

4 Constantin Moștoflei, Gheorghe Văduva, *Tendințe în lupta armată*, "Carol I" National Defence University Publishing House, Bucharest, 2004, p. 4.

5 Charles M. Westenhoff, *Military Air Power- The CADRE Digest of Air Power Opinions and Thoughts*, Air University Press, Maxwell Air Force Base, Alabama, october 1990, p. 50, quoted by Henry H. Arnold, https://media.defence.gov/2017/Apr/06/2001728008/-1/-1/0/B_0036_WESTENHOFF_CADRE_ DIGEST_AIRPOWER. PDF, accessed on 14.06.2018.

6 Fawwaz T. Ulaby, David G. Long, *Microwave Radar and Radiometric Remote Sensing*, The University of Michigan Press, 2014, p. 3.

7 Side-looking airborne radar.

8 Fawwaz T. Ulaby, David G. Long, *op.cit*., p. 5.

9 *Ibidem*, p. 4.

10 Synthetic aperture radar.

11 Inverse synthetic-aperture radar.

12 Interferometric synthetic-aperture radar.

13 Philippe Lacomme, Jean-Philippe Hardange, Jean-Claude Marchais, Eric Normant, *Air and Spaceborne Radar Systems: An Introduction*, William Andrew Publishing, New York, 2001, p. 233.

14 Philippe Lacomme, Jean-Philippe Hardange, Jean-Claude Marchais, Eric Normant, *op.cit*., pp. 251-253.

15 William L. Melvin, James A. Scheer, *Principles of Modern Radar*, vol. III, *Radar Applications*, SciTech Publishing, New Jersey, 2014, p. 431.

16 https://www.satimagingcorp.com/satellite-sensors/terrasar-x-radar-satellite/, accessed on 27.05.2020.

17 https://directory.eoportal.org/web/eoportal/satellite-missions/c-missions/cosmo-skymed-second-generation accessed on 27.05.2020.

18 Donald R. Wehner, *High-Resolution Radar*, second Edition, Artech House, Boston, 1995, p. 341.

19 Merryll Skolnik, *Radar Handbook*, Third Edition, The McGraw-Hill Companies, New Zork, 2008, p. 17.30.

20 *Ibidem*, p. 17.30.

REFERENCES

*** *Dicţionarul explicativ al limbii române*, Univers Enciclopedic Publishing House, 2nd Edition, Bucharest, 1998.

Ghica-Radu Dan, „Tipologia misiunilor în condiţiile noului mediu operaţional la începutul secolului XXI", *CSSAS Annual Session with international participation*, *Politici şi strategii în gestionarea conflictualităţii*, "Carol I" National Defence University Publishing House, Bucharest, 2008.

Lacomme Philippe, Hardange Jean-Philippe, Marchais Jean-Claude, Normant Eric, *Air and Spaceborne Radar Systems: An Introduction*, William Andrew Publishing, New York, 2001.

Melvin L. William, Scheer A. James, *Principles of Modern Radar*, vol. III: *Radar Applications*, SciTech Publishing, New Jersey, 2014.

Moştoflei Constantin, Văduva Gheorghe, *Tendinţe în lupta armată*, "Carol I" National Defence University Publishing House, Bucharest, 2004.

Skolnik Merryll, *Radar Handbook*, Third Edition, The McGraw-Hill Companies, New Zork, 2008.

Teodorescu Eugen, Neagoe Visarion, Munteanu Ioan, *Supravegherea aeriană – de la mitolocaţie la radiolocaţie*, Sylvi Publishing House, Bucharest, 2001.

Ulaby T. Fawwaz, Long G. David, *Microwave Radar and Radiometric Remote Sensing*, The University of Michigan Press, 2014.

Wehner R. Donald, *High-Resolution Radar*, Second Edition, Artech House, Boston, 1995.

Westenhoff M. Charles, *Military Air Power-The CADRE Digest of Air Power Opinions and Thoughts*, Air University Press, Maxwell Air Force Base, Alabama, october 1990, https://media.defence.gov/2017/Apr/06/2001728008/-1/-/0/B_0036_WESTENHOFF _CADRE_ DIGEST_AIRPOWER. PDF

https://www.satimagingcorp.com/satellite-sensors/terrasar-x-radar-satellite/

https://directory.eoportal.org/web/eoportal/satellite-missions/c-missions/ cosmo-skymed-second-generation

https://www.usgs.gov/centers/eros/science/usgs-eros-archive-aerial-photography-side-looking-airborne-radar-slar-mosaics

https://pubs.usgs.gov/of/2000/of00-006/htm/slar.htm

http://edcwww.cr.usgs.gov/glis/hyper/guide/slar

http://www2.rosa.ro/index.php/ro/cercetare/proiecte-nationale/100-pncdi2-c1/85-ro-sar

https://www.ro-ceo.ro/ro/observarea-pamantului

https://es.qwe.wiki/wiki/Interferometric_synthetic-aperture_radar

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-36

CONFIGURING ARMORED BATTLEGROUPS IN THE LAND FORCES

Lt.Col. Florin-Ioan CIOANCĂ*

The configuration of military forces in the land forces, especially battlegroups, is a solution for using only those components and microstructures of a military force, at a tactical level, that can be successful in military operations with minimal costs and losses. In modern military operations there is a need to use combat groups that have, as a result of their configuration, a military structure with mobility, firepower and high protection. These conditions can be met by armored vehicles on wheels or tracks, not necessarily tanks, organized in armored battlegroups. The configuration of armored battlegroups in the land forces must respect the principles of the use of military forces in military operations.

Keywords: armored battlegroups; configuring; mobility; firepower; protection; capabilities.

The planning and execution of military actions and operations in the modern battle space will no longer be able to be carried out by military forces or structures organized only by their category, specialty or quantity. It is becoming more and more pressing to configure the forces with those qualitative components and microstructures that can emphasize the existing elements of the combat space, from the ground to the weather conditions at the time of the military operation.

Thus, military operations in modern battle space will be performed by structures with a configuration depending on the mission or objectives to be fulfilled, the nature and value of enemy forces that are in battle space and the nature of own forces available at the time of the military operation.

The combined use of different combat structures in military actions is not necessarily new, the method being used since ancient times when commanders grouped in a single structure, under a single command, cavalry with infantry to achieve victory. Later, the Roman army combined the effect of catapults with the actions of infantry and cavalry in the military actions of that time. More recently, since World War I, there have been several attempts by military commanders and planners to find new tactics, techniques, and methods for using available forces, by temporarily grouping at least two or more different forces structures for fulfilling a specific mission, respectively breaking through the enemy's lines for that time.

More recently, in order to overcome the situation of the belligerent forces during the First World War, namely the static war, based on trench warfare, each of these parties tried to change in one way or another that tactic by using other techniques to configurate the available military forces.

Thus, to change the result pursued by the German army used *Stormtroopers*, in German *Stoßtruppen*, shock troops, who were trained to fight specific infiltration tactics, part of the new German method of attacking the enemy's trenches, and thus fulfill their purpose.

In the British Army, the trend has been to support the use of combined forces in attack, especially artillery, machine guns and infantry using decentralized fire control and a single command system.

Although the French army intended, through the proposals of captain Andre Laffargue[1], to develop the infiltration tactics and techniques existing at that time, they did not implement them. These proposals referred to the fact that the first wave of an attack had to identify the positions of defence difficult to conquer but not to attack them but only to fix them, letting the subsequent waves to do so.

The Russian army successfully used large-scale shock and infiltration tactics in June 1916 during the Brusilov[2] offensive, but due to the February 1917 Russian Revolution, their development was not continued.

**** Battalion 405 "Năsăud" Logistical Support***
e-mail: *heniu@yahoo.com*

Practically, every belligerent part of the First World War tried one way or another to change the way their forces were organized and configured in order to achieve victory in their military campaigns.

The battlegroup, translated from the term "battlegroup", has an etymology that is directly related to the historical evolution of the military.

Battlegroup (British term, BG abbreviation) or Task Force (US term, TF abbreviation) in the military theory of these armies, is "the basic component of the constitution of an army's fighting force"[3].

During the Second World War, the first battlegroups appeared in both Germans' and the Allies' armies, as we know them today.

In the German army they were called Kampfgruppe (abbreviation KG), representing an ad-hoc assembled combat formations, usually a combination of tanks, infantry, artillery including antitank elements generally organized for a particular activity or operation.

A Kampfgruppe could differ in size from a corps to a company, but the most common was a formation of *Abteilung*[4] size, respectively battalion level.

One of the commanders of the German army at that time who understood and used the effect produced by the combination, especially of tanks with aviation, in the execution of a military operation, was *General Heinz Guderian*. He used, as a method of configuring forces, throughout the war, as commander of tank structures, especially tank and aviation forces, as well as combat support forces, being successful in the military campaign against the Russian army.

Among the armies of NATO member countries, I consider as representative the army of Great Britain and that of the United States of America in the configuration of forces in battle groups of different sizes and values.

In the British Army a battlegroup is defined as an "assembled group of maneuvering combat forces formed on the basis of a command of a combat unit, organized for a specific mission"[5].

The large number of options for grouping forces to form battle groups led to the development and detailed establishment of specific tactics, techniques and procedures. Moreover, it was necessary to establish the doctrine and tactical options available to commanders and staffs of land battlegroups.

The approach to the use of combat forces combined in combat actions is a tactical concept underlying the doctrine of this army, which accepts the idea that combat forces and units are much more effective when operating in a "combined" manner than when acting separately. Thus, the British designate a battlegroup as the unit of maneuver of basic assembled combat forces consisting of the combination of combat subunits, combat support and service support.

Battlegroups are usually grouped under the command of a brigade headquarter. Exceptionally, they may be placed under the direct command of a division headquarter to perform a specific task. The fundamental benefit of such a battlegroup is the synergy created by the grouping of combat forces specially designed for a specific mission. Moreover, a battlegroup has a task-based mission organization. In order for the mission organization to be able to put into practice a battlegroup must "be able to regroup at both day and night and have common skills throughout the battlegroup but also of the subunits in the composition that will allow the success of the regrouping, and the use of redeployed elements"[6].

In the U.S. army, in terms of the brigade, as a major unit of reference in planning and conducting all types of operations, we find another perspective on the concept of battlegroup. Thus the new types of brigades were introduced, based on a battlegroup configuration (*brigade combat teams–BCTs*) which, although smaller, are just as or even more effective in major combat operations and stability operations and are much better in interaction with tactical elements other than the basic ones.

Because the new BCTs, considered brigade-level battlegroups, are smaller than the base brigades of the divisions, the army can deploy them in larger numbers and therefore can more effectively meet the geographic combat requirements of the command, while it also ensures a high operational tempo of the army.

At the level of the US military land forces, three types of brigade level battlegroups have been established: mechanized (*Heavy Brigade Combat Team–HBCT*), infantry (*Infantry Brigade Combat Team–IBCT*) and Stryker (*Stryker Brigade Combat Team – SBCT*)[7].

Regarding the battlegroups, the mechanized battlegroup (*Heavy Brigade Combat Team–HBCT*)

replaces the armored or mechanized brigades of the mechanized divisions, and those separated from tanks, mechanized and armored regiments. These HBCTs have tanks and mechanized infantry in standardized maneuvering battalions of assembled joint forces are able to defeat the military forces of any country when fighting "force-against-force" and are organized to fight in a system of combined forces by at company/team level.

A particular aspect of these battlegroups is that they are organized with self-sustaining capabilities, in the battle space, for up to 72 hours[8].

Regarding the infantry battlegroup type (*Infantry Brigade Combat Team–IBCT*), designed as a light force, it replaces the special brigades of the airborne, air assault and light infantry divisions. This brigade is the "lightest", based on dismounted infantry, capable of airborne or air assault operations, being designed to operate in restricted terrain.

Regarding the Stryker battlegroup type (*Brigade Combat Team–SBCT*), the newest type is a lightly armored motorized infantry brigade. SBCT combines the deployment capacity of IBCT with the characteristic mobility of HBCT. It is usually structured on three infantry battalions with armored vehicles. SBCTs have some features that other infantry units do not have, the Stryker vehicle offers the advantage of greater mobility along with additional protection[9].

A closer analysis of the geopolitical context and the security environment of which Romania is a part, and taking into account NATO's military relations with non-Alliance states, shows that there is a need more than ever for an adaptation of national military structures to these possible challenges. Thus, some types of optimal military structures can be identified to face these challenges and how to use them in any possible scenario and in any specific environment.

In this context, following a closer analysis of the military forces of the Member States of the Alliance and of their doctrines, concepts and how to use them in military operations, it is necessary to implement them, with implicit adaptations, in national military structures. All these concepts, of the representative member states of NATO, regarding the use of military structures in military operations start from the principle of combining the effects of the combat power of the forces of different specializations (tanks, infantry, helicopters) in one, in the same place, at the same time and with maximum effort.

In essence, we must focus on identifying the type of military structure or structures that meet some of the essential requirements of the modern battlefield: high firepower, mobility and extended endurance, equipped with high-performance equipment and trained in specific environments and the possibility of logistical autonomy as much as possible.

A possible solution for a military structure that meets these requirements, at least theoretically and based on the experience of the forces of the representative NATO member states, is at this time the battlegroup. Going further, an armored battlegroup, in which to set up the available armored fighting vehicles, can be a solution for organizing the forces of a mechanized/armored brigade.

A battlegroup can be a combined or joint structure, for a temporary time, under a single command, intended to fulfill a mission received from the higher echelon.

This armored battlegroup must be able to be realized in a very short time, to be functional, to be modular in relation with other existing combat structures, to be equipped with modern equipment with high mobility and firepower, to ensure protection staff, its communications system being reliable and having a clear picture of the tasks and missions that it can perform.

Another aspect of reasoning compels us to consider the organization of a hypothetical enemy. Romania is on the eastern flank of NATO and in our vicinity there is a world military power that could polarize military forces and means without a specific identity to act to fulfill a variable range of goals. We must ask ourselves the following questions: what organization can these forces have?, what equipment do they have?, how do they act in the tactical field?, how do they use the forces and means available in combat?.

Hence our concern to identify which military structures can counteract these actions of the military forces of a hypothetical enemy. Specifically, how own forces can be organized tactically so that the result obtained after their employment is exclusively favorable to own forces, what kind of principles could be used and how the systems related to these forces should be restructured or adapted.

According to FM 100-2-1[10], a possible hypothetical enemy has in its organization and as a way of use in military operations *mobile groups*, respectively, when the enemy is weakened and does not have credible reserves, the second echelon of the army can organize the group of mobile forces consisting of a tank corps or mechanized (normally 1-3 reinforced divisions with highly mobile combat and logistic support elements). *The mobile group* differs from the standard second echelon in that it expects it to go into the depths of the enemy's defence and be able to support itself without additional help. This mobile group will be used by the hypothetical enemy to attack the reserves, headquarters and logistics elements of its own forces. Through this action, if it succeeds, it compels our own forces to polarize other forces, in the depths of own battle space, in order to be able to face the threats of this mobile group. This involves adapting the plan of operations of our own forces or even changing it. We can certainly deduce that if the hypothetical enemy can organize high size mobile groups, respectively corps or division, he can also organize lower size mobile groups, brigade, regiment or battalion level to be used in the same way as mobile division or army corps level group.

These possibilities of a hypothetical enemy compel us to identify solutions in the organization and use of our own forces so that we can counteract its actions in a timely manner.

Increasing the destructive effect, accuracy and speed of reaction, the emergence and development of highly efficient reconnaissance, directing, guidance and hitting systems have produced profound changes in increasing the combat potential of forces, especially if they are organized and used in combination, in a battlegroup. Consequently, certain missions and tactical rules were reconsidered and changes were especially imposed in the identification and organization of structures with a greater combat power and mobility.

Taking into account all the above, I think that in our army we must consider the opportunity to configure and use battlegroups of different types and sizes, the study of the conditions in which commanders would decide to use forces in a slightly different way than the classic based on the requirements of the modern battlefield. Here we refer both to the essential aspects that must always answer the 5 "C" (who, what, where, when, why?) but also to other requirements regarding the adaptation of tactics and techniques and combat systems to the specifics of some situations that may occur in the battle space.

Next, what will be analyzed are the organization and use of tanks and armored vehicles in mechanized brigades, or more recently armored brigades, within an armored battlegroup structure that can be configured and used in the land forces.

An armored battlegroup refers to its configuration with armored means of combat, on wheels or tracks, not exclusively tanks.

In my opinion, an armored battlegroup is a tactical military structure formed by attaching to tank structures, for example to the tank battalion, company or platoon level structures, as a whole or in part of subunits, a number of infantry subunits equipped with infantry fighting vehicles and combat support subunits necessary for this military structure to fulfill a specific mission. The mandatory condition for the battlegroup to be armored is that all forces be equipped with armored equipment, on tracks or wheels. As for the command of this military structure, it may belong to the tank battalion or a staff especially generated for the mission to be performed.

In order to support the use of tanks and armored vehicles in armored battlegroups, we need to pay attention to the following factors: the combat power of a battlegroup in which to use tanks and armored vehicles increases significantly, the mobility that such a battlegroup can have and especially the speed with they can act on the enemy is very high, the possibility of performing maneuvers over large spaces and especially in the depths of the enemy's battle space recommends these battlegroups as the most effective in military operations of land forces.

In my argument for the organization of armored battlegroups within the mechanized/armored brigade, I support, mainly, the organization and use of at least two tank-based battlegroups and two infantry-based battlegroups equipped with infantry fighting machines. Depending on the tactical situation, the number of battle groups and their composition may be different.

As a possible example, I would like to bring the following: the mechanized brigade is organized, in

principle, on combat forces, respectively infantry and tanks battalions with a number of armored vehicles that may differ depending on the organization, combat support forces and logistics forces[11]. The organization may result, at least theoretically, in the following armored battlegroups: an armored battlegroup organized on two tank companies with two infantry companies, two armored battlegroups organized on one tank company and two infantry companies and one battlegroup organized on two infantry companies. An infantry company remains as a reserve for the mechanized brigade.

The battlegroups in which armored vehicles predominate will be used for offensive actions, battlegroups organized on infantry will be used for defensive actions and the battlegroup consisting only of infantry can be used as a reserve, for force protection actions, ensuring points of mandatory crossing, the destruction of air assault troops and the fixation of the enemy.

The above example is theoretical; the real organization of the battlegroups is given by the tactical and terrain situation. It is very possible that their architecture might be different from the example given above, but in essence, by organizing battlegroups in which the tanks and armored fighting vehicles are used, the aim is to achieve the desired goal and final state.

A major influence on the organization of battle groups is played by the enemy and its organization for combat and implicitly the form of combat and maneuver adopted by our own forces. An optimal option would be to organize a battalion-level armored battlegroup, consisting only of tanks, infantry fighting machines, self-propelled ground artillery and armored anti-aircraft artillery, for the *decisive operation* of the mechanized brigade and two to three armored battlegroups for *shaping operations*.

This armored battle group relies, in particular, on the use of tanks and infantry fighting vehicles to achieve the desired result or final state, namely the defeat of the enemy through bold offensive actions, quickly and firmly executed.

Certainly, in all military operations in which armored battlegroups will be used, anti-armored helicopters will also be used to fight against enemy helicopters and armored vehicles. In this case, the combat power of the battle group increases and will lead to an increase in personnel confidence in achieving success on the battlefield.

The configuration of an armored battlegroup takes into a consideration a careful analysis of the needs/possibilities ratio and on this basis the determination of the optimal structure of combat forces, combat support forces and logistics forces suitable for the mission to be fulfilled. Ideally, the respective armored battlegroup should be strengthened in proportion to the mission to be accomplished and the existing threat. It must be taken into account that the resources of forces and means of the brigade are limited, and in the situation of setting up battlegroups, the basic element being the structure of forces and means at that time and some possibilities of support from the upper echelon.

The actional structure of an armored battlegroup must be balanced, the combat forces corresponding to the mission and the support forces proportional to the size of the fighting forces and the specifics of the mission. Its actional possibilities therefore depend directly on the composition of the brigade and the degree of its capabilities.

One factor influencing the formation of armored battlegroups is the support forces, and in particular, the artillery and air defence forces. The more forces we have at our disposal, the more battlegroups can be configured. Depending on the tactical situation and the terrain, it is not necessary to configure many battlegroups, but only as many as are needed, but with a high combat power. An armored battlegroup without air defence is very vulnerable on the battlefield to the air threat and the possibilities of use in combat are reduced. Also, the lack of artillery can negatively influence the fulfillment of the mission.

The fundamental advantages of armored battlegroups are the mobility and combat power generated by the group of forces set up for a specific mission. Referring to the organization for the mission, an armored battlegroup must be able to regroup quickly, day and night, in any operation and be composed of subunits of tanks, infantry and combat support forces collectively trained, allowing the possibility of regrouping and putting into operation the elements already deployed.

Regardless of the specificities of the grouping, the full potential of the armored battle group can be developed only if the collective training and command unit are performed at the highest degree of discipline.

Based on his estimate and plan, the brigade commander will organize for the mission one or more armored battlegroups by attaching or reinforcing with subunits or elements within the structure of the brigade taking into account the available tank structure. The organization of the forces for the mission must be the most appropriate for the accomplishment of the entrusted mission.

In order to outline our image of how a battlegroup organized at the level of the mechanized/ armored brigade works on the battlefield, we tried to highlight the role of the two main combat forces, tanks and infantry, but also of their combination during combat, both in the operation offensive as well as in the defence operation. The role of combat support forces and logistics forces is no less important, but we intend to bring to the fore aspects of combat power and maneuverability of tanks and infantry equipped with infantry fighting vehicles in battlegroups.

The combat power of an armored battlegroup is generated by the combined use of tanks and infantry fighting vehicles in a certain way during military operations. The combat power of the battlegroup can be increased or decreased depending on the mission it has to fulfill.

Regarding the maneuver, the unrestricted terrain is favorable to conduct military operations characterized by the efficient use of tanks and armored vehicles within the armored battlegroup. In this field, the infantry supports the forward movement of the tanks by ensuring immediate safety, maintaining key points, clearing enemy trenches and increasing direct fire with light weapons and anti-tank weapons. Restrictive terrain increases the vulnerability of armored battlegroups by reducing the speed, mobility and reduced fire power advantages of tanks and infantry fighting vehicles.

To best exploit the offensive capabilities of an armored battlegroup's force, tanks and mechanized infantry must work together to pursue the common goal. Each of the elements of the battlegroup provides a degree of direct support to the other element. If they act separately, both tanks and infantry, there is a good chance that they will be neutralized or taken out of battle quickly.

At the level of mechanized/armored brigades we consider that this way of using tank and armored structures (infantry fighting vehicles) can be applied to fulfill precise purposes and here I refer, in particular, to the organization of battlegroups consisting of tanks, infantry, helicopters and combat support forces.

In order to configure the armored battlegroup, the units and subunits that are to be part of it require a regrouping in a certain area or district established by the brigade commander. Regrouping is, in principle, a simple action but requires practice and training. Regrouping within the battlegroup or between such groups may take place before or during the operation. This takes time and if not done at the right time it can result in the loss of this favorable moment as well as the loss of the armored battlegroup.

Usually, a battlegroup organized within the mechanized brigade may include[12]:

- a battlegroup headquarter;
- 3 to 5 maneuver groups, usually consisting of infantry, armored and if there is the possibility and aviation elements;
- 1 reconnaissance subunit supported, when necessary, by armored vehicles, infantry, aviation or engineering reconnaissance vehicles;
- 1 maneuver support subunit which may include guided anti-tank weapons or grenade launchers;
- 1 to 3 artillery subunits/units;
- 1 to 3 air defence subunits/units;
- an engineering structure to which is added the organization for the mission of the means specific to the service;
- logistics elements: logistics support detachment, part of the logistics of the "parent" unit for each fighting unit, a medical subunit.

Although the battlegroup can be considered to replace the term "detachment", a difference can be made between them: high flexibility in the organization/composition of the battlegroup, high degree of independence, accentuated maneuvering role and independence in actions, obtaining the desired effect of combat power due to the accumulation of combat potentials of the components. The detachments are organized mainly for a single mission, precise and often led by the upper echelon while at the level of the battlegroup its commander has freedom of action and can perform several tasks both specified and implied.

Conclusions

We consider that the theoretical aspects presented from the specifics of the British and US armies can be a documented reference point in the development of the concept of organization and use of armored battlegroups, in which to configure the tanks and armored vehicles of the mechanized/ armored brigade with the amendment to achieve the concordance with the reality and the specific military existing at the moment in the Romanian Army.

For supporting any approach in adopting the concept of armored battlegroup, we must consider some doctrinal aspects regarding the use of the armored battlegroup, tactics, techniques and methods that are applied at this tactical level and a series of missions of the elements that configure a military structure organized on a mission.

The configuration of the armored battlegroups must respect the principles of use in combat of the structures that will compose it.

This manner of configuration and employment in combat of armored battlegroups can increase the efficiency of the specific tasks and missions of the land forces, efficiency characterized in particular by speed, strength and accuracy of maneuver, loss reduction, economy of forces and means, covering a wider range of possibilities in the tactical field.

Regarding the use of tanks combined with other branches and especially with infantry and combat helicopters, which is not necessarily new, taking into account that in the Romanian military literature a number of ways of combined use of these forces have been developed, I want to emphasize that in order to accomplish a mission or seize an objective in the battlefield, it is best to find the optimal solution for configuring the forces available for battle, in a battlegroup, the most suitable being an armored battlegroup, so that once put into action it achieves the planned result. Certainly, a well-organized armored battlegroup with tanks, mechanized infantry, armored vehicles and supported by helicopters and other combat support forces will defeat the enemy when it is on defence and will break through the enemy's defence on the offensive. A major contribution to achieve success is brought by the maximum exploitation of the terrain and the weather conditions.

As a general conclusion we can say that it is absolutely necessary to identify the optimal solutions for the organization and use of military forces and implicitly of tanks and armored vehicles within the structures of the land forces, in military operations. These solutions for organization and use must be able to be used successfully against a hypothetical enemy. Once identified, these solutions can be put into practice, first at a lower tactical level to eliminate any possible gaps. This implies the elaboration of a normative framework, respectively specific regulations and instructions that are in line with the reality on the ground regarding the capabilities of combat equipment and weapons systems of the land forces.

NOTES:

1 https://en.wikipedia.org/wiki/Infiltration_tactics accessed on 24.05.2020.

2 https://en.wikipedia.org/wiki/Brusilov_Offensive accessed on 22.05.2020.

3 https://en.wikipedia.org/wiki/Battle_group, accessed on 22.05.2020.

4 https://en.wikipedia.org/wiki/Abteilung, accessed on 24.05.2020.

5 *Battlegroup Tactics Manual,* extract from AFM Vol. 1 Combined Arms Operations, part 2 – Battlegroup Tactics, "Carol I" National Defence University Publishing House, Bucharest, 2007, p. 3.

6 *Army Field Manual*, Volume 1, part 2, Battlegroup Tactics, 2002, p. 4-1

7 FM 3-90.6, *The Brigade Combat Team,* Headquarters Department of the Army, Washington DC, 4 August 2006, p. xvi.

8 *Ibidem*, p. 12-1.

9 *Ibidem*, p. A-7

10 FM 100-2-1, *The Soviet Army, Operations and Tactics*, Headquarters Department of the Army Washington DC, 16 July 1984, p. 2-7.

11 F.T./I. – 1, *Manualul pentru luptă al brigăzii mecanizate*, Bucharest, 2004, p. 27.

12 Maj. Stelian Pantazi, PhD Candidate, lt.col. Cristian Hîra, "Consideraţii privind constituirea grupurilor de luptă (Battle Groups)", *Sesiunea anuală de comunicări ştiiţifice cu participare internaţională STRATEGII XXI/2006*, 13-14 april, "Carol I" National Defence University Publishing House, Bucharest, p. 555.

REFERENCES

*** *ADP Land Operation*, London, 1999.

*** *Army Field Manual*, Vol. 1, part 2, *Battlegroup Tactics*, 2002.

*** *Battlegroup Tactics Manual,* Vol. 1, Combined Arms Operations, part 2 – *Battlegroup Tactics*, "Carol I" National Defence University, Bucharest, 2007.

*** *CGSC Student Text 100-3 Battle Book*, US Army Command and General Staff College, Fort Leavenworth, Kansas, 2000.

*** *FM 3-90.6*, *The Brigade Combat Team,* Headquarters Department of the Army, Washington DC, 2006.

*** *FM 100-2-1*, *The Soviet Army, Operations and tactics*, Headquarters Department of the Army Washington DC, 1984.

*** *F.T./I. –1*, *Manualul pentru luptă al brigăzii mecanizate*, Bucharest, 2004.

*** *F.T. –1*, *Doctrina operaţiilor Forţelor Terestre,* Bucharest, 2006.

*** *F.T. –3, Manualul de tactică generală a Forţelor Terestre*, Bucharest, 2006.

Military Doctrine Precis, Regional Training Centre Romania-United Kingdom, *Army Brigade Course*, Bucharest, 1998.

*** *Strategia de Securitate Naţională a României*, Bucharest, 2007.

*** *Design for Military Operations: the British Military Doctrine*, HMSO, January, 1989.

Buța Viorel, Alexandrescu Gelu, Dumitru Daniel, *Elemente dinamice ale câmpului de luptă modern: Puterea de luptă,* "Carol I" National Defence University Publishing House, Bucharest, 2004.

Dr. Dragomirescu Valentin, „Consideraţii privind evoluţia şi întrebuinţarea în acţiunile militare rapide a grupurilor de luptă europene", *Impact Strategic* No. 4[37]/2010, "Carol I" National Defence University Publishing House, Bucharest.

DuBois Edmund L., *A Concise Theory of Combat*, The Military Conflict Institute, 1997.

Gudmundsson Bruce I., *Stormtroop Tactics: Innovation în the German Army, 1914-1918*, 1995.

Mr. Pantazi Stelian, PhD Candidate, lt.col. Hîra Cristian, „Consideraţii privind constituirea grupurilor de luptă (Battle Groups)", *Sesiunea anuală de comunicări ştiiţifice cu participare internaţională STRATEGII XXI/2006*, april 2006, Bucharest, "Carol I" National Defence University Publishing House.

A. Zanella James Maj., *Combat Power Analysis is Combat Power Density*, School of Advanced Military Studies, United States Army Command and General Staff College, Fort Leavenworth, Kansas, 2012.

https://en.wikipedia.org/wiki/Battle_group

http://en.wikipedia.org/wiki

http://www.us.train.army.mil

https://en.wikipedia.org/wiki/Infiltration_tactics

https://en.wikipedia.org/wiki/Brusilov_Offensive

https://en.wikipedia.org/wiki/Abteilung

https://en.wikipedia.org/wiki/Heinz_Guderian

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-37

TRAINING, CONCEPTUAL DELIMITATIONS. ADAPTATION OF TRAINING TO REGIONAL RISKS AND THREATS

Capt. (Navy) Nicu CHIREA, PhD Candidate*
Capt. (Navy) Assoc.Prof. Lucian Valeriu SCIPANOV, PhD**

Instruirea personalului armatei reprezintă un proces complex, adaptativ, continuu optimizat, în condiții de eficiență, proThe training of army personnel is a complex, adaptive, continuously optimized process, in terms of efficiency, designed to effectively fulfill the fundamental missions of the army, in accordance with national interests and international commitments.

This approach aims to identify training optimization solutions, from the perspective of adapting to the dynamics of the operational environment. After the identification of the manner evolution of the concepts of strength training and by outlining a training optimization model, the research will follow the validation of the hypothesis that training optimization is achieved according to the evolution of risks and threats to regional security. With the structuring of some specific concepts to the approached field, these will be able to complete the content of the Doctrine of the Romanian Army Training, in order to offer a doctrinal framework adapted to the training needs in the conditions of the modern war.

The novelty of this article is based on the identification of content elements for adapting the doctrine of military training to new regional risks and threats, taking under consideration the need for strength training in the reality of the operational environment in the wider Black Sea region and neighboring regions.

Keywords: training; standardization; optimization; efficiency.

We start from the assumption that the role and importance of training are considered, along with scientific research, the engines of evolution and development in all areas of society, in which the military occupies an important place so that in the military field, the principles of training acquire particular valences.

The purpose of this approach is to identify a way to optimize training, from the perspective of threats and risks manifested in the dynamics of the modern operational environment, by identifying concepts that complement the current content of the Romanian Army Training Doctrine. This approach is based on the level of knowledge related to the analyzed domain, observation and identification the training-specific concepts of the evolution, a comparative analysis, elements of research that are supported by our experience, as beneficiaries and providers of education, on the one hand, but also as specialists and practitioners on the other hand. We are interested in the analysis of the operational environment, of the regional actors and the relations among them, the identification of the means, ways, and objectives through which their strategies are materialized, as we consider that it represents an indicator that reflects the directions regarding the strength training.

We will use as the main research hypothesis, the concretization of the bi-univocal relationship between the level of ambition and the way of doing the strength training, considering that the training optimization is achieved to the evolution of risks and threats to the operational environment, all taken under the conditions of adapting the means of response to the desired final state, namely to the level of training assumed for fulfilling the objectives related to the strategic directions.

For this, we set ourselves two research objectives. The first objective is the structuring of specific concepts in the field of military education, regarding the strength training in terms of the role of the military education system. Therefore, we will identify the doctrinal framework that supports the training system and we will analyze some features that define military training. The second objective, subsequent to the first, is to identify proposals for optimizing the training activity adapted to regional

** General Staff of the Romanian Navy*
e-mail: *nicu_chirea@yahoo.com*
***"Carol I" National Defence University*
e-mail*: shcipio@navy.ro*

risks and threats, which we set out to promote in order to increase the content of the Romanian Army Training Doctrine. These proposals will be a model based on the evolution of doctrinal concepts on training, the current level of knowledge in the analyzed domain, observation, and comparison of existing concepts in different schools of thought, through which we can draw conclusions, including predictions about the future of the training.

The two objectives will support the validation of the research hypothesis so that we will be able to argue that in order to fulfill the entrusted missions, it is necessary to optimize the strength of training in the evolution of the security environment to which various variables can be added. A nowadays influencing factor for the training mode is represented by the technological evolution and its impact on combat tactics.

Contents Of The Military Educational Field

To begin with, let us see the structure of the military education system according to the doctrinal concepts, the main concepts specific for military system area related to the education-training-learning triptych, in order to identify the relationship between training and education in the military field.

The military education system

The military education system is based on a complex process of training human resources, which is projected on three main pillars: education, training, and exercises. This system is constantly evaluated and supported by the practice training stage. Training through practice, from our point of view, is a result of the other components of training, which completes and closes the training cycle, maintaining and developing the level of performance achieved through practical activities. This phase involves the accumulation of professional experience by performing duties, tasks at work, or during missions and is supported by the accumulation of knowledge and the development of skills achieved by completing the main components of the training. Given the fact that the broadening of the knowledge horizon, the development, and acquirements improvement are characteristic of this phase, we consider that the particularity of training through practice is quality, to the detriment of quantity.

The civil education system, customized by the pedagogical field or the sciences of education, uses its own concepts such as education, training, learning, curriculum, teaching methodology, or adopted concepts such as: „instructional design, educational management, professional counseling"[1]. However, we notice that there is a close link between the two fields (military and civilian), so that the military system adapts conceptually to the civilian system, customizing some concepts to the need for specific education, using teaching-learning methods and procedures, and the civilian system uses the experience of the military system that identifies the limits of using established methods or well-known procedures, applied under special conditions. Here we can mention war games, computer simulations, the use of e-learning systems, etc.

We can emphasize that the mission of military education is to generate and transfer specific knowledge to the military art domain. The purpose of the educational process is to generate competent, high-performing graduates, able to put into practice the procedures, standards, and training and assessment techniques learned and practiced during the training cycles. One of the military education objectives is to obtain a human resource capable of assuming the responsibility of fulfilling the attributions of the functions for which training was ensured. Another objective is targeting the generation of force structures capable of participating in wide range missions in a national context, as well as in a multinational context, in times of peace, crisis, or war.

We consider that *education* is at the basis of the transformation and modernization process of the military system. It must take into account the evolution of defence planning and the implementation of endowment programs with new technology. Under these conditions, the continuation of the training process and adaptation to technological development and endowment, allow the synchronization of using equipment procedures with the tactics of their use, in relation to the interoperability degree accomplished with allied partners.

Specific concepts for the military education system

We will briefly present the main specific concepts related to our subjected area customized

at the level of the military system: *education, training, learning*, which we will analyze from several perspectives.

Education will be analyzed from a historical, cultural, psychological and pedagogical perspective. Training will be analyzed from the point of view of the instructor-trainee relationship and the quality-quantity ratio.

From a historical-evolutionary point of view, *education* describes the phenomenon of transmitting economic, political, religious, philosophical, scientific, technical, artistic experience from one generation to another. (In Latin, *educo, education* - means to grow, to cultivate, to generate). From a cultural perspective, education is the phenomenon of raising the individual, group, community or society as a whole, from the biological state to the state of culture, where it acquires and offers cultural values. From a psychological perspective, education is the activity, the process and the result of human creation as a personality. It is defined by cognitive, affective, volitional, empowering, attitudinal components. The individual develops himself/herself sustained by society, acquires a level of maturation, based on self-discovery and self-knowledge, is self-formed and self-educated. Thus, that it is a pedagogical perspective, education is action, it can influence its results and exercise its society for each person to bring personality and create princes who can capitalize on biopsychic potential, to help a favorable environment, to adapt and integrate into societies. So far it is very important for the two environments, military and civilian, as education is a common point in the field.

Training (in Latin, *instruo, intruere* - to build, arrange, furnish, foresee), is the activity, process and result of transmitting, receiving, processing and assimilating knowledge, training skills and abilities, building and modeling the conduct of knowledge, the intellect. This is done in a relationship, which they are part of, the one who transmits (the instructor) and the one who receives, processes and assimilates knowledge, skills, abilities (the educated), through different forms of training organization: lessons, courses, seminars, laboratory works, internships, exercises, in different periods, hours, semesters, years of study, learning cycles.

Training is an activity that triggers and maintains the gradual process of acquiring knowledge, skills, abilities, integrating them into their own experience, developing practical skills and abilities. This, as a result, confirms the quality of the instructor's activity and through the abilities of the instructor. Under these conditions, the efficiency of training is materialized in training results and informative results. In our opinion, the formative results in the military field are similar to the civilian field, as follows: the development of the knowledge capacity (perception, memory, imagination, thinking, language, intelligence); learning and using learning methods and techniques through individual study. The informative results are: quantitative and qualitative assimilation of knowledge; training skills and abilities; enriching the knowledge experience, establishing, developing and capitalizing on learning attitudes and beliefs; developing learning motivation. However, in the military field, the skills and knowledge, the experience of knowledge, attitudes and beliefs are much more specific, so that the instructor-trained relationship becomes much more particular. In the military field, the quality of the results depends on the adequate formulation of the informative and formative aims and objectives mentioned above, fulfilled by a specific methodology, appropriate to the field.

Training can be analyzed through the prism of four criteria[2], the descriptive criterion, the intentional criterion, the normative criterion, and the scientific criterion. Descriptively, training is the distribution of knowledge and skills and is based on learning. Training is an intentional activity, where the role of the teacher's objectives and beliefs prevails. Normally, training focuses on the analysis of ethical and deontological principles. Scientifically, training follows specific behaviors during training. In this sense, the explanatory dictionary of the Romanian language presents for the training in the military field the following meaning: to prepare the soldiers in order to acquire military theory and practice.

The conceptual analysis of the criteria definitions presented emphasizes that training is an action that intends to produce *learning*. Thus, we can emphasize that training covers a wide range of content in relation to learning, both of which are intertwined with the much wider sphere of education.

It can be concluded that in the instructional process learning takes place. Learning has as a

peculiarity, the conscious and active acquisition of knowledge, the formation of skills and abilities, the exercise of knowledge capacities, skills, and attitudes.

Education, in a broad sense, includes *training* and *learning*, which means that the development of human potential is possible due to the learning acquisitions acquired through training. Training represents the transmission of knowledge, skills, abilities, based on some programs, in an organized institutional framework and determines the learning that has formative-educational effects.

In conclusion, the reporting of any concepts specific to military education in the field of military sciences involves corresponding activities that derive from the conceptual framework of the *education - training - learning* triptych.

At national level, the Doctrine of the Romanian Army Training is the reference document that defines, substantiates, and directs military education, training, exercises, their evaluation and training through practice. It defines military training as „the activity carried out by the army to achieve the capacity of personnel/forces to perform specific duties/missions using military equipment"[3]. In the military field, the components of training are military education, training, exercises, and training instruction. These components are interdependent, there is no precise delimitation between them, and in order to achieve an effective and complete training of the forces, a complete approach of all these components is necessary. Practice training involves the accumulation of professional experience, the accumulation of knowledge, the maintenance and development of skills.

A very important role in the military education process is played by the teaching staff and the technologies used. Their adaptation is made according to the needs of the beneficiaries but also to the human resource. The teaching staff must be anchored to the existing reality, to know the requirement of the beneficiaries, to be concerned with their own training but also with the need for training of pupils, students. Educational technologies are constantly evolving. In this case, the role of the teacher is important, because he/she will have to choose the technology that identifies with the optimal learning methods and procedures.

The dialogue between teacher and pupils or students has become one of the main methods of education. But in the conditions of the crisis caused by the pandemic, we noticed that e-learning technologies offered the possibility of learning at a satisfactory level, close to the conditions of classical learning. Even if e-learning technologies are necessary but not sufficient, we found that they proved to be a good alternative in certain conditions of education, providing mobility and efficiency to military personnel.

The second component of training, instruction, which the doctrine[4] defines as the totality of actions taken to create, develop and maintain individual and collective skills necessary to perform tasks / missions, is done on two levels, individual instruction and collective instruction, covering the theoretical sides, physical, psycho-moral, technical and tactical training.

Physical training is the basis for developing the confidence to acquire the qualities necessary to act on the battlefield, but it cannot exist without the development of the theoretical side. The relationship between the two should not minimize the importance of either side of the training.

Training by simulation can be performed in a virtual or real environment and is a constructive variant of continuing the classical instruction or a variant of completing it. An advantage of this form of training is that it reduces the consumption of resources needed for training, in conditions close to the reality of field training or the battlefield.

Exercises are a very important component of training, close to collective instruction. They can be performed on the map, in the field, computer-assisted (by simulation), or combined. The exercises involve performing activities similar to those performed in the conditions of the battlefield. Therefore, from certain points of view, it is sometimes considered that the exercises belong to the field of military operations and less to the field of training. From experience, we can mention that the exercises increase the level of training of the structures by setting specific objectives, their purpose being to raise the capacity to perform the tasks entrusted.

The training-education relationship in military education

The training-education relationship is a challenge of the military education system, in which the main actors are providers and beneficiaries,

teachers and instructors on the one hand and pupils, students, master and doctoral students, on the other hand. The quality of military teacher, manifested at all levels of the system we are part of, is reflected in his/her ability to educate and train, to stimulate the responsibility of the military beneficiary. He must acquire the ability to develop culturally, to collaborate within the group, to adapt to the system and external variables, to learn.

In our opinion, the content of the concept of training, particularly in the military field, has a narrower scope in relation to education, which is a general sense, aims at the formation and permanent development of the human personality. Instead, we can mention that training covers a wider scope than learning, because it requires more intellectual effort and external support.

We can conclude that society has a very important role in education, so the military system must be connected to the evolution of society and its needs, as emphasized in national literature: „Education is closely linked and depends on the environment created by society"[5]. In the same vein, it can be emphasized that society must provide the means necessary to carry out the military educational process, as it provides the means necessary to carry out the civilian educational process.

The Influence Of Specific Risks And Threats On Training Models

Following the analysis of the main concepts specific to the field and the meanings they have in relation to military education, we further set out to identify the variables that influence the interdisciplinary approach to educational content in educational programs, leading to building capacity and development to carry out the tasks entrusted to the force participating in the operations. We are considering the analysis of risks and threats manifested in the regional operational environment, in order to be able to offer some proposals on improving the national doctrinal framework on training. These proposals will be able to form the basis of a training model adapted to unconventional risks and threats.

Risks and threats in the wider Black Sea region

In the last decade, the evolution of the regional security situation has signaled the emergence of new risks and threats. Next, we are going to highlight some of these, such as: the development and use by some regional actors of hybrid techniques and tactics; the accelerated militarization of the Crimea region and the tendency to militarize the Black Sea region; fueling a new frozen conflict in eastern Ukraine; restricting the freedom of navigation between the Sea of Azov and the Black Sea; the attempt to extend the military influence on some states bordering the Black Sea; the permanent military presence in Syria, etc. These can be added economic indicators such as: economic competition and resource security; identification of new natural resources; influencing emerging markets.

Given these risks and threats, we aimed to identify how they influence the training of forces that could participate in actions in the operational environment delimited by the wider Black Sea Region and beyond. For this, let us see the elements that participate in the training process and how it is carried out, to identify solutions that will contribute to the structuring of an optimal training model concerning the risks and threats of the operational environment.

In the American doctrine, we have identified the fact that the training of forces is performed in relation to the existing geostrategic conditions, both regionally and globally, by the permanent changes of the security environment and according to the necessary resources[6], which are increasingly more limited.

At national level, we have noticed a permanent concern to adapt military education to the realities of the operational environment. Because military education is a component of the training through which the training, specialization, and professional development of its personnel is carried out, it is today in a process of adapting the curriculum, being subject to negotiations and adjustments in which beneficiaries and trainers participate. We notice a substantial share of topics related to hybrid warfare, cyberattack, and cyber defence, leadership, information for defence, the action of special forces. Such themes contribute to the adaptation of military education to all types of threats that participants in theaters of operations may face.

A recent example of the adaptability of processes specific to military education is the way activities are managed during the emergency measures generated by the current pandemic. In an attempt to stop the spread of SARSCOV 2 coronavirus,

in the conditions of restricting training activities, the Romanian military education has moved to the virtual teaching-learning environment, e-learning technologies being adapted to this challenge. Despite all the prevention measures, the effects of the pandemic affected the training process so that an additional reason can be identified for adapting the training with new variables of a future reality.

Optimizing training in the conditions of the operational environment

Both globally and regionally, the security environment is in a continuous transformation characterized by unpredictability, which causes difficulty in determining risks and threats and the delimitation of asymmetric and hybrid.

The current combat space has been transformed into an integrated operational environment, dominated by high-tech forces that cover the three-dimensional combat space. It is defined by fluidity, military actions being characterized by a high degree of decentralization, independence, and efficiency.

We notice the decrease of characteristics such as linearity or uniformity, predictability, and symmetry of military actions. Against these particularities, the training of the forces must be adapted, considering that it is executed in a standardized way, according to principles established in the national doctrine that generally respects the lines of the allied doctrine.

Technological development determines an adaptive dynamic of training forms, methods, and procedures. Sudden changes in the equation of stability of the regional security environment have led to measures to identify response mechanisms in decision-making structures in the field of training, so that it can be seen that the cycles of training processes are short and flexible, characterized by increased intensity of activities, in contradiction with the long and stable periods which we were accustomed with. Lifelong learning and the adaptation of training programs to the new conditions are mandatory to meet the call for the consolidation of a credible armed force.

Changes in the security environment lead to the identification of strategies to achieve the set national and allied objectives. To meet these requirements, a well-sized, trained, and equipped force is needed. Optimizing the preparation process is an appropriate solution to the need to adapt to the requirements of the beneficiary.

Optimizing the training process involves identifying criteria to ensure the highest efficiency of the educational process. This is necessary for the product of the Romanian military school to face the challenges of the operational environment in conditions of interoperability with the soldiers of the allied and partner armies.

Even if the training of the military is carried out in a standardized way, there are solutions for identifying an optimal necessary for the training of the human resource, so that it can fulfill its missions in the conditions of the current security environment. Sources of training can be found in defence planning documents at the national level and at the level of the North Atlantic Alliance. These are the normative acts that compel the military structures to optimize all their endowment, training, planning, execution, and evaluation processes.

The National Strategy for the Defence of the Country for the period 2020-2024 is currently in force. This document continues and develops the measures addressed and implemented by the previous strategy for the period 2015-2019. Romania's military strategy establishes as a direction of action for fulfilling the national military objectives „increasing the quality of training of military and civilian personnel"[7]. Under these conditions, military education has the task of transmitting knowledge and developing the action skills necessary to fulfill the entrusted missions, in accordance with the directions of action and the ways to ensure national security in the dynamics of the regional security environment.

The directions of action addressed by the current strategy aim at 24 goals, which mainly follow to strengthening the national defence capacity in national and allied contexts, developing strategic partnerships, developing the security industry, developing the necessary capabilities to react in case of asymmetric and hybrid type threats, achieving interoperability with the armies of other Member States, developing security, health, research, etc.

From the summary analysis of the directions of action, mentioned by the strategy, for the defence field, six of them are closely related to the training of the army. These directions refer to strengthening the defence capacity; continuing the process of transformation, modernization and endowment of the army; developing capabilities to respond to an

asymmetric and hybrid threat; military cooperation in the Black Sea region; achieving interoperability with the armies of other Member States; participation in crisis monitoring and management missions[8].

At the Alliance level, the SACEUR education directive, SAGE 17-21[9], is the document through which the ACO periodically provides strategic-level guidance and direction, priorities and requirements for the implementation of NATO's ETEE policy[10]. SAGE consists of a main body and six annexes containing general principles in the field of ETEE, SACEUR priorities in the field, as well as guidelines on the use of resources, so that it represents the foundations of the process of developing the NATO Multiannual Military Training and Exercise Program – MTEP 2017-2021.

The allied documents issued are Bi-SC 75-002, Education, training, exercise and evaluation directive (ETE & ED), NATO, 2013; Bi-SC 75-003, Collective training and exercise directive (CT&ED), NATO, 2013 and Bi-SC 75-007, Educational and individual Training directive (E & ITD, NATO, 2015. The provisions of these documents are permanently updated by order of the supreme commander ally in Europe, based on observations, lessons identified and lessons learned during the application of previous documents, these proposals are discussed and harmonized in the working groups dealing with specific normative acts of the training alliance – NTG.

At national level, we find that in the field of training and exercises, the Romanian Defence General Staff (SMAp) through the categories of forces achieves the concordance of the concepts and principles of training with the document issued by NATO in the field of ETEE. The doctrine of Armed Forces training sets out what needs to be done to maintain the credibility of the force in its relations with allies and partners. It also correlates between strategic objectives and available resources, based on the *end-ways-means* triptych.

Proposals for the optimization of training

In order to structure a training model, below we will offer some proposals regarding those specific features of the national training system, which relate to defence planning, training by practice, staff resources, inter-institutional cooperation plans, optimization of the technical training report/ tactics, the role of exercises, evaluation, reserve of strength, lessons learned, etc.

If we make a comparison of the training systems within NATO with the national one, we can observe a major similarity between the two schools. In both systems, there are four main pillars of training: education; education/training; Exercises / Exercises; assessment/evaluation. The minor differences are that there is a distinct pillar at the national level; practice training and evaluation is done at all stages of training, unlike NATO, where evaluation is the mainstay. Following the evaluation, we consider that there are no major differences between the two training systems and the fact that training through practice is a pillar of national training is a feature that can turn into an advantage.

We find that the defence planning documents have been modified, so they need to be revised in order to constantly adapt to the evolution of the operational environment. Military training is a complex, standardized, and adaptable process that takes place in order to train, develop, maintain and improve the operational capacity of forces to be able to perform complex missions, using modern military techniques and equipment, corresponding to tactics adapted to the current operational environment and that of the future.

In our opinion, training through practice is a process of accumulating action experience on the job or in the theater of operations. Given that training through practice is a result of education, training, and exercises, as mentioned in Allied documents (Education, Training, Exercises, Evaluation), we believe that at the national level we can adapt the contribution of the fourth pillar, training with practice by the three established pillars of education, training, instruction, and exercises, as a particular format for national training needs, in which evaluation is a particular stage of each defined pillar.

From the point of view of training planning, which is currently done annually and with a four-year perspective, we militate for a multi-annual training planning, for a correlation with the provisions of the allied documents.

Given the report on national staff resources, soldiers and professional ranks are a very important category of staff, so the training of soldiers and professional ranks in courses must be a permanent goal.

Inter-institutional training in the face of new types of threats is based on cooperation with other state institutions.

Given the fighter model that is foreshadowed in the conditions of hybrid warfare, a resizing of individual instruction is needed, with an optimized tactical and technical instruction ratio.

From the point of view of the role of the exercises for the training and evaluation of the forces, we consider that the experience of the action must be capitalized in conditions as close as possible to the fight, the theater of operations, and the operational environment.

From the point of view of evaluation, given that there are force structures available to NATO and for this, they are evaluated by teams of national evaluators and teams of NATO evaluators, it is clear that the evaluation will include a national side and a multinational side, which are provided for in the reference documents.

In terms of training resources, force structures are currently organized into force packages with different levels of operational capacity. Because the resources allocated to training are different, careful analysis is needed to formulate provisions for their differentiated use according to the strength packages being trained.

The principle of reservation must be applied. Training of the operational reserve is mandatory, in peace, crisis, or war. From our point of view, it is necessary to introduce the principle of operational reserve in the doctrine.

Because at NATO level there are structures that identify lessons, collect them, analyze them, and the finished products of this process, lessons learned, are used in any component of training, the use of lessons learned must be the basis for planning and executing all training activities. At present, the Doctrine does not provide principles for the use of lessons learned in the process of planning the execution and evaluation of training.

Conclusions

Given the comparative analysis of training-specific concepts, identified in both Allied and national doctrine, we can see that the terminology is similar, we use and act according to the same principles, methods, and procedures of training, we aim to standardize them so that the force trained to become interoperable with the ally.

We consider that the modernization of training in the military field is due to maintaining permanent contact with the operational environment. The compatibility of training with the NATO training model allows us to continue standardization by implementing allied concepts at the national level. From the point of view of interoperability, we consider that the main pillar is training with the same tools, adoption, and adaptation of the doctrinal content of specific common documents in the planning, execution, and evaluation of training, which are important steps in standardization.

We can emphasize that if training is necessary to deal with predictable events in the theater of operations, education instead prepares the military for unexpected situations that are unfamiliar to them and research identifies optimized models of training and action procedures in similar conditions to the modern operational environment.

An important component of training is military education so that human resources become the most valuable defence resource, which if properly capitalized, become the center of gravity of the force trained under these conditions.

Training is a process in an intrinsic relationship with all specific concepts in the field of military education, therefore, it must find its components well defined and conceptually detailed in the main national documents governing the doctrinal framework: defence strategy, military strategy, doctrines for operations, operational plans, plans for phasing out combat capability, operationalization plans, mobilization plans, etc.

Strength training, regardless of the specialty and the form in which it is carried out, respects principles, uses similar methods and procedures, with small differences, but at the same time, they are the ones that make the difference. Each training system adapts its principles, methods, and teaching-learning procedures, depending on the tools, means, and resources at hand, tradition, experience, awareness, but also support from society.

Regardless of which pillars will be supported, the training system of the Romanian Army is permanently adaptable to risks and threats in the operational environment, the training process being able to generate interoperable forces, in the efficient conditions, so as to act effectively in the spectrum of increasingly unconventional threats.

Under these conditions, we can conclude that the national training system will produce trained forces, leaders and structures, which will be able

to carry out the tasks entrusted independently or jointly, in a national or multinational context.

NOTES:

1 Elena Macavei, *Educație, instruire, învățare*, Sibiu, 2005, p. 3.

2 Eugen Noveanu, *Științele educației*, Sigma Publishing House, Bucharest, 2006, p. 12.

3 *** *The doctrine of training the Romanian Army, Bucharest*, Bucharest, 2006, p. 14.

4 *Ibidem*, p. 57.

5 *** The Admirals' Club, *Amiralul Dr. Gheorghe Marin în elita Armatei României,* Technic-Editorial Center of Army Publishing House, Bucharest, 2010, p. 549.

6 Army Regulation 350–1, *Army Training and Leader Development*, Headquarters Department of the Army Washington DC, 10 December 2017, p. 2.

7 Romania's Military Strategy, Bucharest, 2016, cap. III.

8 *National Defence Strategy of the Country for the Period 2015-2019*, Bucharest, 2015, pp. 18-19.

9 SACEURs Annual Guidance on NATO Education, *Training, Exercise and Evaluation 2017-2021*.

10 ETEE – *Education, Training, Exercise and Evaluation*.

REFERENCES

*** *Strategia militară a României*, Bucharest, 2016.

*** *Strategia națională de apărare a țării pentru perioada 2015-2019*.

*** *Doctrina instruirii Armatei României*, Bucharest, 2006.

*** *SACEURs annual guidance on NATO education, training, exercise and evaluation 2017-2021*.

[Clubul amiralilor], *Amiralul Dr. Gheorghe Marin în elita Armatei României*, Technic-Editorial Center of Army Publishing House, Bucharest, 2010.

[Army Regulation 350–1], *Army Training and Leader Development*, Headquarters Department of the Army, Washington DC, 2017.

[Bi-SC 75-002], *Education, training, exercise and evaluation directive* (ETE&ED), NATO, 2013.

[Bi-SC 75-003], *Collective training and exercise directive*, CT&ED, NATO, 2013.

[Bi-SC 75-007], *Educational and individual Training directive*, E&ITD, NATO, 2015.

Macavei Elena, *Educație, instruire, învățare,* „Lucian Blaga" University from Sibiu, 2005.

Noveanu Eugen, *Științele educației*, Sigma Publishing House, Bucharest, 2006.

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-38

THE OPPORTUNITY FOR USING REMOTELY OPERATED UNDERWATER VEHICLES IN SUPPORT OF NAVAL ACTIONS

Capt. (Navy) Assoc.Prof. Lucian Valeriu SCIPANOV, PhD*
Capt. (Navy) Denis DOLCEANU**

There is an international trend for research and development programs aiming to provide fleets with modern combat systems. Remotely piloted underwater vehicles represent a capability that occupies an important place in the concerns of the naval forces, so they have experienced an evolutionary stage with a great technological advance as compared to other classic combat systems.

Although a large-scale military action is considered unlikely, there are general concerns about minimizing risks on the battlefield, in order to avoid the loss of human lives, so a handy option was to capitalize on the technological advance we are witnessing, leaving dangerous and routine tasks to robots. Anticipating a future widespread use of unmanned systems, this article is a plea for the use of remotely piloted vehicles for missions in the underwater environment, an environment hostile to human life but permissive to specialized vectors.

The novelty of this article is that it presents some tactical advantages that a naval force can benefit from in the future by using robots and autonomous systems that influence underwater and surface operations.

Keywords: remotely piloted vehicles; underwater drones; technological revolution.

We believe that technological advance has a major impact on the use of techniques and tactics in combat hence the naval forces of the future will widely use remote-controlled combat systems in this increasingly complex military environment in which time contracts and speed reaction increases.

The purpose of this approach is to promote the potential use of these innovative technologies by the Romanian Naval Forces, especially for the use of remotely piloted vehicles for missions in the underwater environment.

To this end, this article has set the following objectives: identification of the remote-controlled or autonomous vehicles importance in tactical actions and the relationship with the doctrinal aspects of the use of such revolutionary capabilities; presentation of some missions of the naval forces in the underwater environment and the opportunity to use remotely piloted or autonomous underwater vehicles in such missions; identification of risks and threats related to the use of remotely piloted or autonomous underwater vehicles in naval forces actions.

**"Carol I" National Defence University*
e-mail: *shcipio@navy.ro*
***Diving Center, General Staff of the Romanian Navy*
e-mail*: denis.dolceanu@navy.ro*

The novelty of this article is that it analyses some tactical advantages that a naval force can benefit from when using robots, autonomous systems or remotely piloted underwater vehicles.

We have noticed that at the international level there is a tendency to adapt technologies initially developed for civilian purposes within military programs to equip fleets with modern machinery. Remotely piloted underwater vehicles as a capability will play an important role in the tactical field, so they must be part of the permanent concerns of the naval forces. Due to the effect they produce and the low risk factors on the personnel, they have known an evolutionary stage with a great technological advance in relation to other classic combat systems in the underwater environment.

The evolution of underwater combat systems has recent origins and this has to do with the ability of fleets to support naval systems development programs in order to gain and maintain maritime superiority. The major maritime powers understood this and promoted research in the field, so that in all three environments of the maritime space, air, surface and underwater, they benefited from innovations that encouraged competition. The military naval field was the engine of technological development but also benefited from

the technological advantages in the field of civil applicability.

From the evolutionary point of view regarding underwater combat systems, we observe an active involvement of the great maritime powers early in the history when the great visionaries sensed the importance of mastering the maritime environment for the manifestation of regional or global interests. The British and Spaniards ruled the world at the beginning of the Modern Age by dominating the world's seas and oceans aboard cannon-armed galleons. Later in World War II, Nazi Germany and Imperial Japan met their operational objectives by dominating the underwater environment, using submarines to fight surface ships. At the end of the second millennium, analyzing the composition of the navies of the most important military forces, we could conclude that a combination of surface ships and submarines is necessary to be measured as a maritime power. In the 21st century, the revolution of militarized robots and the development of autonomous systems could rewrite the recipe for success.

Thus, today, we can consider that the trend of technological development has determined in the maritime field the appearance of a turning point that will change the approach of modern warfare and that of the future. The war will remain a confrontation of interests, but technology will certainly change its character. Clausewitz himself stated that war could have different manifestations depending on the actors involved, the purpose and the means at hand[1].Remotely piloted weapon systems are the new means available. They are already widely used, and this suggests that they could be the fighting machines of the future, a war waged by robots armed with artificial intelligence.

Undoubtedly, this foreseeable progress will also lead to changes in mentality by imposing changes in doctrines and tactics that will highlight the usefulness of new combat systems and specify their role in combat or combat support. In this article, we will not analyze the factors that require a change of mentality but rather we will review the tactical advantages that we can benefit from in the future using robots and autonomous systems and the impact in underwater and surface combat, in order to meet those three objectives of our approach.

Specific terminology

For the beginning, we will make a short presentation of some specific terms pertaining to the approached field. According to the Explanatory Dictionary of the Romanian language, a robot is "an automatic device that can perform, based on a complex system of programs, a series of directed actions, similar to human actions". The key is that the robot can replace a person in performing predetermined tasks by pre-programming. An autonomous system or robot refers to the fact that it is composed of a robotic element but also has a functional autonomy based on the on-board sensors that allow it to react and / or change its action in certain situations.

Regardless of the human-machine command and control relationship, words such as "automatic", "automated" and "autonomous" are often used to refer to the machine's complexity. The term "automatic" is used to refer to systems that have very simple mechanical responses to environmental change. Examples of automatic devices include toasters and mechanical thermostats. In the navy, mines can be described as automatic devices. The term "automated" is often used to refer to more complex systems, which based on certain rules may react differently on a case-by-case basis. The personal cars used every day are equipped with automated braking systems, traction control, etc. The term "autonomous" is reserved for systems that perform tasks or have a mode of operation capable of overcoming certain situations and which is not directly predictable. In addition to all this, there is also the term "artificial intelligence" which refers to systems that have almost human intelligence but in a strict field of activity, performing tasks depending on certain variables.

These tasks can be performed, and there are examples, in space, in the air, on the ground, on the water and underwater. Hence the military literature has developed various acronyms that include the operating environment for which the system is intended: UAS (Unmanned Aerial System), UGS (Unmanned Ground System) and those for the maritime domain USS (Unmanned Surface System) for surface and UUS (Unmanned Underwater System) for the underwater environment. UXS or simply US (Unmanned Systems) is another acronym that encompasses all of these unmanned systems.

The term "unmanned" although widely used can be considered inaccurate and should rather be replaced by "remote piloted". Although these systems do not have an operator on board, they

are, to a large extent, not autonomous and benefit from human intervention for effective piloting and more. The best example is the UAS MQ-9 Reaper recently used by the U.S. for specific actions in the enemy's territory.[2] One such system needs 171 people during a mission patrol[3].

In the literature, even the term "drone" has begun to be accepted for all means of action of these systems, in fact defining a system piloted remotely or by means of an autonomous computer or equipped with artificial intelligence located on board.

The importance of remotely piloted vehicles

The technological revolution we are witnessing today also has an impact on the way the armed struggle is planned and conducted. The environment in which the military operates today is more complex than before. It is characterized by uncertainties regarding the nature of the threat, the place from which the attack is launched and the means of combat used by the enemy. The situation is further complicated by the media exposure when any tragedy immediately reaches the public's attention and causes emotion. Thus, it is no longer politically and socially viable to launch a mass attack based exclusively on mass superiority. The use of remotely piloted vehicles will minimize the risks and prevent the need to deploy an increased number of troops and manned combat vehicles. Furthermore, we want to emphasize the importance of remotely piloted vehicles by presenting their place and role in underwater combat.

Understanding what is happening beneath the water surface has always been a formidable task. Visibility is scarce, movement is difficult and environmental pressure becomes critical as depth increases. It is essentially a hostile environment to humans and therefore calls for the use of robots.

We are on the verge of time when technological advancement, sensors, navigation systems and software programming allow underwater drones to perform these complicated tasks. Their use will undoubtedly increase in the coming years. We note that demand does not come only from military needs but from the commercial sector since the competition for resources is more and more focused on this environment that has been and will remain difficult to explore.

The maritime field will witness a rapid development of such autonomous or remotely piloted systems that will impact the naval combat tactics similar with air drones that changed the land tactics.

Most likely, we will never get rid of manned combat platforms, but this does not mean that we will not be able to improve to a large extent the current capabilities by using remotely piloted vehicles.

Therefore, we are going to further describe the role and location of remotely piloted vehicles in military actions. We choose three missions, considered by us the most relevant, in which the action of underwater drones will produce effects with impact on the field: MCM, ISR and enemy deception.

Drones' missions in the underwater environment

While the warfare principles remained relatively unchanged throughout history, the technological advancement and the adoption of unconventional warfare tactics are increasingly provoking commanders to consider possible future conflicts. Potential adversaries are further complicating the operating environment adopting anti-access / area denial (A2/AD) tactics.

The missions that underwater drones can accomplish are numerous. Without claiming to list them exhaustively, we will continue with the following:

- Mine counter measures (MCM)
- Intelligence Surveillance and Reconnaissance (ISR)
- Enemy deception

All these missions have been identified as dangerous to human operators but also time and resource consuming.

Mine counter measures

Mine counter measures represent the process of neutralizing marine mines so that they do not affect the use of maritime communication lines. Marine mines are different in terms of explosive power, initiation mechanism, location (bottomed or anchored). Other mines become active only under acoustic, magnetic or pressure influences or a combination of them.

There are two methods to fight mines: mine hunting and minesweeping. Mine hunting involves detecting, identifying and neutralizing the danger

posed by the mine. Minesweeping is the process that imitates the mine explosion trigger or by which the mine anchors are cut so them come to the surface and can be neutralized. Mine hunting offers more certainties but is time consuming because it involves identifying the mine while minesweeping is faster but involves operational risks and does not offer guarantees in terms of efficiency.

In addition to eliminating the danger to which ships and their crews are exposed during the fight against mines, underwater drones can support the conduct of these operations in several ways. In the case of mine hunting, the chances of identifying mines would be improved, as multiple crossings would no longer be necessary to scan the mine, reducing the long and difficult period imposed by current tactics. During minesweeping, the challenges come from maintaining an established course and from the task to reproduce the influences that can trigger the mine explosion. If the first challenge can be easily overcome by the vehicle dimensions and high maneuverability, the second challenge, the correct setting of the influence generated by the drone, it is rather the field of mine hunting.

Collection and providing information

With the invention of the diesel-electric submarine, the naval forces benefited from the advantage of clandestine actions using the underwater environment to carry out their missions. The purpose of these missions is usually intelligence collection, surveillance, and reconnaissance (Intelligence Surveillance and Reconnaissance – ISR). Usually, the data collected in this type of operation is not used immediately in the tactical actions such as, for example, an attack initiated by the submarine because the submarine usually avoids revealing its position through an attack. If the submarine attacks, it would alert to its presence and the intelligence collection mission would be compromised. Since the attack mission is not necessary, the action will be limited to navigating or stationing in the area of interest, collecting data, possibly processing data in information, and disseminating them to other systems in a way that does not compromise the mission. In this way, the submarine platforms can concentrate on the firing mission.

Collecting information is a long-term activity and can be very dangerous if it takes place in an area controlled by the enemy. Thus, the use of manned submarines will test the crew's endurance and will keep these submarine platforms occupied without be available in other missions. The use of submarines in surveillance missions is feasible when the human decision is needed to initiate an attack based on the information obtained. In the absence of this imperative, the interest is that these routine patrol missions be carried out by autonomous systems that do not involve the costs and risks of using a manned submarine.

Actions to discourage and deceive the opponent

The effects produced by the remotely operated vehicle during the military actions are identified at all levels of manifestation of military art, tactical, operational, and strategic levels.

At the tactical level, we are talking about the direct and indirect actions of the autonomous systems. They have a role in both offensive and defensive actions. They can be vectors of attack or they can carry out subversive actions of disorganization, deception, destabilization, or disturbance of the actions of the opponent's forces.

The deception of the opponent in a conflict is as old as the war itself. It is one of the simplest means at hand in terms of forces and means required Remotely Operated Vehicle could be very useful in the effort to mislead the opponent considering that equipment and transmitters can be arranged onboard which could convincingly reproduce a target for the opponent.

In this situation, remotely operated vehicles must not have independent navigation capabilities but only the ability to detect the presence of an enemy and in turn emit a false target signal. Although the likelihood of an enemy using ammunition against these false targets is quite low, underwater drones can generate a variety of plausible targets for the opponent's radar so that the process of identifying the nature of the target is difficult. Instead of certainties, the opponent will have to go through a selection process that involves very valuable time and resources during an attack.

The operational effort of an opponent to neutralize the actions of drones or remotely piloted submersible vehicles will be considerable. The disadvantage of such an action will be the need for additional forces deployed on the battlefield. From the point of view of the one who uses such

systems, there is a tactical disadvantage, because they can be engaged from the surface, from the air or from the water, or underwater. But there are countermeasures to reduce the action of some vectors on these remote-controlled systems.

At the strategic level, a series of effects of the actions of the remotely operated vehicle can be identified, carried out at operational or strategic level, but the most diplomatic action is to discourage an opponent by the technological impact manifested by the possibility of using such systems which are not within the reach of any actor or user unless the competition produces a different effect in this war of technologies.

Discouraging the opponent by using drones or a remotely operated vehicle is a specific mission of these systems that has effects at the strategic level. Naval diplomacy is a form of manifestation of maritime interests and is a mission of the naval forces. Here, too, in this area, the use of drones or remotely operated vehicle in the underwater environment finds its role and place in military actions in the maritime environment, so that a coercive manifestation of the maritime interests of states can also have preventive utility.

Risks and threats related to the use of remotely piloted underwater vehicles

Technology developed for industrial purposes is sooner or later available to society or the individual consumer. These innovations allow people to be more productive, to work in safer conditions and ultimately to have a healthier life. Often, however, the same technology is co-opted on the battlefield or in the criminal environment. As we have seen, in certain situations, cells can be used to initiate explosions from a distance or, through GPS technology, to track a person's position. Air drones are also used to transport explosive ammunition to military and civilian targets, causing significant losses and effects that raise many questions about the future of asymmetric warfare or other actions in the hybrid war spectrum. Through social networks, certain non-state actors recruit followers and exercise the act of command and control over their members. Through the Internet it can be discover how to build a bomb at home or how to gain unauthorized access to a computer or a computer network. Through these examples we want to suggest that remotely piloted vehicles, part of the "smart" technology that assists us daily in our current activities, are already and will continue to be used with ill intentions.

Some of the possibilities for unmanned vehicles to act could affect the right to privacy and personal freedom while others can become dangers to the public. In other cases, it will be difficult to attribute the use of these systems by international actors, be they individuals, non-institutional entities, terrorist organizations or failed states. Many concerns about the risks and threats posed by the uncontrolled use of these systems can arise from analyzing whether all these harmful possibilities of using unmanned vehicles cannot be prevented. The answers to these concerns are unknown or at best not a guarantee that these uses will be ruled out. We can possibly hope that the technical limitations, good practices and legal provisions will be enough not to escalate in a situation out of control.

From a military point of view, drones raise various questions ranging from how the use of this technology should be trained, organized and controlled to the dilemma of whether the use of this technology is moral and legal, in accordance with international conventions. Britain has even predicted that the proliferation of underwater drones will make its Trident-class nuclear submarines increasingly difficult to hide, and they have debated whether it is worth upgrading them[4].

The rights of nations to use these systems in the territorial sea and the exclusive economic zone should not be restricted. At first sight, we can claim that freedom of navigation in the open sea also belongs to these autonomous or remotely piloted systems as long as they are able to comply with the navigation rules and do not constitute a danger to other ships.

However, by not having a crew on board, their presence in areas where freedom of navigation is established may lead to nervousness and speculation that the activities carried out are outside the freedoms and even pose a threat. From here things can take an unfavorable turn by triggering a diplomatic conflict or even an attack on the system since the reason for its presence can only be speculated.

Conclusions

More than a century ago, Jules Verne imagined what someone could do if they could operate

unchallenged in the underwater field. Captain Nemo, the antihero in the novel *20,000 Leagues Under the Seas*, built the time machine, the Nautilus submarine, due to his engineering genius. Today, the underwater field is a competitive arena in which only a few states play a significant role. This will almost certainly change in the next period when this combat environment will be predictably sprinkled with remotely piloted underwater vehicles.

Starting from this aspect, we built this approach, because we identified in this field a major potential for doctrinal and action adaptation of combat tactics in the maritime environment in general and in the underwater environment in particular. Technological development will lead to the definition of a paradigm that will change the approach of large fleets on the use of power in the war of the future that will inevitably influence the attitude of other states that will want to show interests in the maritime field.

With respect to the terminology used in the field, we have identified a range of names of these remote or autonomous systems, which cover all combat environments related to the marine environment, surface and underwater, generically called UxS or simple US (Unmanned Systems), an acronym that encompasses all of these unmanned systems.

US (Unmanned Systems) are the following:

- UAS (Unmanned Aerial System) for the air environment;
- UGS (Unmanned Ground System) for the terrestrial environment (at the seaside);
- USS (Unmanned Surface System) for maritime surface platforms;
- UUS (Unmanned Underwater System) for the underwater environment.

We have observed that autonomous or remotely piloted systems engaged in intelligence, surveillance and reconnaissance (SRI) missions can frustrate the ability to maneuver hostile forces. These compact drones that can operate in the air, on the surface and underwater can perform several combat functions that would otherwise involve platforms with crews on board.

We propose that in the future these systems be differentiated in terms of assigned terminology, which considers the possibility of piloting as a classification criterion, so we consider that the term "unmanned", widely used, can be considered inaccurate, in the classification of these systems, and it should be replaced by two variants:

- "remote controlled" system or vehicle;
- "autonomous" system or vehicle.

Similar to the terrestrial field, we believe that the development of these autonomous or remotely piloted systems will place its mark on naval combat tactics.

We believe that autonomous or remotely piloted systems will be used mainly in the following main missions of the Naval Forces:

- mine action (MCM);
- collection and provision of information (ISR);
- actions to discourage and deceive the opponent.

In the mines warfare, autonomous or remotely piloted systems will occupy an increasingly visible place, even if their actions will be discreet. Mine hunting is an activity that has helped identify technological solutions that have revolutionized mine warfare.

The collection and provision of information is an activity carried out since peacetime, so that starting from civil systems of public utility, the information field has actively exploited the technological potential in the field.

The actions of deterrence and deception of the opponent cover tactical actions as well as their effects at the strategic level so that their usefulness is diverse and high impact. Tactically and operatively, autonomous or remotely piloted systems are difficult to discover, employ, and destroy. At the strategic level, they are a tool for negotiating the state on the manifestation of regional interests in the maritime environment, through their potential.

The role that these systems can play in asymmetric actions in the spectrum of hybrid warfare should not be underestimated. This obliges the main maritime actors to identify solutions for controlling the use of autonomous or remotely piloted systems and to protect the rights of nations to use these systems in the territorial sea and the exclusive economic zone.

Despite possible concerns, the use of unmanned vehicles could be a lifeline for countries such as Romania, which inherits a classic technology fighting technique and is under the imperative to improve these capabilities with a modest defence budget compared to that of the riparian states.

Clearly, a comprehensive approach to anticipating the impact that these remotely piloted vehicles will have on security tactics and strategies is imperative for future defence planning processes.

Therefore, we believe that it is necessary to promote an institutional approach to capitalizing on the opportunity to develop research programs and to identify strategic partners that could support a national effort to contribute to the underwater warfare on the eastern Euro-Atlantic flank. Given the role and place of these autonomous or remotely piloted systems in military actions from tactical to the strategic level, we believe that the synergistic effect of owning and using them with other submarine sensor systems or naval and air platforms will represent a way of peaceful manifestation of Romania's maritime power in the Black Sea, in accordance with national interests in the region.

We are sure that this approach will represent a benchmark for the direction of development of the subject of this topic, in a field where similar actions have not been so visible, given the complexity of the field on the one hand and the concerns of specialists in the field, where the manifestation of such interests is usually under the spectrum of classified information. The article is addressed to specialists and decision-makers in the field, encouraging the attention to technological development trends and forecasting the effects on military and civilian actions in the underwater environment.

NOTES:

1 Carl von Clausewitz, *On war*, Princeton University Press, 1832, p. 76. *The invention of gunpowder, the constant progress of improvements in the construction of firearms are sufficient proofs that the tendency to destroy the adversary which lies at the bottom of the conception of war is in no way changed or modified through the progress of civilization*.

2 Michael Crowley, Falih Hassan, Eric Schmitt, *U.S. Strike in Iraq Kills Qassim Suleimani, Commander of Iranian Forces*, https://www.nytimes.com/2020/01/02/world/middleeast/qassem-soleimani-iraq-iran-attack.html, accessed on 11.02.2020.

3 Slide 4 from *The Way Ahead: Remotely Piloted Aircraft in the United States Air Force,* briefing slides presented by Lt.Gen. Dave Deptula, Deputy Chief of Staff, Intelligence, Surveillance and Reconnaissance, http://www.daytonregion.com/pdf/UAV_Rountable_5.pdf, accessed on 11.10.2019.

4 David Hambing, *The Inescapable Net: Unmanned Systems in Anti-Submarine Warfare*, Parliamentary Briefings on Trident Renewal, March 2016, https://www.basicint.org/wp-content/uploads/2018/06/BASIC_Hambling_ASW_Feb2016_final_0.pdf, accessed on 10.07.2020.

REFERENCES

Clausewitz Carl von, *On war*, Princeton University Press, 1832.

Crowley Michael, Hassan Falih, Schmitt Eric, *US Strike in Iraq Kills Qassim Suleimani, Commander of Iranian Forces*, https://www.nytimes.com/2020/01/02/world/middleeast/qassem-soleimani-iraq-iran-attack.html

Lt.Gen. Deptula Dave *The Way Ahead: Remotely Piloted Aircraft in the United States Air Force*, http://www.daytonregion.com/pdf/UAV_Rountable_5.pdf

Hambing David, *The Inescapable Net: Unmanned Systems in Anti-Submarine Warfare*, Parliamentary Briefings on Trident Renewal, March 2016.

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-39

APPROACHES TO MEDICAL EQUIPMENT LIFE CYCLE

Col.Eng. George UDROIU, PhD Candidate*
Col. (ret) Prof.Eng. Toma PLEȘANU, PhD**

Medical equipment is the most expensive investment in the healthcare industry that helps ensure the safety, quality and efficiency of the medical care. In the context of the continuous development of technology and the limitation of available resources in the healthcare sector, as well as in order to increase the potential of assets and their technical performance and for optimizing the costs associated with use, advancing robust equipment management is a managerial must for healthcare leaders. This multidisciplinary activity of health technology management is of fundamental importance in the development of the organization and requires an understanding of the life cycle of medical equipment and the associated processes. The current article provides an overview of the stages of equipment life and the interdependent functions of this chain, in order to improve the decision-making process and the rational use of resources.

Keywords: medical equipment; life cycle; lifespan; medical equipment management; efficiency.

Uncertainties caused by the ongoing health care reform, the year-by-year increase in general healthcare costs, the expansion of patients' medical demands, the concern of health units to extend the life of assets and reduce the costs of operating and supporting medical equipment, in order to make the hospital's business profitable, are the main factors that determine the development of a complete management during the life cycle of medical equipment. This involves thoroughgoing and optimizing the stages in the life of equipment, through a systematic approach to their life cycle, continuous monitoring and periodic analysis of each stage, from the identification of the need in the medical market to sales, within the innovation cycle and development, from planning to final disposal, within the operational life cycle, as well as activities necessary to support the lifetime of the equipment.

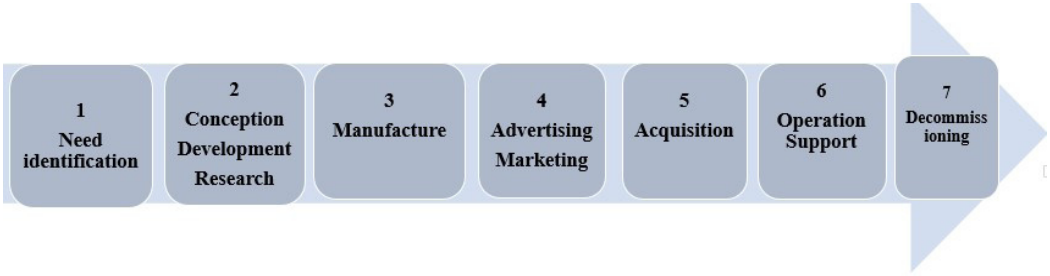


Figure 1 *Phases of the extended life cycle of medical equipment*
Source: Adaptation after [World Health Organization], Medical Device Regulations, *Global overview and guiding principles*, Geneva, 2003, p. 5.

The extended life cycle of a medical equipment (ME), as shown in Figure 1, represents the time frame and the progress of the equipment, from the clarification of its need and utility in healthcare services to the decommissioning. This cycle includes interdependent management activities, corresponding to the two component sequences of ME life – the industrial life cycle (innovation and development sequence) and the operational life cycle (clinical sequence under the responsibility of health units).

***"Gl.dr.av. Victor Anastasiu" National Institute of Aeronautical and Space Medicine*
e-mail: *uddy_74@yahoo.com*
****"Nicolae Bălcescu" Land Forces Academy, Sibiu*
e-mail*: tomaplesanu@yahoo.co.uk*

Industrial life cycle

In the first sequence, following the identification of the need in the clinical environment, researchers and medical practitioners seek to develop concepts, through technical methods and scientific conventions to ensure prototypes of safe and high-performance equipment, with low risks and increased effectiveness. After obtaining the prototypes and performing the tests and the verifications of the acceptance parameters, the clinical engineers make corrective modifications to the initial project in order to attest the concept and to carry out the clinical studies.

Official approval in advance of the manufacturing phase (e.g. CE marking in the European Union) for placing on the market is made by notified bodies from the New Approach Notified and Designated Organizations (NANDO[1]) list, and at the end of production, medical devices are assigned unique device identifiers[2] (UDI).

Advertising aims to promote ME and to influence users (medical staff) and final beneficiaries (patients) on the belief in the safety, quality and performance of new technologies, in order to increase future expectations and sales.

The sale of medical technologies overlaps with the acquisition phase of the operational life cycle, representing the intersection of the two sequences in the life of medical technologies and requires the implementation and compliance by providers of international regulations on medical devices, and by medical organizations, good knowledge of ME newly entering the market (performance, parameters, costs).

Lifespan of ME

With the interaction of ME with the clinical environment in the health unit (clinical sequence of life cycle - operational life cycle), we encounter, although not in equipollence, interchangeably, three terms for life[3]: actual life, physical life and useful life.

Actual life is the period of time during which an ME operates at nominal technical parameters and can achieve the expected results in the diagnosis or treatment for which it is recommended and used.

Physical life is determined by the period of time in which an ME is productive and ends when it suffers a severe failure and can no longer be restored to operational status or can no longer fulfill its function and purpose for which it was created.

The useful life is the estimated available resource of an equipment, recommended by the manufacturer, usually expressed in operating hours, number of exposures, number of procedures performed or number of diagnoses.

Estimating the actual life of the ME is a crucial parameter in the life cycle planning phase, and the operation is strictly dependent on the following elements of influence: the attention paid by operators to the mode of operation, the periodicity and quality of preventive maintenance operations, usage frequency and environment, the cost of operational support, the availability of software updates, and regulatory changes in the area of regulation.

As part of the ME management and life cycle projection process, clinical engineering (CE) departments around the world use an average ME life of 10 years, with the exception of radiology and imaging equipment, which is extended to 15 years. This period is different from the normal duration of operation legislated at the level of each state and periodically reviewed by the specialized internal bodies. In the United States of America (USA), for example, regulations on the lifespan of ME are renewed cyclically, at 5-year intervals, based on data collected through technical structures in hospitals, by the American Hospital Association (AHA)[4].

Operational life cycle

Analyzed in terms of operational life, the life cycle of ME includes four main phases, as shown in Figure 2, each phase comprising a wide range of actions and activities, components of medical equipment management during the life cycle of competence and the responsibility of the medical organization, such as: needs assessment; technical consultancy; scheduling and cost planning; supply chain management; contract management; records of stocks and spare parts; human and material resources management; hazardous materials management and safety protocols.

The planning stage, initiated by the tool of identifying and demonstrating the need, is an essential period in the management decision-making process, providing the correlation of requests for replacement or additional ME with the vision and strategy of the medical institution, in

terms of future objectives management, regarding the health care services provided or the resources forecast to be allocated.

During this stage, medical equipment management groups must consider a number of aspects and conditions for the viability of projects to invest in medical equipment, as follows:

• Justification of the choice made to demonstrate the opportunity for future investment.

Planning is a dynamic element in the management decision-making chain of ME, with the role of optimizing the allocation and use of resources, thus based on three pillars of health unit development: management policy and strategy, the

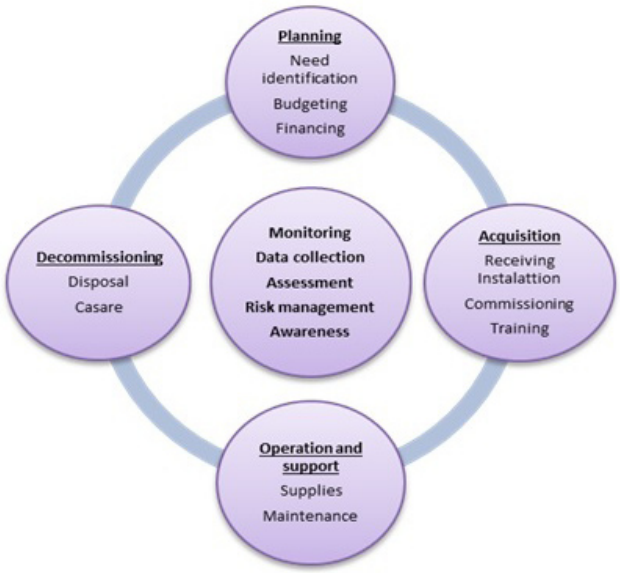


Figure 2 *Phases of the life cycle of medical equipment (operational sequence)*

Source: Adaptation after Joseph F. Dyro, *Clinical Engineering Handbook*, Good Management Practice for Medical Equipment, *Steps in the life cycle of a medical device*, Elsevier Academic Press, Burlington, 2004, p. 130.

• Substantiation and prioritization of the equipment needs, benefits (qualitative, financial, performance) brought to the medical organization by adopting new technologies;

• Identifying the financial feasibility of possible solutions: new acquisition, modernization (reconfiguration/software update) of existing technologies, operation of existing equipment over a well-defined time horizon;

• The capacity and compatibility of the current infrastructure and of the electronic system adopted for the new technology;

• Qualification and competence of the medical and technical staff of the medical organization;

• The degree of development of the service network at national or local level;

• The additional costs necessary for the works and services necessary for the installation and commissioning;

• The costs necessary to operate and maintain the equipment during the life cycle;

• Verification and compliance with the regulations governing medical services;

quality and safety of the health care services and the profitability of the organization, in relation to the costs of the life cycle of the ME.

Internationally, the recommendation for the annual budget allocation for investments is 10% of the total replacement value of the equipment fleet[5], but in recent years, the allocation of resources is based on cost analyzes - efficiency, reliability and operational support.

For a balanced budgeting and funding, the planning must cover all hidden costs of ME life (human resources costs, training, maintenance, consumables and spare parts, fees for accreditation and operation, administrative costs, decommissioning and disposal costs), by designing a realistic budget, based on availability and applicability, prioritizing needs and making financial allocations more flexible. Budgets must be planned for the entire life cycle of the equipment, usually with an annual maintenance cost for a full service contract[6] of 10% of the acquisition cost, each sometimes reaching up to 14% in the case of complex equipment (CT, MRI) or, compared to

the total budget of a hospital, of 1% per year, for maintenance support provided to all MEs[7].

The acquisition of medical equipment is a complex and difficult task in their life cycle, requiring good collaboration and communication between all the structures involved in the health unit, in order to procure good quality devices, both safe to operate and accurate in delivering results, cost-effective for life and in line with internationally accepted standards.

The most popular ME purchasing options are:

- New ME from world-renowned manufacturers – advantages: superior quality, operational safety, lifelong logistical support, multiple clinical functions; disadvantages: high life cycle cost and complexity in operation;
- Used or reconditioned ME from globally recognized manufacturers – advantages: attractive quality / price ratio, availability of consumables; disadvantages: low clinical acceptability (medical staff prefer new technologies), short warranty period;
- New, cheap and low-reliability ME, usually made in China – advantages: low life cycle cost; disadvantages: lower quality, lack of compliance with European standards, short service life, low availability for logistical support;

At this stage, the evaluation and selection of existing technologies play a key role in the procurement of appropriate equipment, and specialists must take into account certain factors, such as:

- exchanging information with other medical units about the reliability and results of ME;
- identifying potential suppliers and verifying their ability to support the technology throughout the life cycle (references);
- availability of consumables and checking their price;
- complexity of existing equipment;
- interoperability of identified medical devices;
- standardization of equipment in order to reduce costs during the life cycle;
- choosing the best solutions in relation to the total life cycle costs;
- centralization of needs at national or departmental level (centralized procurement).

The profile of the technical specifications, after which the offers are evaluated from a clinical, technical and financial perspective, must aim at the acquisition of qualitative and high-performance ME, the reduction of risks to patients and operating personnel, logistical assurance issues, technology life, as well as achieving cost efficiency.

In this regard, the World Health Organization (WHO) has drafted a general template of technical specifications for medical devices, which should cover at least the following aspects[8]: the name of the ME and the purpose of its use; technical and physical parameters; usage requirements; requests for consumables and spare parts (accessories); environmental requirements; installation / commissioning rules and initial training; minimum warranty period; maintenance and decommissioning rules; compliance standards.

The award criteria used to determine the most economically advantageous tender may address three economic elements[9]: price only; cost only or the best ratio between quality and price or cost, but for the profitability of procurement processes it is advisable to use as evaluation factors parameters or characteristics that streamline the cost over the life cycle of the ME.

ME reception is based on a detailed planning, developed on a set of tools related to the required documentation, test reports, manuals, instructions, data sheets confirming the required quality and safety performance, as well as compliance conditions and standards.

In order to carry out the ME installation and commissioning procedure in the best possible conditions, all acceptance needs must be assessed in advance, such as: the availability of electricity and water networks in the facility; maximum permissible floor load; the dimensions of the access and storage spaces; coordination and supervision of operations; availability of test equipment and qualified technical staff. The medical and technical staff involved in the use and the maintenance of the equipment must be trained during the commissioning (mandatory request of the specifications - number of persons and duration) to increase skills and professional development, as well as to avoid operating errors or maintenance, the cause of most ME failures.

Operation and support require increased technical attention over the lifetime, during which time the CE is the link between the user medical staff and the provider or service operator of the

equipment, a stage in which patient safety and the validity of the results, the availability of ME and the provision of consumables necessary for operation are paramount.

To this end, medical organizations should:

- plan all control and verification operations;
- develop plans for the training and improvement of medical and technical staff for the training and development of skills;
- promote and respect protocols of good practice adopted at the level of the institution;
- establish procedures for cleaning, disinfection and sterilization;
- estimate, ensure and monitor the need for consumables on stock levels and on shelf life, as well as certified and compliant spare parts for preventive maintenance (based on the manufacturer's recommendations or on a statistical basis);
- develops preventive maintenance, calibration and testing programs, with the role of extending the life of medical technology;
- properly monitor and manage the costs necessary for operation and maintenance;
- assess the risks of equipment not included in maintenance programs;
- hold all staff accountable for the proper operation of ME and the rational use of consumables.

ME maintenance is performed as planned, following a maintenance program that includes two categories of procedures[10]: inspection and preventive maintenance (IPM) and corrective maintenance (CM).

IPM aims at the timely execution of technical actions necessary to reduce the failure rate of ME and increase their availability or to identify and regulate problems hidden or undetected by user medical staff.

CM has the role of restoring the operability of the equipment to nominal technical parameters, through repair, testing and calibration actions.

The management of these procedures is ensured throughout the life cycle by the CE department in hospitals, which should identify, in the context of current budgetary constraints and the complexity of health technology, efficient ways to implement the program[11], by selecting ME that should be included in the maintenance program, both internally (on its own) and outsourced, depending on the human, material and financial resources available, their skills and training, the criticality (function) of the devices within the health unit, the manufacturer's recommendations in regarding the frequency of IPM operations, the history of technical problems and the costs of maintenance operations.

The economic efficiency is largely determined by this financial balance within the maintenance program, found by the CE department, between the identified risks of using the equipment, the maintenance costs and the benefits to the medical organization.

Decommissioning and disposal is the end-of-life stage of the ME life cycle, in which CE structures must identify, following technical and economic analyzes and evaluations, medical devices that have a normal service life, have reached the reported inefficiency point, operating costs, support and benefits to the medical organization, are technologically obsolete and are no longer relevant in the current activity or future strategy of the health unit, have major defects that require unjustified restart costs, the incidence of regulations prohibiting the use of current technology or, simply, unavailability of logistical support on the profile market caused by the lack of production of consumables or spare parts.

Throughout the life cycle, CE structures in healthcare units should monitor the operational trajectory of ME, collect data on the activities and on the costs necessary for their operation and, periodically, analyze and evaluate the results obtained by transforming data into information, in order to understand the management process, confirm progress or stagnation and promote the concept of learning. At the same time, the culture based on data is the essential tool of planning, and the information obtained from the equipment progress reports bring the necessary elements to the analysis of human resource use and medical technology, how to ensure its maintenance and effectiveness, the study of complete costs per life cycle and determination of the efficiency of the usage and the management of medical equipment.

In the same quadrant of monitoring and data collection, the life cycle risk management approach involves monitoring the safety, performance and effectiveness of the equipment, from placing on the market to the end of its life. Adverse events, technical problems, alert criteria, investigation and resolution, as well as safe disposal methods are notions that require their registration and inclusion

in the holistic analysis of medical equipment life cycle management.

Conclusions

Life cycle management of medical equipment is a complex and varied process, initiated with the identification of the need and completed after a period of their interaction with the medical organization (sometimes more than 10 years) with the decommissioning and disposal of devices.

Effective lifespan, which measures the parameters of functionality and reliability, ensuring the quality, safety and clinical performance of the medical act (generally between 8 and 12 years) must be reevaluated, estimated and reviewed periodically, as a complementary factor to support the decision-making process to invest in medical equipment and ensure the availability of support throughout the life cycle.

Life cycle management must be planned and permanent and requires time, physical and budgetary resources and must comply with healthcare-specific regulations and meet the strategic objectives of the healthcare organization, in order to maximize the benefits of both stakeholders (patients and the organization), control costs and reduce the risks associated with the use of health technologies.

The intrinsic relationship between the safe and efficient use of medical equipment and the patient satisfaction determines the full responsibility of all actors involved in the process, with skills and responsibilities in planning, evaluating, purchasing, operating and maintaining medical devices, through an understanding based on data and information, in order to optimize the results of life cycle management. The first elements of streamlining the way of managing the life of medical equipment are the cooperation and communication of the responsible factors: manufacturers, suppliers, service providers, users, patients and government.

NOTES:

1 https://ec.europa.eu/growth/tools-databases/nando/

2 https://ec.europa.eu/growth/sectors/medical-devices/new-regulations/guidance_en

3 *** *Medical equipment asset management framework*, State of Victoria, Department of Health, Melbourne, 2012, Part C, pp. 14-17.

4 [American Hospital Association], *Estimated Useful Lives of Depreciable Hospital Assets,* Chicago, Health Forum Inc, 2004.

5 Temple-Bird et al., *How to plan and budget for your healthcare technology. How to manage series of health care technology guides no. 2*, St. Albans, Ziken International (Health Partners International), 2005, pp. 119-120.

6 The annual full sevices maintenance contract is a legal commitment by which the service provider covers all the technical expertise necessary for the operation of the equipment, on site and remotely, 24x7, repair and repair of technical problems, software update and modernization, support and in-service training, spare parts and maintenance materials.

7 Binseng Wang, *Medical Equipment Maintenance: Management and Oversight*, Morgan & Claypool Publishers series, University of Connecticut, 2012, pp. 1-2.

8 [World Health Organization], *WHO Medical devices technical series*, Global Atlas of Medical Devices, *3.4 Health Technology Management*, Geneva; 2017, pp. 60-63.

9 *** *Law no. 98/2016 regarding public acquisitions*, Bucharest, May 19th, 2016.

10 Ernesto Iadanza,Valentina Gonnelli, Francesca Satta, Monica Gherardelli, *Evidence-based medical equipment management: a convenient implementation,* Medical & Biological Engineering & Computing, 57(2):1-16, August 2019.

11 N. Saleh, A. Sharawi, M. Abd Elwahed, A. Petti, D. Puppato, and G. Balestra, "A New Approach for Preventive Maintenance Prioritization of Medical Equipment", *XIII Mediterranean Conference on Medical and Biological Engineering and Computing*, *IFMBE Proceedings*, Springer, Cham, 2013.

REFERENCES

*** *Law no. 98/2016 regarding public acquisitions*, Bucharest, May 19th, 2016.

*** *Medical equipment asset management framework*, State of Victoria, Department of Health, Melbourne, 2012, Part C.

[American Hospital Association], *Estimated Useful Lives of Depreciable Hospital Assets,* Chicago, Health Forum Inc., 2004.

[Managing Medical Devices], *Guidance for healthcare and social services organizations*, Medicines&Healthcare Products Regulatory Agency, UK, 2015.

[World Health Organization], WHO Medical devices technical series, *Medical equipment maintenance programme overview,* Geneva, 2011.

[World Health Organization], WHO Medical Device Regulations, *Global overview and guiding principles*, Geneva, 2003.

[World Health Organization], WHO Medical devices technical series, Global Atlas of Medical Devices, *3.4 Health Technology Management*, Geneva, 2017.

[European Commission], *Medical Devices*, https://ec.europa.eu/growth/sectors/medical-devices_en

Dyro F. Joseph, *Clinical Engineering Handbook*, Elsevier Academic Press, Burlington, USA, 2004.

Iadanza Ernesto, *Clinical Engineering Handbook,* Second Edition, Elsevier Academic Press, London, 2020.

Iadanza Ernesto, Gonnelli Valentina, Satta Francesca, Gherardelli Monica, "Evidence-based medical equipment management: a convenient implementation", *Medical & Biological Engineering & Computing*, 57(2):1-16, August 2019.

Rivas Rosanna, Vilcahuaman Luis, *Health Technology Management Systems*, Elsevier Academic Press, Burlington, USA, 2017.

Saleh N., Sharawi A., Abd Elwahed M., Petti A., Puppato D., Balestra G., "A New Approach for Preventive Maintenance Prioritization of Medical Equipment", *XIII Mediterranean Conference on Medical and Biological Engineering and Computing, IFMBE Proceedings*, Springer, 2013.

Temple-Bird et al., "How to plan and budget for your healthcare technology", *How to manage series of health care technology guides*, no. 2, St. Albans, Ziken International (Health Partners International), 2005.

Wang Binseng, *Medical Equipment Maintenance Management and Oversight*, Morgan & Claypool Publishers series, University of Connecticut, 2012.

Willson Keith, Ison Keith, Tabakov Slavik, *Medical Equipment Management*, CRC Press Taylor & Francis Group, Broken Sound Parkway NW, 2014.

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-40

TERRORISM DURING THE CORONAVIRUS PANDEMIC – COVID 19. EVOLUTIONS AND FORECAST

Prof. Costică VOICU, PhD*
Police Chief Commissioner Ion GANE, PhD Candidate**

In the run-up to the Covid-19 pandemic, the world has witnessed a significant number of conferences, articles and opinions that have revolved around the same topic – RESILIENCE. Undoubtedly, a valid topic of discussion, but which lacked the current pandemic – Covid-19. The complex world we live in is facing a new thorny issue, consisting of a mixture of terrorist threats from ISIS and other terrorist organizations, to which has been added the worldwide virus – SARS-CoV 2 and which triggered the pandemic, which spread rapidly and with a major negative impact on the economies, finances and serious humanitarian problems of those in need. These threats have severely affected the security climate in various parts of the world, affecting all states, territories and the most vulnerable people.

The question is whether the world is ready to live in the new conditions. Do Europe and the rest of the world have a clear roadmap to respond to the new situation? The current situation has become a unique test to verify the unity of the EU and NATO, their capacity and readiness to return to the forefront of terrorism.

Keywords: Covid-19; ISIS; terrorism; Middle East; NATO; Europe.

Why did we choose such a topic?

Obviously, the reason why we chose this topic is determined by the current realities in Europe and worldwide.

We do have to admit that after a period of relative peace and tranquility – mainly determined by the restrictions of movement in relation to the current pandemic, it would be appropriate to understand the need to anticipate and to be prepared for what can be the next phase of the terrorist activities in Europe.

Any professional working within defence, public order and security services has to be proactive and to provide in due time answers to policy makers. In such circumstances, scholars from the field of security and defence must offer answers to few crucial questions, such as: Can we expect a new type of terrorism in the near future? In other words, would we have to face new manifestations of this phenomenon?

In our endeavor, we gathered and took into account information available to public – the so called opened sources. We put together pieces of information, we analyzed them, we compared them and came to conclusions, which we do consider real and valuable.

There were two possible hypotheses we started from:

1st. Terrorism weaker and less attractive to the individuals, both as a movement and as an option for young people.

2nd. Terrorism will emerge from the pandemic period stronger and modernized with respect to the means used and the way of perpetrating specific acts.

What is the current situation?

The Covid 19 pandemic, the latest serious problem in Europe and worldwide, fueled the terrorist rhetoric, and somehow created an advantage for terrorists who did not cease their operations, while security forces had to comply with the states of emergency and alert, which imposed strict specific rules and regulations.

Fighting the coronavirus pandemic crisis and containing its huge negative economic and social consequences is the first objective for governments. People lack money for covering their basic needs and the unemployment rate is increasing at alarming levels.

The question we asked ourselves is related to the way terrorists approached the current crisis

**"Carol I" National Defence University*

***"Alexandru Ioan Cuza" Police Academy*
e-mail: *latinromania@gmail.com*

situation. It has been established that the mandatory wearing of face masks was used by ISIS terrorists in order to return to Europe without being noticed. One relevant example is the arrest of Britain's most wanted ISIS fugitive, Abdel-Majed Abdel Bary. To better understand his profile and the danger he poses, it will be worth mentioning that he had links with the dead British ISIS executioner Jihadi John. Also, it has been assessed that after reaching Spain by boat coming from Algeria, he remained unnoticed for five days, while he intended to commit a lone wolf attack in Barcelona[1].

According to terrorist propaganda[2], the current pandemic is a gift of Allah for the so-called true believers and a curse for westerners and non-believers[3]. We have no doubts that there are enough people who do believe that this is a punishment for the westerners and a gift for the true believers and followers of radical Islam. If we consider Afghanistan, where the illiterate rate is huge, access to information is very poor, nevertheless having in place the radical Islam propaganda, this situation can lead to an amplification of the number of youth joining IS-K (Islamic State Khorasan) ranks.

Middle East

While the situation in Europe improved, in Syria and Iraq nothing is calm or quiet. ISIS is re-emerging mostly in the desert areas and along the border line between the two states.

The U.S. estimates the terror group's force strength in Iraq and Syria as being in between 14,000 and 18,000 Jihadis.[4]

ISIS resurgence is real and proved by multiple deadly attacks. In Iraq, during the month of Ramadan, ISIS perpetrated a number of 260 attacks, killing or wounding 426 people[5].

In Syria, ISIS terrorist cells starting with April 2020, perpetrated a large number of terrorist attacks, killing – according to Syrian official reports – at least 887 pro-regime fighters. Unofficially, it is considered that the number of victims among Syrian forces supporting Assad regime has actually doubled[6].

Maybe, we should mention the fact that President Trump's initial announcement on defeating ISIS was not completely justified, as first it seemed that as a state, ISIS lost the battle and disappeared from the map of the Middle East, yet as an ideology, ISIS is far from being defeated. Therefore, we can see first visible signs of its resurgence, proved by the deadly attacks against civilian and military targets.

A special remark has to be made about the massive number of ISIS fighters detained in autonomous Kurdish region from Iraq, who recently tried to escape aiming to join the fight against legitime authorities. The improvised prisons in Syria and Iraq hold about 10,000 men, of whom about 8,000 are locals Syrians and Iraqis – and the remaining detainees are from 50 other nations like Belgium, Britain, France and Germany, countries which are refusing to accept them or even deprived them of their citizenship just to make sure they cannot return home[7].

According to other sources[8], the total number of women and children living in makeshift detention camps in northeastern Syria, on suspicion of being in connection with Islamic State links, add up to approximately 14,000 foreigners who belong to more than 60 countries. To this number we have to add another 30,000 Iraqis living in a section of the camp.

Given this information, we have to remember that during last October, hundreds of ISIS fighters had escaped from detention camps in northern Syria. According to existing assessments, most of Jihadists were able to hide and afterwards regroup in the vast deserts of Syria and Iraq[9].

As a conclusion, we may say that as long as prisoners are not put on trial and they are detained mainly in makeshift prisons, they are nothing but a ticking bomb. From the legal point of view, they cannot be detained forever. And thus, we may ask ourselves: what next?

Libya just joined the club of the group of states in the area that have security issues. Here, according to different reports[10], Turkey transferred Jihadists to fight with Field Marshall Haftar's forces[11], in order to prevent the defeat of the Islamist-backed Government of National Accord. Allegedly, Jihadists are promised several thousands of dollars per month in exchange for fighting along Turkey. The picture is more complex, since we have to admit that according to other reports United Arab Emirates, Egypt and Russia are supporting Field Marshall Haftar in his effort to remove from Tripoli the internationally recognized government[12]. All in all, Islam adepts have received a big and unexpected amount of oxygen.

Under all these circumstances, just briefly mentioned, since there is vacuum of power, ISIS is flourishing and getting back on the battlefield, either through some states sponsors or under its own flag, command and ideology. As mentioned before, some just got a *job* in another battlefield - Libya. According to all evidence, western Libya became a safe haven for terrorist organizations where the AQIM (Al Qaeda in the Islamic Maghreb) is very active[13].

An interesting assessment of the US-China commercial war[14] mentions the alleged existence of an understanding between the US and Turkey which allowed the existence of an enclave of ISIS terrorists on the possible Silk Road crossing Iraq and Syria towards Turkey. And this allegedly happened just for blocking Chinese plans for economic expansion. Since we do not have a different statement from the US, we cannot dismiss this possibility which is somehow justified. Moreover, it shows the complexity of the Middle East political-military game.

All these are happening while the US is trying hard to pull out from Afghanistan – somehow being forced to trust and make a deal with the Talibans (one of the dozen terrorist groups operating on Afghan soil), who, in turn, promised to deny shelter and training for any future terrorist group targeting American interests – and also keeping a small number of troops in the Middle East (Syria and Iraq) – probably around 500.

In our opinion, pulling out from the hotspots of the world the troops of the greatest military power – America is a dangerous option which can trigger a chain of negative consequences for Europe and worldwide security.

This proves what the Talibans always stated: "You have the money, we have the time. One day you will have to leave and then we will take over"... Considering the statements issued by the Talibans, the day of taking over the full power in Afghanistan is pretty close. And then, we do estimate that a fratricide war – a typical Afghan war, is going to start. Under these circumstances, terrorists are bound to find a safe haven just as in good old times.

One of the constant concerns of the security services has always been related to what future terrorist attacks will look like, and a special focus has been on biological weapons. The current pandemic Covid 19 proved, as if it had been necessary, that a biological weapon can be developed and used in the near future, even by terrorist organizations which comprise in their ranks highly educated people also.

Europe

According to existing reports, there are maybe 1,000 of ISIS terrorists ready to come out from their sleeping cells status and to get into action against constitutional and democratic regimes.[15]

It is obvious that in Spain, Catalonia which is flooded with male Pakistani nationals – most of them having entered unlawfully and without proper identification papers, is the epicenter of coronavirus – Covid 19 and this aspect seems to be also linked with their attitude towards European culture. Thus, it is well known that they disobey the basic rules of protection against Covid 19 and this can be both a sign of lack of consideration towards state authority but also a possible action for supporting ISIS willingness to reconquer the former Muslim territories lost in Iberic peninsula to the European Christians.

An important step forward in fighting terrorism in general and ISIS Jihadi fighters who returned from the Middle East especially has been made by the UK. Thus, all convicted Jihadists are no longer released from British prisons following a routine procedure, but rather a strict assessment of the risks they are posing. In other words, the time of formal statements of good will and regrets is over. Also, of the same great importance is the ratification of a new law which gives power to the Police to arrest and detain for a longer period, all suspects of terrorism activities.

France also, is tackling the complex issue of terrorism by following the Agenda of the "No Money for Terror Conference" which was held on 25th and 26th of April in Paris and had as main objective combating the financing of Al-Qaeda and Daesh (ISIS)[16].

We cannot ignore a significant detail. The illegal immigration flow into Europe is an issue that requires careful consideration. Thus, according to reports[17], based on Pew Research Center evaluation, the situation is as follows:

- in France it is estimated that there were between 300,000 and 400,000 immigrants in 2017, and now the number is probably well above half a million;

• in Great Britain there are up to 1.2 million people, out of which a quarter have illegally entered Europe.

There are other potential pending problems due to the acceptance of unattended children on EU territory and the situation caused by Covid 19 pandemic which forced authorities to release from special centers a lot of illegal immigrants without proper identification papers.

The role of social media

One of the long lasting issue in fighting terrorism is fighting the online terrorist propaganda which is aiming to recruit new individuals and also to incite individuals to act as lone wolfs against so-called legitimate targets (security forces, militaries, employees of international organizations, etc.).

Both social media and mass media are playing a critical role in keeping up and coordinating the terrorist groups and activities. Despite EU regulations forbidding terrorist propaganda, social media worldwide leaves breach spots which allow these kinds of dangerous activities for the public order.

We would not refrain from mentioning that the detrimental aspects inculcated on our security by mass media are probably similar to the ones done caused by some social media. The former is indirectly and unwillingly supporting the terrorist propaganda through keeping on the front page names, pictures, statements and interesting details of the terrorists and their crimes, since we all know the main rule they are following is the "bad news is good news" because bad news sells well and makes audience rating. The latter (social media) often, or better said most of the time, allows the dissemination of propaganda videos inciting to hatred and violent actions, praising acts committed by individuals assumed without any proof as being ISIS members or at least followers.

But what kind of expectations does the International Community have when *Facebook* – a major social media player, is assigning in the oversight board, an individual like Tawakkol Karman who is considered to be a leading figure of *Yemen's Islah Party – a Muslim Brotherhood affiliate*[18].

A number of videos belonging to *ISIS Amaq News Videos* including an execution of Kurdish deminer have been spread on a number of social media networks as follows: Telegram, RocketChat, Hoop and at least 10 websites: Amazon Drive, File. Fm, Streamable, Top4top, Dropbox, Mediafire, the Microsoft One Drive, the Internet Archive, Ok.Ru, Mega.Nz,ys later, Mediafire, the Internet Archive, and Ok.Ru.[19]

The pro-ISIS tech group Electronic Horizons Foundation (EHF) launched a new web magazine dedicated to cyber and internet information security addressing smart phones, the Android and iOS operating systems, basic internet security practices, using alternate operating systems, using Tor and VPN to hide IP addresses, and elements related to privacy issues while using social media websites[20].

During the current coronavirus pandemic, terrorist organizations such as Muslim Brotherhood and ISIS took the advantage of lockdown to spread their ideology aiming to recruit and rebuild their networks[21]. The Euro Fatwa app which was created by the Council of Europe for Fatwa and Research – having its offices in Dublin, has been assessed by security services' European officials as a dangerous application (app), because its development is intended to provide a tool for Muslim Brotherhood to be used for radicalization purposes. The UK already triggered the alarm for security agencies because it is estimating a possible explosion of terrorist violence in the near future.

London Metropolitan Police Assistant Commissioner Neil Basu has raised concerns about the excessive media coverage of terrorist attacks, the so called copycat attacks, because they are aiming for minimizing the potential harm of reporting on terrorism[22] which is opposite to the damaging effects created by this kind of reporting.

We have to point out that, just over the Mediterranean Sea, on its shores, there is an on-going war and, similarly, based on evidence and analyses, it is estimated that Russia started a new military built up, in order to consolidate its future long lasting military presence in the area.

Conclusions

The Middle East is literally boiling and ISIS terrorists have become active again on the battlefield, despite losing the territory of the so called *Caliphate*. ISIS is obviously re-emerging, especially in the deserts of Syria and Iraq.

As long as detained Jihadists are neither tried, nor sent back to Europe and they are detained

mainly in makeshift prisons, without having in place proper detention standards (food, sanitation and security), they are a ticking bomb and the fundamentalist Islamic radicalization process is flourishing.

To all of the above, we have to add an aspect that is alarming everybody: the centers for radicalization and recruitment of future jihadists are in fact the camps where families of detained Jihadists are living in extremely poor conditions, in the desert areas. We are talking about a population of more or less 70,000 people: wives and children – who may serve as a strong base for recruitment.

An adversary of NATO and the U.S. (Russia)[23] is working hard to build up an air exclusion zone – A2/AD (the so called *bubble*) just above the Mediterranean Sea, which will trouble the access for NATO south flank forces.

In Europe we do have a strong number of ISIS terrorist cells, ready to be activated; to this we have to add a huge number of terrorists ready to be released from the European penitentiaries, many of them known for their terrorist intentions they swore to materialize just the next day after being released.

In front of all these challenges, the European economies seem to be close to bankruptcy, lacking the technical and human capacity to tackle all these numbers of terrorists and we can even state that the leadership of EU Commission is far from being strong enough to respond to current challenges. A good example in this regard can be the first unprofessional and selfish reactions to the current pandemic which placed under serious question mark the EU member states' unity and solidarity.

It really seems that after the pandemic is over, the 2nd hypothesis (terrorism will emerge stronger and modernized with respect to the means used and the way of perpetrating their acts) is going to be the valid one, which is due to be confirmed by the coming events.

What could be the shapes of near future terrorism?

First of all, we have to accept that terrorist ideology will not disappear in the near future.

One of the arguments is that, for example, somebody always led the ISIS, no matter how many leaders were annihilated by the U.S. Led Coalition wherever in the theaters of operations in the world.[24]

We can predict that using social media for disseminating alarmist news or hiding the truth related to the current pandemic and the new viruses might trigger social unrest that will eventually turn into serious disorder and turmoil, to the detriment of public order and security.

This will match with the current proven propaganda offensive conducted by a NATO and US adversary, aiming to destabilize the internal order of not only the Western societies but also of the new Eastern democracies if they are member of NATO and the EU, by focusing on the so-called lack of interest and solidarity of the economically developed member states towards new members, with weaker economies.

We can also predict that, since the social media providers do not act properly regarding terrorist propaganda, this will still exist and get more sophisticated in terms of messages, graphics and calls for Jihad. If we agree that the audience for this kind of propaganda will find, for a number of years to come, a huge number of unemployed young people, then we can see the ingredients for having a recrudescence of terrorism in Europe. Recruitment through an especially designated computer application is certainly an alarming episode of the evolution of terrorism[25].

Can we exclude from the equation the fact that Europe has a big number of illegal migrants, among whom there were cases of proven foreign fighters hidden among them? To that, we have to add the local extremists-right wing, neo Nazis, xenophobes and all other members of this growing family.

Developing and using a biological weapon by terrorists is in our opinion a credible threat. The current pandemic proved the narrow limits of our readiness to fight a global health problem.

Cyber attacks on critical infrastructure recently proved one more time to be an alternative to traditional terror attacks. Thus, in Israel, the installations used for providing drinkable water to local consumers have been targeted by a cyber attack aiming to increase to a lethal level the chemicals used originally for the treatment of drinking water. Consequences could have been devastating. The fact that allegedly, a state sponsor (Iran) was behind the cyber attack is less important. The important issue is that this cyber attack proved to be possible.

The use of bitcoin for covering the funding of terrorist organizations became a recommended tool by their leaders themselves due to the fact that the origin of transaction cannot be determined.

Identity theft is also a recommendation of terrorist leaders and is aiming to provide a new identity for former Middle East Jihadi fighters, in order to support their effort to return to Europe, as it has recently happened in Spain.

The employment and sending the ISIS former fighters from the Middle East in battles which are taking place in different parts of the world could prove to be a new episode of evolution of state-sponsored terrorism.

Destroying crops by setting them on fire, right before harvesting time, as the case was in Iraq, can be extended to forests and minerals (oil, gas exploitation and transport pipes)[26].

According to a report[27] related to the existence of Facebook live meetings organized by ISIS, "It is only a matter of time before these pre-existing sophisticated networks start to take advantage of the experience ISIS operatives to conduct terror attacks within the United States". Probably the moment chosen for answering the request made by the American organization "Black lives matter" to reduce the funds allocated to the Police is a completely wrong one, which is going to have a negative impact upon public safety in America, which is going to have – in turn – a global impact, too.

Also, it is mentioned that "the U.S. group is one of 15 communities of ISIS supporters the researchers have identified in regions like the Middle East, Europe, Turkey and Africa. These groups, which are also interconnected, contain at least 1,000 unique members located in 96 countries around the world."

Thus, the final conclusion is that terrorism will get stronger and modernized with respect to the way of perpetrating its acts.

NOTES:

1 Gerard Couzens, *Counter terrorism police fear ISIS cells are being reactivated to plot attacks across Europe after second terror arrest in Spain*, Mail One, https://www.dailymail.co.uk/news/article-8302571/Counter-terrorism-police-fear-ISIS-cells-reactivated-plot-attacks-Europe.html, accessed on 29.05.2020.

2 James Gordon Meek, *Terrorist groups spin COVID-19 as God's 'smallest soldier' attacking West*, 2 April 2020, https://abcnews.go.com/International/terrorist-groups-spin-covid-19-gods-smallest-soldier/story?id=69930563, accessed on 10.04.2020.

3 Thomas Joscelyn, *How Jihadists Are Reacting to the Coronavirus Pandemic*, 06.04.2020, https://www.fdd.org/team/thomas-joscelyn/, accessed on 10.04.2020.

4 Jeff Seldin, May 28, 2020, *Rebuilt Islamic State Growing "More Brazen" in Syria, Iraq*, https://www.voanews.com/middle-east/rebuilt-islamic-state-growing-more-brazen-syria iraq?utm_source=iterable&utm_medium=email&utm_campaign=1252850

5 *ISIS launches 260 Ramadan attacks*, https://www.theaustralian.com.au/subscribe/news/1/?sourceCode=TAWEB_WRE170_a&dest=https://www.theaustralian.com.au/world/the-times/resurgent-isis-launches-260-attacks-during-ramadan/news-story/ebbaebf3eacce09e3799ce04cb2253a1&memtype=anonymous&mode=premium, accessed on 28.05.2020.

6 Gregory Waters, *ISIS Redux: The Central Syria Insurgency* – April & May 2020, CEP Research Analyst Gregory Waters On The ISIS Insurgency In Central Syria, 03.06.2020, Counter Extremist Project, Newsletter

7 Eric Schmitt, ISIS Prisoners Threaten U.S. Mission in Northeastern Syria, 25.05.2020, https://www.nytimes.com/2020/05/25/world/middleeast/isis-prisoners-syria.html, accessed on 28.05.2020.

8 Louisa Loveluck, *The most dangerous camp in the world: Inside the Syrian camp for women and children*, https://www.independent.co.uk/news/long_reads/women/syrian-women-children-isis-camp-a9594186.html, accessed on 07.07.2020.

9 Osama Al-Sharif, *Daesh exploiting Syrian, Iraqi vacuums to make a comeback*, 26.05.2020 , https://www.arabnews.com/node/1680261, accessed on 28.05.2020.

10 *Reports shed light on mercenaries, terrorists sent by Turkey to Libya*, https://thearabweekly.com/reports-shed-light-mercenaries-terrorists-sent-turkey-libya, accessed on 18.07.2020.

11 Giuseppe Carlo Carisio, *In Libya 229 ISIS Fierce Leaders with 4700 Turkish-backed Jihadists. UN Investigates, Europe Sleeps*, http://www.gospanews.net/en/author/admin/, accessed on 20.02.2020.

12 Dan Keane, *Bloodthirsty Fanatics Turkey "working hand-in-hand with ISIS to recruit Syrian fanatics to fight in Libya", expert terror monitor group claims*, https://www.nthesu.co.uk/news/11812624/turkey-isis-libya-terror-monitor-group/, accessed on 10.06.2020.

13 Djallil Lounnas, *The Libyan Crisis: A Case of Failed Collective Security, Middle East Policy Council*, https://mepc.org/, accessed on 07.08.2020.

14 Thierry Meyssan, *Damascus (Syria),19.05.2020, Washington's New Anti-China Strategy*, https://www.voltairenet.org/article209925.html?fbclid=IwAR2ttVFMQh7BrjCgQsCQCBbWi2EMaqT7RV0_4vaO1dSHMyl_TdBaCUcEUZY, accessed on 29.05.2020.

15 Anne Speckhard, Ardian Shajkovci, *ISIS Smuggler: Sleeper Cells and "Undead" Suicide Bombers Have Infiltrated Europe*, 05.02.2019, https://www.thedailybeast.com/isis-smuggler-sleeper-cells-and-undead-suicide-bombers-have-infiltrated-europe, accessed on 10.06.2020.

16 *Terrorism: France's International Action Share*, https://www.diplomatie.gouv.fr/en/french-foreign-policy/security-disarmament-and-non-proliferation/terrorism-france-s-international-action/, accessed on 10.06.2020.

17 Soeren Kern, *Coronavirus: Lockdown for Europeans, Amnesty for Illegal Immigrants*, 12.05.2020, https://www.gatestoneinstitute.org/16013/european-lockdown-illegal-immigrants

18 *Facebook sparks controversy by naming Brotherhood figure to oversight board, Tawakkol Karman is more known for Islamist advocacy than public service commitment*, 08/05/2020, https://thearabweekly.com/facebook-sparks-controversy-naming-brotherhood-figure-oversight-board, accessed on 29.05.2020.

19 *Extremist Content Online: Neo-Nazi Manifesto Siege Re-Emerges For Sale On Lulu Despite Previous Removal For TOS Violation, Newsletter COUNTER EXTREMIST PROJECT*, https://mail.google.com/mail/u/1/#inbox/FMfcgxwHNWFzLhhzCrVfTnhTGkPXCgjq, accessed on 26.05.2020.

20 *Extremist Content Online: White Supremacist Accelerationists And Neo-Nazis Celebrate Violence in Minneapolis, Counter Extremism Project*, New York, Newsletter, Counter Extremism Project <info@counterextremism.com, accessed on 02.06.2020.

21 *How extremists are using Zoom and other tools to exploit this pandemic*,14.05.2020, "The Euro Fatwa app, which was created by the European Council for Fatwa and Research, based in Dublin, has been described by European security officials as a "dangerous hate app" specifically designed as a radicalisation tool for the Muslim Brotherhood", https://www.thenational.ae/opinion/how-extremists-are-using-zoom-and-other-tools-to-exploit-this-pandemic-1.1019515, accessed on 28.05.2020.

22 Nicky Harley, *UK's head of counter-terrorism says publicity raises fear of copycat killers*, 12.05.2020, https://www.thenational.ae/world/uk-s-head-of-counter-terrorism-says-publicity-raises-fear-of-copycat-killers-1.1018086m, accessed on 01.06.2020

23 *Summary of the National Defence Strategy Sharpening the American Military's Competitive Edge*, https://dod.defence.gov/Portals/1/Documents/pubs/2018-National-Defence-Strategy-Summary.pdf, accessed on 25.07.2020.

24 *ISIS "governor of Iraq" killed in Syria, says Baghdad, 26.05.2020, (" Moataz Al Jubouri, known as the "governor of Iraq and head of ISIS's foreign operations", was killed in an air strike in Syria's Deir Ezzor province")*, https://www.thenational.ae/world/mena/isis-governor-of-iraq-killed-in-syria-says-baghdad-1.1025093, accessed on 28.05.2020.

25 Jeff Parsons, *Hidden ISIS Android app lets terrorists spread news and recruit members directly through their smartphones*, https://www.mirror.co.uk/news/technology-science/technology/hidden-isis-android-app-lets-6203483, accessed on 29.05.2020.

26 *Iraqi official says ISIS behind recent crop fires*, 14.05.2020, https://www.kurdistan24.net/en/news/a923df68-3d94-44a4-9a3a-f28a1c73a922, accessed on 28.05.2020.

27 David Gilbert, *American ISIS supporters are organizing on Facebook. Here's how*, 22.08.2018, https://www.vice.com/en_us/article/59qgaz/american-isis-supporters-are-organizing-on-facebook-heres-how, accessed on 04.06.2020.

REFERENCES

*** *Summary of the National Defence Strategy Sharpening the American Military's Competitive Edge*, https://dod.defence.gov/Portals/1/Documents/pubs/2018-National-Defence-Strategy-Summary.pdf

*** Silk Road Economic Belt and 21st-Century Maritime Silk Road Development Strategy, http://sedeenchina.com

*** *ISIS launches 260 Ramadan attacks*, https://www.theaustralian.com.au/subscribe/news/1/?sourceCode=TAWEB_WRE170_a&dest=https://www.theaustralian.com.au/world/the-times/resurgent-isis-launches-260-attacks-during-ramadan/news-story/ebbaebf3eacce09e3799ce04cb2253a1&memtype=anonymous&mode=premium

*** *Terrorism: France's International Action Share*, https://www.diplomatie.gouv.fr/en/french-foreign-policy/security-disarmament-and-non-proliferation/terrorism-france-s-international-action/

*** *Facebook sparks controversy by naming Brotherhood figure to oversight board, Tawakkol Karman is more known for Islamist advocacy than public service commitment*, Friday 08/05/2020, https://thearabweekly.com/facebook-sparks-controversy-naming-brotherhood-figure-oversight-board

*** *Extremist Content Online: Neo-Nazi Manifesto Siege Re-Emerges For Sale On Lulu Despite Previous Removal For TOS Violation*, Newsletter Counter Extremist Project, https://mail.google.com/mail/u/1/#inbox/FMfcgxwHNWFzLhhzCrVfTnhTGkPXCgjq

*** *Extremist Content Online: White Supremacist Accelerationists And Neo-Nazis Celebrate Violence in Minneapolis*, Counter Extremism Project, New York, Newsletter, Counter Extremism Project <info@counterextremism.com

*** *How extremists are using Zoom and other tools to exploit this pandemic,14.05.2020, "The Euro Fatwa app, which was created by the European Council for Fatwa and Research, based in Dublin, has been described by European security officials as a "dangerous hate app" specifically designed as a radicalisation tool for the Muslim Brotherhood"*, https://www.thenational.ae/opinion/how-extremists-are-using-zoom-and-other-tools-to-exploit-this-pandemic-1.1019515

*** *ISIS "governor of Iraq' killed in Syria, says Baghdad ("Moataz Al Jubouri, known as the «governor of Iraq and head of ISIS's foreign operations», was killed in an air strike in Syria's Deir Ezzor province"), https://www.thenational.ae/world/mena/isis-governor-of-iraq-killed-in-syria-says-baghdad-1.1025093*

*** *Iraqi official says ISIS behind recent crop fires,* https://www.kurdistan24.net/en/news/a923df68-3d94-44a4-9a3a-f28a1c73a922

*** *Reports shed light on mercenaries, terrorists sent by Turkey to Libya*, https://thearabweekly.com/reports-shed-light-mercenaries-terrorists-sent-turkey-libyasmallest-soldier/story?id=69930563

Al-Sharif Osama, *Daesh exploiting Syrian, Iraqi vacuums to make a comeback*, https://www.arabnews.com/node/1680261

Carisio Giuseppe Carlo, *In Libya 229 ISIS Fierce Leaders with 4700 Turkish-backed Jihadists. UN Investigates*, Europe Sleeps, http://www.gospanews.net/en/author/admin/

Couzens Gerard, *Counter terrorism police fear ISIS cells are being reactivated to plot attacks across Europe after second terror arrest in Spain*, Mail One, https://www.dailymail.co.uk/news/article-8302571/Counter-terrorism-police-fear-ISIS-cells-reactivated-plot-attacks-Europe.html

Gilbert David, *American ISIS supporters are organizing on Facebook. Here's how*, 22.08.2018, https://www.vice.com/en_us/article/59qgaz/american-isis-supporters-are-organizing-on-facebook-heres-how

Harley Nicky, *UK's head of counter-terrorism says publicity raises fear of copycat killers*, 12.05.2020,https://www.thenational.ae/world/uk-s-head-of-counter-terrorism-says-publicity-raises-fear-of-copycat-killers-1.1018086m

Joscelyn Thomas, How *Jihadists Are Reacting to the Coronavirus Pandemic*, 06.04.2020, https://www.fdd.org/team/thomas-joscelyn/

Keane Dan, *Bloodthirsty Fanatics Turkey "working hand-in-hand with ISIS to recruit Syrian fanatics to fight in Libya", expert terror monitor group claims*, https://www.nthesu.co.uk/news/11812624/turkey-isis-libya-terror-monitor-group/

Kern Soeren, *Coronavirus: Lockdown for Europeans, Amnesty for Illegal Immigrants*,12.05.2020, https://www.gatestoneinstitute.org/16013/european-lockdown-illegal-immigrants

Lounnas Djallil, *The Libyan Crisis: A Case of Failed Collective Security, Middle East Policy Council*, https://mepc.org/

Loveluck Louisa*,"The most dangerous camp in the world": Inside the Syrian camp for women and children*, https://www.independent.co.uk/news/long_reads/women/syrian-women-children-isis-camp-a9594186.html

Meek James Gordon, *Terrorist groups spin COVID-19 as God's "smallest soldier" attacking West*, 2 April 2020, https://abcnews.go.com/International/terrorist-groups-spin-covid-19-gods--gods-smallest-soldier/story?id=69930563

Meyssan Thierry, *Damascus (Syria), 19.05.2020, Washington's New Anti-China Strategy*, https://www.voltairenet.org/article209925.html?fbclid=IwAR2ttVFMQh7BrjCgQsCQCBbWi2EMaqT7RV0_4vaO1dSHMyl_TdBaCUcEUZY

Parsons Jeff*, Hidden ISIS Android app lets terrorists spread news and recruit members directly through their smartphones*, https://www.mirror.co.uk/news/technology-science/technology/hidden-isis-android-app-lets-6203483

Schmitt Eric, *ISIS Prisoners Threaten U.S. Mission in Northeastern Syria*, https://www.nytimes.com/2020/05/25/world/middleeast/isis-prisoners-syria.html

Seldin Jeff, *Rebuilt Islamic State Growing "More Brazen" in Syria, Iraq*,https://www.voanews.com/middle-east/rebuilt-islamic-state-growing-more-brazen-syria iraq?utm_source=iterable&utm_medium=email&utm_campaign=1252850

Speckhard Anne, Shajkovci Ardian, *ISIS Smuggler: Sleeper Cells and "Undead" Suicide Bombers Have Infiltrated Europe, 05.02.2019*, https://www.thedailybeast.com/isis-smuggler-sleeper-cells-and-undead-suicide-bombers-have-infiltrated-europe

Waters Gregory, "ISIS Redux: The Central Syria Insurgency – April & May 2020", *CEP Research Analyst Gregory Waters On The ISIS Insurgency In Central Syria*, Counter Extremist Project, Newsletter.

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-41

STRATEGIC COMMUNICATION – ELEMENT OF INFLUENCE ESSENTIAL IN EXERCISING POWER - *SOFT POWER* OR *SMART POWER*?

Lt. Antonia Teodora MARIȘ, PhD Candidate*

This article proposes, first of all, an analysis of how the concept of power has evolved and is perceived in the 21st century and a conceptual delimitation of hard power, soft power and smart power. Secondly, within the article we will find a description of the importance of strategic communication as an element of influence of power, concrete examples of its manifestation and a classification of this process in a form of use of power as defined in the first part of the material.

Keywords: soft power (SP); hard power (HP); smart power (SmP); strategic communication; power; persuasion; influence.

This article aims to highlight the role of strategic communication as an element of influence essential in exercising power. If before this current century the measurement of the power of a state was a quantitative process that referred to elements such as population size, geographical dimension, volume of military acquisitions, gross domestic product etc., in the 21st century, "power" gained new forms of manifestation. The levers of military power or economic power are either replaced or supplemented by other methods of influencing or obtaining certain behaviours.

The foundation of this article is the hypothesis that strategic communication is an element of influence essential in exercising power. In a complex security environment and in a continuous change, the strategic communication properly used and based on narrative strategies adapted to the cultural characteristics of the target audience, may be the most effective solution to meet internal and external national strategic objectives.

Power in the context of international relations

The concept of power has been long debated by a wide range of disciplines, whether we are talking about sociology, political science, international relations or international politics. The main objective of the political life, be it the internal environment of a state actor or the international one, has always been to obtain, gain and maintain power. In international relations, power is both a goal in itself and a means of achieving other goals[1].

In his book, entitled *Soft Power – The Means to Success in World Politics*, Joseph Nye associates the concept of power with various other phenomena and processes[2]:

- power associated with the weather: everyone depends on it, talks about it, but few get to understand the mechanism;
- power seen as having characteristics in common with love: simpler to have had it than to define it or measure it, but not entirely real.

Viewed on a more general level, power represents the ability to achieve and meet certain goals.

Although initially power mainly focused on the military factor, over time the importance of other factors defining the power of a state actor has been ascertained. Barry Buzan, in his paper entitled *Peoples, States and Fear*, distinguishes between strong and weak states, taking into account not only military capacity, but also factors such as economy and the degree of socio-political cohesion[3].

Power can be defined as the ability of an actor to achieve certain goals or objectives. The central idea remains the same: obtaining superiority and determining an entity to act in a certain direction established by the entity that has the capacity to impose itself in one form or another[4]. Resources such as population, territory, natural wealth, economic

* *"Carol I" National Defence University*
e-mail: *antonia.maris@yahoo.com*

potential, armed forces or political stability are key factors that are associated with the ability to obtain certain behaviours from other actors. Reality proves that not always the one who has the greatest power resource in certain areas comes out triumphant from a possible confrontation. A clear example of this is the situation of France and Britain, which, although had considerably more tanks than Germany in 1940, the latter had greater manoeuvrability and a much better military strategy.

Accepting as a starting point the fact that the U.S. is a global player on the international stage, if the power were limited to resources only, then it means that the United States should have prevented the 9/11 attack in relation to the problems in Afghanistan, the US should have had the capacity to handle the situation without too great a loss.

The conversion of resources into the power factor is actually the result of addressing power in terms of resources. However, each actor has his own personal art and the ability to use the resources he has in a certain context. Also, the importance of resources differs from situation to situation. Power conversion represents the ability to convert potential power into realized power. In order to be able to predict correctly the consequences of a particular confrontation, it is necessary to know both the appropriate resources to be used in the respective situation and the ability of a country in the conversion of power[5].

Soft Power (SP), Hard Power (HP), Smart Power (SmP) – conceptual delimitations

Joseph Nye defines three forms in which power can be expressed:

- HP – obtaining certain behaviours through coercive methods (military, economic, political dimension);
- SP – the ability to persuade, influence and attract another actor to change or choose a certain type of behaviour;
- SmP – includes both HP expressed by coercion and SP highlighted by the power of attraction, influence.

HP and SP have common issues because both represent in fact the ability to meet a certain goal by influencing the behaviour of the targeted partner.

It is worth mentioning that, in certain situations, the resources of a certain type of power may influence the ability to use another type of power. For example, if the People's Republic of China loses its place as a global economic actor, the window of opportunity of this actor to use specific elements of SP would decrease.

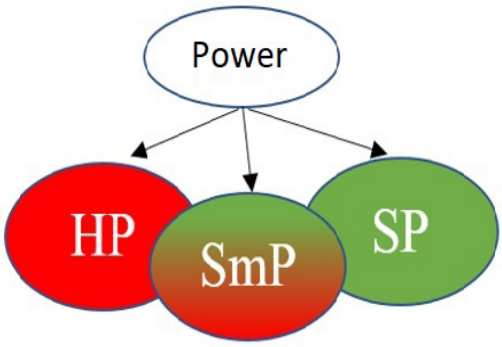


Figure 1 *Forms of power expression*
(author's design)

SP does not always depend on HP elements. For example, although the Romanian Orthodox Church (BOR) does not have HP elements, uses SP to change perceptions, behaviours and attitudes. Joseph Nye mentions three main resources on which SP is based:

- Cultural factors, cultural power (values, principles accepted by the population);

Table no. 1

***HP* AND *SP* – MODALITIES OF INFLUENCING THE BEHAVIOR**

	HP	SP
Behavioural spectrum	Coercion, force	Attraction, influence, persuasion
Resources likely to be used	Sanctions, force, repercussions	Values, principles, cultural elements

- Political values;
- External politics.
- Joseph Nye also discusses three types of power specific to the information age[6]:
- Military power (coercion, threat, force);
- Economic power (coercion, sanctions, economic dependence, the need for certain services / products, etc.);
- SP (values, culture).

The difference between SP and HP is in the tools used by each type of power in international relations, to meet certain goals or to create a certain perception. The term *soft power* is used in contrast to *hard power*, the latter referring to the use of military or economic means to directly influence the behaviour or interests of a political entity.

Measuring the power of a state is, according to the supporters of the HP theory, a quantitative process that refers to elements such as population size, geographical size, volume of military procurement, gross domestic product. According to this approach, a state actor may cause another state to adopt a certain behaviour using levers of military or economic power.

The success of SP depends to a large extent on the actor's credibility and reputation within the international community. The more a global actor enjoys a more clearly defined and sustained reputation through examples over time, the greater the chances that SP will help achieve the goals.

A well-known example of efficient use of SP is strategic communication. For example, American cinema, which has promoted US values with remarkable success, has been conducive to American interests not only in Europe, but also in the Far East. SP is a mandatory condition for the success of the war against terrorism because it requires the voluntary cooperation of other people, institutions and nations[7].

A nation that has the ability to use SP reduces the need for HP. Strategic communication can be defined as a way to influence the perceptions, attitudes, beliefs of a target audience in order to support the achievement of certain objectives[8]. The concept also involves targeting the audience that a certain state actor / organization / institution wants to influence and applying persuasion in the information environment. This can be applied to one's own audience, neutral forces, partners or opponents.

Strategic communication – a power influencing tool

There are many approaches and attempts to define and conceptualize strategic communication. I will refer briefly to the NATO-US approach to StratCom.

In NATO's view, strategic communication is the coordinated and appropriate use of communication activities and capabilities in support of the Alliance's policies, operations and activities in order to promote NATO's objectives. These activities and capabilities are[9]:

- public diplomacy: responsible civilian communication efforts to raise awareness and strengthen understanding and support for NATO policies, operations and activities, in addition to Allied national efforts;
- public affairs: engaging the civilian public through the media in order to inform about NATO policies, operations and activities in a timely, accurate, pro-active manner;
- military public affairs: promoting NATO's military objectives in front of audiences in order to increase the level of understanding of the military aspects of the Alliance;
- intelligence operations: NATO military advice and coordination of military intelligence activities carried out in order to create certain effects on the will, understanding and capacity of adversaries, in support of the Alliance's operations, missions and objectives;
- psychological operations: psychological activities planned using means of communication and not only, performed in order to influence perceptions, attitudes and behaviours, thus supporting the achievement of political and military objectives.

The recent edition of NATO's Strategic Communication Policies considers that, in the context of the Alliance's military activities, strategic communication represents the integration of command and InfoOps command capabilities with other military activities to understand and shape the information environment in support of NATO goals and objectives[10].

In the US view (in the Dictionary of Military and Associated Terms, edited by the US Department of Defence), strategic communication is defined as: "The U.S. Government's focused efforts to understand and engage key audiences to create, strengthen, or maintain conditions favourable

to the promotion of the interests, policies and objectives of the United States Government through the coordinated use of programs, plans, themes, messages and products in sync with the actions of all instruments of national power"[11].

Strategic communication, regardless of how it is found, aims at social influence. Narrative strategies, themes and lines of persuasion, the use of the vulnerabilities of certain audience segments, are just some of the stages that are part of the complex process of strategic communication.

We start from the idea that people are beings who most of the time act emotionally, are influenced by expectations and personal beliefs and tend to seek information that supports and consolidates already formed opinions[12]. In order to be able to influence perceptions, to change attitudes and behaviours, an analysis of the audience that is addressed to formulate appropriate messages to ensure the attainment of the desired effects must be performed. For this, it is necessary to know in detail the targeted audience segment's vulnerabilities, preferences, desires, fears. Also, the economic, religious, cultural, political, military, etc. context must be taken into account. Changing the perceptions, attitudes, behaviours of an audience can be a long-term process[13].

In the current context, strategic communication has become a necessity in view of the exponential development of social media, the intensification of online misinformation campaigns, the diversification of the means, sources and targets of manipulative influence campaigns. For a state actor, strategic communication is also the process designed to counteract the destructive effects of misinformation and malicious information, targeting not only the external public, in order to promote national interests, but also the internal public, in order to increase its resilience to information attacks[14].

Additionally, special importance must be given to the object on which the strategic communication, with all its components, acts upon: the people, constituted in groups, communities, masses, institutions and organizations. The masses or crowds are also targeted by propaganda, based on favourable events or conjunctions that facilitate the achievement of the purpose precisely by presence. Propaganda usually pursues remnant effects and therefore prefers social formations less ephemeral than masses. The masses are different from the social formations in that they do not imply any historicity, no safe future.

From my point of view, strategic communication is an activity/tool that aims to obtain certain subsequent effects, at a perceptual, attitudinal or behavioural level. Strategic communication is a neutral tool; it can be used to meet objectives in different categories. Strategic communication is not a new concept, it is found over time in various forms: whether it is propaganda, influence, manipulation, persuasion or information, promotion of values and principles, counteracting the destructive effects of misinformation and malicious information etc.

The Nayirah case

A relevant situation in the context of strategic communication that has generated many media products is the Nayirah case. Nayirah al-Sabah reported as an eyewitness to a commission of the US Congress (October 10, 1990), led by Tom Lantos, on the alleged atrocities committed by the Iraqi military following the invasion of Kuwait. Her testimony had the effect of winning the population's support for the United States intervention in Iraq.

It was later proven that she was actually the daughter of the Kuwaiti ambassador to Washington, the whole story being constructed to influence American public opinion and the United States Congress. The footage was picked up by about 700 TV stations in the United States, totalling an audience of about 40 million viewers on the first evening, with the audience recorded on only two of America's most popular television stations, ABC and NBC.

The case presented above is an example where strategic communication acted as an element of SP used to win the support of the U.S. population. The statement was created and interpreted to activate the sentimental (*pathos*) part of the targeted audience segments to change perceptions – how the people of Kuwait are treated by the Iraqis, and generate behaviours – supporting the U.S. decision to intervene in the conflict between Kuwait and Iraq. The statement called for the cultural values and cultural specificity of Americans to gain support in the desired endeavour.

The strategic communication policy of the People's Republic of China

The People's Republic of China (PRC), an actor with globally recognized military, political

and economic potential, is on an upward slope in terms of the potential strategic impact it can have. Regarding how the PRC chooses to use strategic communication, one can see a difference between the narrative strategies used for internal audiences versus the narrative strategies used for external audiences.

The decision of the People's Republic of China to replace certain television programs with patriotic programs during the period preceding the national day celebration is one of the examples where one can observe the promotion and communication strategy among the internal audience segments[15]. The economic evolution of the People's Republic of China reinforces the image of a powerful actor, who reconfigured the global economy. Through this field, by presenting the turnover and innovative results in terms of artificial intelligence, the People's Republic of China is trying to outline its global dominant position[16].

The foreign strategic communication policy of the PRC is working systematically to realign the international order by establishing parallel structures to a wide range of international institutions[17]. This state has taken on a key role in financing alternative mechanisms designed to increase its autonomy in relation to institutions dominated by the United States of America and to expand its sphere of influence internationally.

While the crises in Ukraine, Syria, Iraq and West Africa have shifted the focus of global attention, the People's Republic of China is seeking a breakthrough through a restructuring of the international order. While Beijing remains an active player within existing international institutions, it is also promoting the financing of new parallel structures.

The goal of these efforts is obtaining a greater autonomy primarily from the United States of America and an expansion of the Chinese sphere of influence beyond Asia. The People's Republic of China identifies the gaps in the international order and fills them with its own initiatives, through strategic messages that are part of the narrative prepared for external audiences[18].

Tensions at the international level accelerate the expansion of the mechanisms promoted by the People's Republic of China and the interest of developing countries for them. The parallel structures centred on the People's Republic of China have already reached a broad spectrum: financial and monetary policy, trade and investment, trans-regional infrastructure projects, security policy, technology, diplomatic forums[19].

Chinese initiatives will have the greatest impact where links between large infrastructure projects and new financing modalities can be created. This is the core mission of the Asian Investment Bank for Infrastructure and one of the objectives to which the narrative strategies set by the strategic communication policy are oriented[20].

The economic field is a key element in the narrative strategies of the PRC on the international stage. A strategic communication with SmP – specific influences is visibly used by the Chinese actor in terms of communicating with external audience segments.

Conclusions

The world in which we live is transforming at a confusing speed, the reality around us takes on different forms, more complicated, more difficult to understand and described. These developments could not be manifested leaving the old mechanisms of regulating the interests of international political actors intact; in this context, peace and conflict have gained a flexible outline. Thus, risks, vulnerabilities and opportunities on the power market were fractured and multiplied.

Understanding and adapting strategic communication to the cultural characteristics of a certain state actor is an important step in creating the necessary forms of response to contemporary conflicts, specific conflicts of the 21st century. As we can see in the examples presented above, strategic communication has, depending on the state actor who uses it and the proposed objectives, specific inflections SP or SmP. However, regardless of the way in which strategic communication is used, it represents an element used to manifest power, specific to the current century.

Strategic communication, an element of influence essential in exercising power, aims at social influence. Narrative strategies, themes and lines of persuasion, the use of the vulnerabilities of certain audience segments, are just some of the stages that are part of the complex process of strategic communication. Through the examples presented in the material, we can affirm that the inclusion of strategic communication in the SP

or SmP category is made according to the actor who uses it, the moment he chooses to use it, the relations that the respective actor has at international level, the level of credibility, etc. This multitude of variables highlights the multiple forms that strategic communication can take, depending on the proposed objectives.

NOTES:

1 Teodor Frunzeti, *Geostrategie,* Technic-Editorial Center of Romanian Army Publishing House, Bucharest, 2009, p. 31.

2 Nye Joseph S.Jr., *Soft Power – The means to success in world politics*, Public Affairs, New York, 2004, p. 3.

3 Barry Buzan, *Popoarele, statele și teama – o agendă pentru studii de securitate internațională în epoca de după Războiul Rece*, Cartier Publishing House, Chișinău, 2000, p. 106.

4 Dorel Buşe, *Relații internaționale,* university course, "Carol I" National Defence University Publishing House, Bucharest, 2019, p. 102.

5 Aigerim Raimzhanova, *Power in IR: Hard, Soft and Smart*, http://www.culturaldiplomacy.org/academy/content/pdf/participant-papers/2015-12_annual/Power-In-Ir-By-Raimzhanova,-A.pdf, accessed on 01.10.2019.

6 Nye Joseph S.Jr., *op cit.*, pp. 40-45.

7 Eric X. Li, *The Rise and Fall of Soft Power*, https://foreignpolicy.com/2018/08/20/the-rise-and-fall-of-soft-power/, accessed on 12.09.2019.

8 Dennis Murphy, *The trouble with Strategic Communication(s)*, Center of Strategic Leadership, US Army War College, Volume 2-08, January 2008.

9 *About Strategic Communication*, https://www.stratcomcoe.org/about-strategic-communications, accessed on 02.06.09.2020.

10 MC 0422/6- *NATO Military Policy on Strategic Communications*, Consiliul Nord-Atlantic, *https://shape.nato.int/resources/3/images/2018/upcoming%20events/MC%20Draft_Info%20Ops.pdf*, p. 6, accessed on 02.06.2020.

11 *Department of Defence Dictionary of Military and Associated Terms*, US DoD, 2017, pp. 223-224.

12 Ruxandra, Buluc, ,,Perception and intelligence analysis. Beliefs, mindsets and their cognitive consequences", in *Strategy changes in security and international relations*, Vol. 3, "Carol I" National Defence University, Bucharest, 2014, pp. 45-47,

13 *Psychological Operations (United States),* https://military.wikia.org/wiki/Psychological_Operations_(United_States), accessed on 11.11.2019.

14 Ioan Deac, Ruxandra Buluc, "Dezvoltare conceptuală a comunicării strategice în domeniul securității", *Impact Strategic*, nr. 1-2(70-71)/2019, "Carol I" National Defence University Publishing House, Centrul de studii strategice și securitate, Bucharest, 2019, p. 46.

15 Timothy Heath, *The China Dream: Never Closer, Yet Never More Elusive*, RAND Corporation, Santa Monica, 2019, pp. 2-3.

16 *Ibidem*, p. 4.

17 Sebastian Heilmann, Moritz Rudolf, Mikko Huotari, Johannes Buckow, ,,China's Shadow Foreign Policy: Parallel Structures Challenge the Established International Order", *China Monitor*, Nr. 18, 28 October, Merics (Mercator Institute for China Studies), 2014, pp. 1-5.

18 David Gompert, Hans Binnendijk, Bonny Lin, "Blinders, Blunders, and Wars – what America and China can Learn", RAND Corporation, Santa Monica, 2014, pp. 6-8;

19 James Dobbins, Andrew Scobell, Edmund Burke, David Gompert, Derek Grossman, Eric Heginbotham, Howard Shatz, *Conflict with China Revisites – Prospects, Consequences, and Strategies for Deterrence*, RAND Corporation, Santa Monica, 2017, pp. 9-11.

20 Michael Spirtas, *Are we truly prepared for a war with Russia or China?*, https://www.rand.org/blog/2018/10/are-we-truly-prepared-for-a-war-with-russia-or-china.html, accesssed on 02.02.2020.

REFERENCES

*** *About Strategic Comunications*, https://www.stratcomcoe.org/about-strategic-communications, accessed on 02.06.09.2020.

*** *MC 0422/6- NATO Military Policy on Strategic Communications*, Nord-Atlantic |Council, https://shape.nato.int/resources/3/images/2018/upcoming%20events/MC%20Draft_Info%20Ops.pdf, p.6, accessed on 02.06.2020.

*** *Department of Defense Dictionary of Military and Associated Terms*, US DoD, 2017.

Buluc Ruxandra, ,,Perception and intelligence analysis. Belifes, mindsets and their cognitive consequences", *Strategy changes in security and international relations*, Vol. 3, "Carol I" National Defence University, Bucharest, 2014.

Buşe Dorel, *Relații internaționale. Curs universitar*, "Carol I" National Defence University, Bucharest, 2019.

Buzan Barry, *Popoarele, statele și teama – o agendă pentru studii de securitate internațională în epoca de după Războiul Rece*, Cartier Publishing House, Chișinău, 2000.

Cathala Henri-Pierre, *Epoca dezinformării*, Military Publishing House, Bucharest, 1991.

Davis A., *Everything you should know about public relations*, Kogan Page Publishers, 2003.

Deac Ioan, Buluc Ruxandra, ,,Dezvoltarea conceptuală a comunicării strategice în domeniul securității", *Impact Strategic*, no. 1-2(70-71)/2019, "Carol I" National Defence University, Center for Strategic and Security Studies, Bucharest, 2019.

Dobbins James, Scobell Andrew, Burke Edmund, Gompert David, Grossman Derek, Heginbotham Eric, Shatz Howard, *Conflict with China Revisites – Prospects, Consequences, and*

Strategies for Deterrence, RAND Corporation, Santa Monica, 2017.

Ellul Jacques, *Propaganda: The Formation of Men's Attitudes*, Vintage, 1973.

Frunzeti Teodor, *Geostrategie*, Technic-Editorial Center of Romanian Army Publishing House, Bucharest, 2009.

Goffman E., *Frame analysis: An essay on the organization of experience*, London, Harper and Row, 1974.

Gompert David, Binnendijk Hans, Lin Bonny, *Blinders, Blunders, and Wars – what America and China can Learn*, RAND Corporation, Santa Monica, 2014.

Heath Timothy, *The China Dream: Never Closer, Yet Never More Elusive*, RAND Corporation, Santa Monica, 2019.

Heilmann Sebastian, Moritz Rudolf, Mikko Huotari, Buckow Johannes, „China's Shadow Foreign Policy: Parallel Structures Challenge the Established International Order", *China Monitor*, Nr. 18, 28 October, Merics (Mercator Institute for China Studies), 2014.

Hentea C., *Propaganda în război*, Cetatea de scaun Publishing House, Bucharest, 2008.

Murphy Dennis, *The trouble with Strategic Communication(s)*, Center of Strategic Leadership, US Army War College, Vol. 2-08, January 2008.

Nye Joseph S. Jr., *Soft Power – The means to success in world politics*, Public Affairs, New York, 2004.

Nye Joseph S. Jr., *The Powers To lead*, Oxford University Press, New York, 2008.

Nye Joseph S.Jr., *The Future of Power, Public Affairs*, New York, 2011.

Raimzhanova Aigerim, *Power in IR: Hard, Soft and Smart*, http://www.culturaldiplomacy.org/academy/content/pdf/participant-papers/2015-12_annual/Power-In-Ir-By-Raimzhanova,-A.pdf

Volkoff V., *Tratat de dezinformare*, Antet Publishing House, Bucharest, 2007.

https://intelligence.sri.ro/

http://www.culturaldiplomacy.org/

https://foreignpolicy.com/

https://www.stratcomcoe.org/

https://shape.nato.int/

https://www.rand.org/

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-42

THE EVOLUTION OF INFLUENCE: FROM CULTIVATION THEORY TO SELECTIVE TARGETING

Lt. Antonia Teodora MARIȘ, PhD Candidate*

Since ancient times, the aim has been to shape the perceptions, attitudes and behaviors of internal and external audiences. Changes in the technological sphere, specific to the current century, have contributed to the discovery of new methods to more efficiently achieve these behavioral, perceptual or attitudinal changes among the targeted audience segments.

The purpose of this article is to describe the specificity of cultivation theory and to highlight the basic characteristics and efficiency of using selective targeting. The article also includes an example where you can see the methods used in the 21st century in the online environment.

Keywords: cultivation theory; selective targeting; social networks; online environment; persuasion; influence.

This article highlights the characteristics of cultivation theory and selective targeting and briefly discusses some situations in which each of these two processes were used.

We start from the idea that people are beings who mostly act emotionally, are influenced by expectations and personal beliefs and tend to seek information that supports and consolidates already formed opinions[1]. In order to be able to influence perceptions, to change attitudes and behaviors, you must perform an analysis of the audience that is addressed in order to formulate appropriate messages and ensure the attainment of the desired effects. For this, it is necessary to know in detail their vulnerabilities, preferences, desires, fears. Also, the economic, religious, cultural, political, military, etc. context must be taken into account. Changing the perceptions, attitudes, behaviors of an audience can be a long-term process[2].

Traditional mass media, new media and social media represent categories that can contribute substantially to the amplification of effects and can also serve as dissemination channels, each exhibiting specific advantages and disadvantages.

Cultivation theory

George Gerbner articulated the cultivation theory in the 1960s, one of the three most cited theories on the effects of mass communication (along with agenda-setting and sanctions and rewards)[3].

The cultivation hypothesis assumes that people who spend more time in front of the television tend to perceive reality in ways that reflect the most frequent and recurring messages in the fictional world of television. According to the cultivation theory, media patterns can be assimilated by individuals frequently exposed to messages that include them, the result of this process being the change of perception about reality. In short, if the media patterns are assimilated, then the individual may consider that the attitudes, behaviors, situations presented in the media have a correspondent in reality and change their perception according to these patterns.

The theory started from a stand-alone study commissioned by US President Lyndon B. Johnson for the National Commission for the Prevention and Research of the Causes of Violence. The research of the problem of violence in American society, with emphasis on the effects of television, considered 3 areas of analysis[4]:

- Institutional processes – how to create and distribute messages;
- The messaging system – a certain image about the social reality, as it is constructed as a whole;
- Cultivation analysis – how the messaging system influences the public's perception of social reality.

One hypothesis was that television models the way in which individuals imagine their social reality. Not just the cultivation of specific attitudes,

**"Carol I" National Defence University*
e-mail: *antonia.maris@yahoo.com*

but rather, assumptions about the fundamental truths of life or certain criteria based on which judgments and conclusions regarding social reality are formulated.

The media cultivates opinions, conceptions, beliefs, just as a farmer cultivates his land or the gardener cultivates his garden[5]. Gerbner's studies actually dealt with the impact of television on the television audience. He considered that this extended delivery channel is the primary way for messages to reach the targeted audiences. Gebner also concluded that television, to some extent, restricts the ability to decide in the case of audience segments, in the sense that television delivers the same type of message to a wide audience. As a result, the cultivation theory, through the use of television, is aiming to cultivate common perceptions about reality on different audience segments. Regardless of their characteristics, over a long and repetitive period in certain sequences that describe a certain reality, the television will cultivate similar expectations and a shared vision of what reality means.

Gebner's conclusion in 1970 was that the dominant environment forms the dominant perspective. Television, the dominant medium in the 1960s, was responsible for the mass production and distribution of messages, thus forming new symbolic fields that reflect the structure and functions of the institutions that broadcast them. These structures short-circuit other social communication networks and superimpose their own forms of collective consciousness on other social relations[6].

In this regard, case studies have been elaborated regarding the increase of violent tendencies in subjects exposed to highly violent TV programs (*mainstreaming and resonance*[7]), the effects of watching romantic comedies/dramas on the formation of perceptions about the emotional life, etc.

The gradual cultivation of the perception of reality among the internal audience has the potential to lead to changes in the way an individual perceives and relates to social situations, can trigger a greater degree of acceptance of authority and can lead to stable attitudes, which tend to be repeated in real social situations. In addition to the potential to induce a higher level of censorship and repression measures and support for extreme government regulations, such as capital punishment, pattern assimilation, there are perceptual changes in gender and race roles or in other notable issues such as attitude science. The advantages of using cultivation theory include the following:

- the emphasis on both visual and auditory;
- TV does not require literacy;
- the costs are low;
- addresses a broad spectrum of ages at the same time;
- uses easy-to-understand narrative strategies, which have the ability to be memorized from the first viewing through the fact that the information is embedded in a narrative thread.

Cultivation theory can be found in the 21st century, in the era of new media. The information environment provides numerous ways of presenting the content and diversity regarding the possibility of choices. Many platforms still have operating principles similar to TV, namely: focus on video, on the delivery of fictional programs, prolonged exposure to the same type of narrative strategies. What is different is the way we receive certain content, but this content continues to reflect a certain way of representing aspects of social reality.

The traditional methods used to change perceptions, attitudes, behaviors (radio, television, print media, etc.) have been and are very useful and efficient. What the current technology and the presence of the information environment offer, however, is difficult to counter. We are subjected daily to a process of shaping our own beliefs, opinions, interests.

Selective targeting

New media and social media allow a segmentation of potential audiences, thus further allowing the formulation of messages according to the vulnerabilities, passions, fears, needs of the audience. The audience segments formed have different features and methods of approach starting from the dissemination method through which one reaches the desired segment, to the way in which information is modelled to obtain the desired behavior, attitude, perception.

A target audience segmentation method specific to the 21st century is selective targeting, method that makes it possible to manipulate information at different levels[8]. To get the same type of behavior / attitude / perception from different people, with different behaviors, vulnerabilities and beliefs,

different messages and techniques are needed. Segmenting the targeted audience into several subcategories to be addressed in a different way, with dedicated messages, created specifically to speak the language of a specific segment, is part of the process of selective targeting.

How we express our preferences in the online environment can help this process by providing certain personal details about what and how they influence us, interest us, or convince us to resort to action in certain situations. These details that we offer voluntarily or involuntarily, consciously or less consciously, put together, map to some extent how we tend to act or form our opinions. Based on these details, analysts are able to write messages that in time convince us of certain issues, turn us into supporters of certain causes or incite us to protests, riots, etc.

Cambridge Analytica

The *Cambridge Analytica* (*CA*) case study is a clear example of the power and effects that selective targeting can have. This phenomenon is possible due to the intense activity in the online environment and the exposure of privacy. Selective targeting makes it possible to manipulate information at different levels[9].

Cambridge Analytica was a British company that provided services, among other things, supporting election campaigns or certain projects. The company came into possession of the data of millions of people (Facebook users), data that they subsequently used to send messages that are appropriate to certain categories of audience. Basically, the CA specializes in creating user profiles (psychological-behavioral profiles of consumers) and in establishing the ways in which an individual can be influenced, without realizing it, in choosing products or validating electoral candidates.

The company is considered to be involved in influencing certain behaviors in the United States (the vote for Donald Tramp), Great Britain (the Brexit LeaveUE campaign), Australia, India, Malta, Mexico, Argentina, Nigeria, Czech Republic, and Philippines etc.

The company later acknowledged that it used the personal data of the users (data obtained after Facebook users completing a questionnaire) to segment the target audiences by using psychological analysis, thus allowing a detailed knowledge of the audience. Analysts created 32 initial psychological profiles based on which they made specific messages to determine the perception of certain audience segments on different topics. The psychological mapping of the target audience and its segmentation into subcategories was made possible both by the users' unconsciousness, as well as by the collection made by Facebook and the subsequent sale of data to the CA[10].

Question-type games like *What character in Game of Thrones are you*, *What dog breed fits you*, *How would you look if you had the opposite sex*, *What would your dream vacation look like*, *What is your most burning desire*, came to have a resounding success and few know that by accessing them they make available their personal data that can later be used to create dedicated messages that lead to a certain type of behavior or perception.

Cyber-psychology explains how our needs in the digital environment are what underlie the digital behavior of users. By making available personal information, actions that seem harmless at first sight (games, questionnaires, posts, comments, locations, distributions, ratings, etc.), we actually make selective targeting possible. This involves the formation of messages dedicated to a particular person, created to attract a certain type and to obtain a certain perception, attitude, behavior. At the same time, segmentation, profiling, precision persuasion, algorithmic generation and amplification of reactions are possible only if those who want selective targeting have enough data to create dedicated messages.

Conclusions

The traditional methods used to change perceptions, attitudes, behaviors (radio, television, print media, etc.) have been and are very useful. However, the current environment allows for quantifiable results to be obtained in a shorter time and with a much higher success rate. Many of us have expectations arising from the cultivation theory regarding love, couple life or violence.

The online environment, the new-media and social media, however, allow a much more efficient modelling of audience behaviors by segmenting potential audiences; this technique allows the formulation of messages according to the vulnerabilities, passions, fears, needs of a certain audience segment (particularities and

different methods of approach, starting from the dissemination method through which the desired segment is reached, to how the information is modelled in order to obtain the desired behavior, attitude, perception).

The effects of lack of good information about the online environment and the impact that our actions can have in this environment can create strategic level effects. We navigate daily in an environment that we do not fully understand, but which makes us feel valuable, important, untouchable; these aspects describe the perfect environment in which to remain naive, unaware of the risks we take, vulnerable to the realities of the present century, pawns used to fulfil strategic objectives. Excessive and unconscious exposure of one's choices in the digital environment can lead to effects that we have little chance of identifying when they occur.

It is very difficult to become aware at every step of why we do what we do or the effects that a particular action can have. But, based on some principles to guide our behavior, we have a higher chance of not ending up in situations we do not want. In this direction, I propose the following steps in order to formulate a future strategy for neutralizing specific risks in the online environment:

- Regulations regarding the use of the data of the media users;
- Digital literacy;
- Emotional skepticism;
- Cultivating a security culture adapted to the current realities and implemented among the population;
- Awareness programs for persons / institutions with strategic positions, which can be targeted by hostile entities;
- Investing in the education of the young generation;
- Identification of vulnerability at the level of perception and attitudes of the population.
- Train critical thinking.

A general conclusion is that the online environment, although initially perceived as an environment with fewer risks and threats than the real environment, has become the appropriate place for various threats to manifest. Knowing and understanding how these changes of perceptions, attitudes, behaviors take place, is a first step in order to raise awareness of the effects that certain information can follow, which comes in a form that convinces us to pay attention.

Cambridge Analytica is just one example of how our data can be used to trigger a certain behavior. Is this the only example of this kind? Storing user data on certain servers for later use to obtain certain behaviors seems to be a possible scenario at the moment.

NOTES:

1 Ruxandra, Buluc, "Perception and intelligence analysis. Beliefs, mindsets and their cognitive consequences", *Strategy changes in security and international relations*, Volume 3, "Carol I" National Defence University Publishing House, Bucharest, 2014, pp. 45-47.

2 *Psychological Operations (United States)*, https://military.wikia.org/wiki/Psychological_Operations_(United_States), accessed on 11.11.2019.

3 George Gerbner, Larry Gross, Michael Morgan, Nancy Signorelli, James Shanahan, *Growing Up with Television: Cultivation Processes,* B. Jennings Publishing House, Media Effects: Advances in Theory and Research, New Jersey, SUA, 2002, pp. 43-44.

4 *Ibidem*, pp. 50-52.

5 Ioan Drăgan, *Paradigme ale comunicării de masă*, SANSA-SRL Publishing House, Bucharest, 1996, p. 216.

6 Alexandra Nicu, *Dinamica familială în cinematografia din România: tipare. Un studiu comparativ al filmelor din perioada comunistă și cea post-comunistă*, PhD Thesis, SNSPA, Bucharest, 2017, pp. 43-44.

7 George Gerbner, Larry Gross, Michael Morgan, Nancy Signorelli, James Shanahan, *op.cit.*, pp. 51.

8 Sorin Topor, *Terorismul cibernetic*, Top Form Publishing House, Bucharest, 2019, pp. 39-44.

9 *Ibidem*, pp. 39-44.

10 David Lyon, Colin Bennett, *Data-driven elections and the key questions about voter surveillance*, https://theconversation.com/data-driven-elections-and-the-key-questions-about-voter-surveillance-121164, accessed on 02.01.2020.

REFERENCES

Bârgăoanu A., *#Fake news, Noua cursă a înarmării*, Evrika Publishing House, Bucharest, 2018.

Balmas M., *When Fake News Becomes Real: Combined Exposure to Multiple News Sources and Political Attitudes of Inefficacy, Alienation, and Cynicism*. *Communication Research*, 2014.

Bourdieu P., *Despre televiziune*, Meridiane Publishing House, Bucharest, 1998.

Buluc Ruxandra, "Perception and intelligence analysis. Belifes, mindsets and their cognitive consequences", *Strategy changes in security and international relations*, Volume 3, „Carol I" National Defence University Publishing House, Bucharest, 2014.

Daase C., *National, societal and human security: on the transformation of political language*, Historical Social Research, 2010.

Dominick J., *Ipostaze ale comunicării de masă. Media în era digitală*, Comunicare.Ro publishing, Bucharest, 2009.

Galloway L., Engstrom E., & Emmers-Sommer T.M., "Does Movie Viewing Cultivate Young People's Unrealistic Expectations About Love and Marriage?", *Marriage & Family Review*, 51(8), 2015.

Gerbner George, Gross Larry, Morgan Michael, Signorelli Nancy, Shanahan James, *Growing Up with Television: Cultivation Processes,* Editura B. Jennings, Media Effects: Advances in Theory and Research, New Jersey, SUA, 2002.

Goffman E., *Viaţa cotidiană ca spectacol,* Comunicare.ro, Bucharest, 2003.

Goffman E., *Forms of talk*, University of Pennsylvania, London, 1981.

Goffman E., *Frame analysis: An essay on the organization of experience*, Harper and Row, London,1974.

Habermas J., *Sfera publică şi transformarea ei structurală*, Comunicare.ro, Bucharest, 2005.

Lippmann W., *Opinia publică,* Comunicare.ro, Bucharest, 2009.

Mccombs M., "A Look at Agenda-setting: Past, Present and Future", *Journalism Studies*, *6*(4), 2005.

Morgan M., Shanahan J., "The State of Cultivation", *Journal of Broadcasting & Electronic Media*, *54*(2), 2010.

Nicu Alexandra, *Dinamica familială în cinematografia din România: tipare. Un studiu comparativ al filmelor din perioada comunistă şi cea post-comunistă*, Doctoral Dissertation, National School for Political and Administrative Studies, Bucharest, 2017.

Ruggiero T.E., *Uses and Gratifications Theory in the 21st Century*. *Mass Communication & Society*, 3(1), 2000.

Scheufele D.A., Tewksbury D., *Framing, Agenda Setting, and Priming: The Evolution of Three Media Effects Models*. *Journal of Communication*, 2007.

Sundar S., Limperos A.M., "Uses and Grats 2.0: New Gratifications for New Media", *Journal of Broadcasting & Electronic Media*, 57(4), 2003.

Topor Sorin, *Terorismul cibernetic*, Editura Top Form, Bucharest, 2019.

Vlăduțescu Ș., *Convicțiune, persuasiune, comunicare jurnalistică negativă (eseu de hermeneutică mediatică)*, Romanian Academy, Bucharest, 2006.

Wingfield N., Isaac M., Benner K., "Google and Facebook Take Aim at Fake News Sites", *New York Times*, 2016.

Zagan C., *Discurs şi putere. Valenţe ale autonomiei discursului în filosofia lui Michael Foucault,* Doctoral Dissertation, Alexandru I. Cuza University, Faculty for Political Sciences, Iaşi, 2016.

https://theconversation.com/
https://intelligence.sri.ro/
http://www.culturaldiplomacy.org/
https://foreignpolicy.com/
https://www.rand.org/
https://www.counterextremism.com
https://nypost.com
https://www.researchgate.net
http://www.icsve.org
https://firstmonday.org
https://doi.org

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-43

FACTORS INFLUENCING THE MOBILITY AND COUNTERMOBILITY OF FORCES

Col. Adrian-Robert GHEORGHE, PhD Candidate*

The conditions in which the armed confrontations took place have always had a major importance on the outcome of military operations and this aspect has been observed and capitalized by specialists and military leaders. A realistic understanding of the existing conditions, doubled by a correct vision of the transformed confrontation environment that must be reached, makes the chance of success substantially inclined in favor of those who prepare in detail and in advance for the battles that are barely visible today.

Keywords: mobility; countermobility; geographical factor; enemy actions; military personnel training; host nation support; technical - equipment factor.

Currently, the range of risks and threats regarding security and defence, that all states have to face, has greatly diversified. If, during the Cold War, every state knew about the threats it had to face or who the possible aggressor was, now, this is not possible. The security environment, regardless of its manifestation level, has evolved and has characteristics such as: unpredictability, dynamism, complexity, in parallel with the emergence of some non-state actors and a significant increase in asymmetric threats to the security of states.

Military experience, things learned on various missions, the effectiveness of actions carried out through combat procedures, in different geographical conditions urgently require that all measures, contributing to the annihilation of the negative effects of some geographical factors on mobility and countermobility of forces be taken in peacetime.

Most papers referring to mobility and countermobility have structured the analysis starting with mobility and later, analyzing countermobility. When we talk about the factors that influence mobility and countermobility, I suggest a format that allows the analysis of countermobility in a complementary relationship with mobility.

Following this idea, it can be mentioned that the main factors influencing both mobility and countermobility are the same, namely: the geographical factor, enemy actions, the military personnel training, the host nation support (HNS), the technical equipment factor (or the specific technical performance of the equipment).

** „Dunărea de Jos" 10 Gen Brigade*
e-mail: *gheorghe.adrian@forter.ro*

Aspects regarding the determining character of the geographical factor on the mobility and counter-mobility of the forces

In order to substantially reduce the problems generated by the factors affecting the mobility of troops, in the tactical field, a creative, innovative management of the available resources is needed. For example, environmental conditions greatly influence the mobility and countermobility of forces, and this leads to the necessity of a multilateral use of data and conclusions established by military science, based on the specific interpretation of the geographical framework. In order for the mobility and countermobility of forces to be viable, all environmental factors must be taken into account, the influencing factors must be identified through an analytical-synthetic process, referring both individually and entirely to certain efficiency indicators.

An essential influence in planning and conducting military actions is that of the *geographical factor*. A fair appreciation of this influence, on the mobility and countermobility of forces is particularly important, as both overestimating and underestimating its role sometimes lead to serious consequences.

The process of modernizing the means of transport allowed the armed forces to be equipped

with new equipment that increased the mobility of structures and also increased the frequency of operations performed over long distances. Simultaneously with the new equipment, additional personnel, materials and equipment necessary for the use, maintenance and repair of the new means of transport were generated.

Due to technological progress, military science and art, the influence of the *geographical factor* on the mobility of military structures has been considerably diminished over time, but without being permanently removed.

Analyzing the influence of the *geographical factor* on the mobility and countermobility of forces, it was found that interesting conclusions can be drawn regarding the organization, endowment and principles of action, of forces placed in areas with different geographical features.

From this point of view, the military actions to be carried out in a theater of operations aim at the mobility and countermobility of the forces on land, on water and in the air, and from the point of view of echelons' actions, it includes all types of mobility and countermobility: tactical, operational and strategic.

The territory has always played a very important role in military actions. Its influence on the mobility and countermobility of forces is represented both by its extent and by the geographical elements it contains: the relief, the hydrography, the communications, the coverings, the localities, the fortifications, etc.

The territory is an essential factor in planning and conducting military actions, because it is a pre-established area, where the armed forces are deployed, organized and prepared, works and installations are made for military purposes, the supply bases necessary for troops are organized.

In modern warfare, joint forces that are facing each other from the very beginning are in large numbers, the equipment is also very varied, so that the area necessary for their safe disposition and concentration is not at all easy to be established. The considerable increase in the area of operation camps is mainly determined by the need to avoid the danger of destruction of these joint forces by enemy aircraft and missiles.

In the last classical armed confrontations, the depth of the operation area was determined, on the one hand, by the maneuvering needs of the large tactical and operative units, and on the other hand, by the need for the logistic department to be able to carry out its activity, safely, against possible front line fluctuations and the direct actions of enemy combat equipment.

The mobility and countermobility of the forces also depend, to a large extent, on the terrain.

Due to the diversity of its forms, it is possible that the terrain become a difficult obstacle to overcome, to increase or reduce the effectiveness of fire, to favor or impede the mobility of troops, to partially or fully affect the firepower of different weapons, and the concentration of large groups of forces on different directions etc.

In terms of relief, the terrain can be divided into three basic forms: *plain regions, hill regions and mountain regions*.

"The plain regions, through their characteristics, have always favored the development of military actions"[1]. The plain areas are the suitable terrains for the battles and operations, because they favor the concentration and mobility of forces and means, carrying out actions at a sustained pace, organizing and maintaining cooperation between all types of weapons, supplying the necessary weapons, etc.

In the plain regions, the large units (offensive joint forces) can make the most of their mobility and superiority of forces and means. The movement of forces in the plain areas is easy, which considerably facilitates the maneuver; in the offensive, it can take place at a faster pace and in deeper areas; the plain less favors the defence, but it is easier to perform the maneuver from the depth; the troops must be also arranged on favorable alignments (positions), to combine the engineering work and the existing obstacles with the execution of some offensive, fast and short-term actions. Therefore, dynamic, offensive and maneuvering actions must also be responded to, through dynamic and maneuvering actions undertaken by the defending forces. The numerically inferior forces defending on a low ground are forced to adopt a front with the forces staggered in depth, sufficiently dispersed, but able to quickly concentrate, in order to stop the enemy by fire and counterattacks.

A special feature of the plain regions is the numerous watercourses and the irrigation process (dams, canals, water storage basins, etc.).

In conclusion, it can be stated that the plain regions do not greatly influence the mobility of

troops, although in certain climatic conditions (torrential rains, thawing, floods), as well as due to irrigation systems, plains can become real obstacles, favoring countermobility.

The desert regions, through reduced communication, aridity and lack of vegetation (sometimes hundreds of km of sand dunes without drinking water except for oases, but also, here in completely insufficient quantities), the very big difference in temperature from day to night, the lack of orientation marks, etc., were considered the worst environmental areas for planning and conducting military operations.

The hilly and plateau regions allow the concentration of forces and this can be done under the same conditions as in the plain regions, in terms of space and the possibilities of grouping forces. Concealment and sheltering conditions are better than in the plains, due to both the varied terrain and to more frequent coverings. Despite all these advantages, the operational network must take into account the communication network and the movement possibilities, depending on the orientation of important ridges and valleys, encountering some difficulties, as compared to the plain regions, due to the more difficult movement of vehicles, as well as the opponent's possibilities to make it more difficult, through fire and obstacles, in areas that are more difficult to cross.

The varied, unevenly rugged feature of the hilly regions offers troops who defend themselves, even in inferior conditions, the opportunity to balance or reverse the power intercourse, to achieve victory, judiciously using each cover, performing bold maneuvers to surprise the enemy.

The mobility of forces in hilly and plateau areas is limited by the declivity of the land, by the lower number of communication routes, by the presence of coverages (forests, orchards), as well as by the vulnerability of the obligatory crossing points.

Mountainous regions are generally characterized by a very rugged terrain, with large differences in altitude between relatively close points or areas, with a poorly developed communication network, and a non-existent one, in some places, as well as by a harsh climate.

The terrain, heavily affected, greatly hinders the mobility of forces and facilitates countermobility measures. Steep slopes, narrow gorges and abundant vegetation on different parts sometimes make it difficult for people and animals to move and make it impossible for vehicles and hypo vehicles to travel off-road.

The mountain forces the reduction of the maneuvering rhythm and the division of forces, which makes the superiority of forces and means, difficult to be capitalized. That is why the mountain has always favored defence.

At present, mountainous regions exert an influence on troop mobility that differs from that of the past, first of all, the mountainous terrain has become much more accessible, due to the increase in the number of communication routes that cross the mountain ranges; some of the roads built on a concrete bed, with tunnels that avoid large declivity, are of high traffic, others satisfy some local needs (forestry, mining, tourism, etc.), but are also important for ensuring the mobility of forces by having branches and reaching high altitudes. To all these are added the railway system and the cable car installations that contribute to the intensification of the traffic in the mountainous regions. At the same time, the countermobility measures were diversified, through multiple possibilities for mining the road and through the railway infrastructure.

On the other hand, the performances of the current combat equipment have increased a lot in terms of mobility and the possibilities of action in conditions of low visibility. The mobility of forces in mountainous terrain has also increased, due to the widespread use of helicopters. The movement of troops on the battlefield with the help of helicopters is only influenced by weather conditions and can be executed in a very short period of time.

Thus, a squadron of helicopters can quickly transport an infantry subunit with all its weapons and combat equipment. Also, the movement of the anti-armor intervention force in a threatened direction is successfully achieved, using helicopters.

Helicopters can be used successfully to cross mountain ranges. However, the characteristics of the mountainous areas determine certain restrictions in this case as well. The low number of flat surfaces suitable for take-off and landing, as well as the meteorological conditions specific to these regions limit the mobility of helicopters.

The low cloud cover, precipitation and fog are common phenomena in such areas. So, although the mobility of troops embarked on helicopters is

higher, in the current conditions, excluding travel on foot or by hypo means, the basis of their mobility in mountainous terrain is represented by combat and transport vehicles.

In the mountains, due to the fact that the movement of vehicles is usually limited off-road, the issue of communication routes is one of the main concerns of commanders. The lack of communication routes forces the transport of troops, supplies, medical and technical evacuations on the same roads, consequently, on these communication routes large congestions of vehicles and people can occur, leading to reduced mobility of troops.

The hydrographic network, composed mainly of watercourses, represents obstacles whose value depends on the width, depth, speed of the water flow in the respective geographical region, the nature of the riverbed, the nature and the configuration of the banks.

All these elements must be studied carefully, especially when they occur simultaneously in unfavorable conditions. Due to the endowment of troops with modern weapons and combat equipment, it is considered that in a possible war the combat actions will be characterized by an important spatial scope and by high speed, which will make the crossings of the rivers to be almost daily events. For this, the land forces were endowed with a large and diversified number of vehicles on wheels and tracks, with a high capacity to cross rivers.

The more land forces possess amphibious combat and transport vehicles, the better equipped they are with engineering vehicles, the less the watercourses will affect their mobility, and the greater the freedom of action the management will have. The endowment of the land forces with amphibious vehicles represents more than the "bridge building", and the mobility of the land forces, resulting from their endowment with such means, improves the premises for fulfilling the missions in all combat situations.

Recently, some armies have been equipped with hovercrafts, thus widening the range of equipment in the field of water mobility.

The special interest currently given to this new type of vehicle is also explained by the non-existence of a means of transport with wider possibilities of exploitation on rivers, lakes and swamps. The air cushion, effectively reducing friction and easily overcoming the hydrodynamic resistance, allows an increase in the speed of the vehicles. When traveling over muddy areas, shallow water, uneven terrain or plowing, the hovercraft can also be a particularly valuable means of transport.

From the above overview, in relation to the various advantages offered by amphibious combat and transport vehicles, we must emphasize that they do not fully solve the requirement of water mobility of land forces, as not all vehicles have the ability to pass on their own over watercourses. In this case, it is necessary that the engineer forces contribute with their own means, to a greater extent, to the troops crossing over the watercourses.

The endowment of units and large units with modern combat equipment led to a considerable increase in the mobility of troops, but, at the same time, it increased their dependence on roads. The preparation and maintenance of the communication network is an essential condition for increasing the mobility of the maneuvering forces.

Air transport is well developed, given the geomorphological conditions of the land, as well as oil-rich resources, which allows the development of an extensive air network.

Most aerodromes are equipped with the necessary equipment to ensure the take-off (landing) of aircraft both during the day and at night or in severe weather conditions.

The geo-climatic conditions in which the military actions take place exert a special influence on the mobility and countermobility of the forces. The most important interrelated climatic elements negatively influence the mobility of forces and contribute to taking countermobility measures such as: temperature, humidity and wind. Thus, in winter time, the mobility of troops can be reduced especially by the low temperature, which negatively affects the resilience of people and the operation of the vehicle engines and by the snow that falls in thick layers, and when in blizzards, it forms snowbanks on roads and hinders movement offroad, especially during periods of thaw, fog, frost and winds, which are quite common in this season.

Considerations on how the actions of the enemy, the training of personnel, the support of the host nation and the equipment factor influences mobility and countermobility in the modern confrontation environment

Enemy actions. As it is known, the mobilization of the armed forces, their concentration, deployment and regrouping, the execution of

large-scale maneuvering during military actions require communication of all categories and in all directions, with a developed network of maneuvering, bypass, detour and backup roads. In a possible war with the most modern means, the rhythm of military actions will require all measures to be taken, to make the communication system as viable as possible against the means of destruction that will be used by the enemy to dismantle it.

The large-scale maneuvering of the means of combat and transport is a feature of modern warfare, given the likely intensification of enemy actions with missiles, aviation and special forces on travel routes, especially on communication nodes (road and rail) and junctions of different communication channels. The actions of the enemy will significantly influence the intensity of the activity on the communication networks. Moreover, we must keep in mind that in addition to the operative transports, the transport of materials, different armaments, the evacuation of the sick and wounded people, materials, etc. will have an extremely large volume.

Anti-aircraft defence is one of the decisive factors in ensuring freedom of maneuver and at the same time it is one of the vital conditions for the mobility of forces. In order for the forces and means of air defence to be able to firmly cover the maneuver of the forces and to have themselves the capacity to carry out maneuvers, they must have mobility and be able to change the battle order in a short time. Foreign military specialists understand by the mobility of air forces and means of defence, their ability to ensure the air cover of troops performing movements, regrouping or maneuvers. Also, anti-aircraft defence contributes to counteracting the mobility of opposing forces by hitting the means of air transport (personnel, equipment and materials).

In connection with the increase of the enemy's possibilities of actions, the issue of shortening the duration of troops and equipment transport acquired a special importance. It depends primarily on the speed of movement and the organization of embarkment-disembarkment actions at the final points of the communication routes. Increasing the speed of travel not only reduces the time when troops and materials are on the move, but also reduces the need for roads and means of transport.

In order to better meet the requirements of high-intensity traffic, in some geographical areas, roads were doubled in some directions, with another road to bypass the localities and allow direct traffic; ring road of large localities; modernization of as many roads as possible; replacement of uneven passages at level crossings, in order to avoid bottlenecks caused by railway barriers; the construction, when passing over the mountains, of some routes through tunnels that avoid the portions with numerous serpentines, big slopes and dangerous curves.

At the same time, the existence of a developed system of communications on the probable directions of operations for carrying out military actions substantially contributes to the increase of troop mobility.

In the conditions of the extremely high consumption of materials, required by the modern warfare, the role of communications increases a lot, ensuring the supply and evacuation transports.

The importance of raids against communication networks has greatly increased. We must also keep in mind that supply can be disorganized not only by the destruction of supply routes, but also by interception or increasing the danger of interception of combat equipment and means of transport.

The enemy's possibilities of disorganizing communications have increased due to the appearance of special forces, paratroopers and aircraft that can be launched (landed) in the operational depth and which, due to their high mobility and increased passage capacity, can block, intercept and conquer mandatory crossings points, road and railway communication nodes, etc.

The works of art for crossing watercourses and hydro technical works are of great significance for ensuring the mobility of land forces. Bridges are the targets on which the enemy's attention is most directed, because their destruction can hinder the mobility of land forces.

Hydro technical works (piers, dams) are also important targets of the enemy, because their destruction can change the hydrological regime of the watercourse. In this context, within the conception of some military specialists for waging war, it is likely that in the theater of military operations vast areas of floods occur, by destroying piers, locks or other hydro technical works.

Within these considerations it is estimated that the flooding of valleys and rivers can be done by various procedures, such as: demolition of high pressure hydro technical nodes; opening, closing

or destroying dam gates; damming watercourses, valleys and passages through rubble or landslides. It is considered that in flood areas, even after the water recedes, due to the shape of the land and the water remaining in the deep valleys of the river, some parts of the land can be flooded for a variable duration, becoming difficult to access and even inaccessible to the actions of different troops.

In the context of countermobility measures that the enemy can take, the use of mines, in all its forms, retains an important role in the "obstacles maneuvering", taking into account the already made technical progress and the one expected in the coming years, much to the extent that, in relation to the firing of anti-tank artillery, the mined area constitutes a permanent anti-tank obstacle.

The variety of imaginable land obstacles against vehicles is virtually endless. It ranges from the classic anti-tank trench and anti-tank concrete fangs to the destruction of art works, including slippery products or artificial adhesives on the ground.

Another measure of countermobility that the enemy can take is the organization and development of electronic warfare, through which it tries to neutralize the radio networks of the opposing forces.

Regardless its number of people and equipment, no unit can be commanded if, due to electronic countermeasures, it can no longer use its radio networks.

The ability to properly use the means of electronic warfare greatly influences the mobility of forces. Command headquarters and weapons systems become very vulnerable on the modern battlefield if, due to their "electronic profile", they are easily identified. Thus, the chances of survival depend on the effectiveness of electronic protection measures by which radiation sources can be hidden or by which the enemy can be misled to their identity and position.

In order to counteract the enemy jamming, radio transmitting-receiving stations were made, working for a very short time (of the order of tens of microseconds) on a certain frequency, then make a random jump on another frequency; these jumps from one frequency to another (chosen at random) are performed hundreds or thousands of times during the broadcast. Such a device that works on thousands of frequencies, for very short durations, is impossible to jam and it is hardly lilkely to witness in the near future the achievement of an effective system to jam them.

It goes without saying that, when listing these factors, we have not mentioned the full range of measures to reduce the mobility that the enemy can take, nor all the possibilities to counteract them. In this field, the imagination of military specialists and technicians permanently has a wide field of application.

Personnel training: The training of specialized personnel greatly contributes to the design, planning and execution of some complex works and obstacles designed to block, fix and return the enemy's forces while reducing its maneuverability and maintaining the freedom of action of its own forces.

Host Nation Support (HNS). The local population is an important factor in carrying out any operations to ensure the mobility and countermobility of forces. Within NATO, the need to carry out efficient and low-cost actions is the key element to providing logistical support. HNS planning coordination and assurance are key elements used to achieve this goal, and it is important that the development and negotiation of multinational Host Nation Support Agreement (HNSA) be applicable by all states. There is also a need for coordination of planning and uninterrupted supply, which will ensure the transparency of the requirements and the means of the host nation for this purpose and, in addition, there will result a need to encourage the use of such means in cooperation. Hence the importance of both developing and negotiating multinational agreements that can be applied by all nations. Thus, the logistics planner will discover that each situation can be a distinct challenge and will look for the necessary solutions to ensure the success of operations.

The performance of specific equipment. Countermobility specific missions are decisively influenced, in the conditions of the modern battlefield, by the performances of the specific endowment, as well as by the quality of the materials and engineering ammunition used for the execution of explosive and non-explosive obstacles and barrages. The state-of-the-art engineering technique ensures the short-term execution of the planned works in conditions of opportunity and efficiency. Engineering ammunition and high-performance

materials guarantee the expected efficiency of countermobility missions in correlation with the mobility missions of own forces.

Engineering logistics can influence the established countermobility objectives, due to specific tasks: providing ammunition, engineering and construction materials, providing engineering equipment and its maintenance, as well as providing transport, all particularly complex, due to the diversity and volume of equipment, ammunition and necessary materials.

Conclusions

It can be concluded that the multitude of factors influencing mobility and countermobility must be managed starting from peacetime in order to achieve the necessary conditions for the successful conduct of a future military operation. Giving due importance to the activities of transforming the future environment of confrontation in peacetime can be the key to success in a possible confrontation even in the situation where numerical superiority and / or technological superiority is to the advantage of the opponent. Also due to the execution of a correct management of the factors mentioned above, we can say that success could have a lower "price" in terms of the number of victims resulting from the confrontations.

The main aspects to be followed in order to optimize the planning process and the execution of military engineering works for military operations in the most favorable conditions for maintaining / increasing the mobility of own troops and creating the countermobility effect for the opponent's troops, aim at realistic determination of the military engineering works needs for the area of operations, identifying the main engineering support tasks and assigning them to the execution structures in accordance with the available capabilities and priorities set by the commander of the supported structure, identifying limitations and opportunities in the engineering line and developing proposals to address them, planning and the detailed organization of the engineering support by using the optimal technical solutions concluded with an execution of the engineering tasks permanently adapted to the factors mentioned above in this article.

No matter how much the performance of the equipment evolves, we can say with certainty that the planners and commanders of the engineering structures will continue to make a considerable contribution to the success of military operations by constantly analyzing the five factors presented and using the results for optimal planning and execution of engineering support tasks specific to the achievement of the mobility of one's own troops and the counter-mobility of the opponent's troops.

NOTES:

1 Ion Constantin, *Mobility and countermobility in joint military actions,* "Carol I" National Defence University Publishing House, Bucharest, 2007.

REFERENCES

*** *F.T.-9 – Manual for engineering support in tactical level operations*, Bucharest, 2017.

*** *AJP-4 – Allied Joint Doctrine For Logistics*, NATO Standardization Office (NSO), December 2018.

Gl.lt.prof.univ.dr. Bădălan Eugen ş.a., *Military Treatie of Tactics,* vol. 2 – *Land Forces,* Nicolae Bălcescu Land Forces Academy, Sibiu, 2003.

Constantin Ion, *Mobility and countermobility in joint military actions*, "Carol I" National Defence University Publishing House, Bucharest, 2007.

Gl.bg.(ret) Grecu Petre, PhD ş.a., "NATO doctrinal requirements specific to the combat actions of engineering troops", *Bulletin of „Carol I" National Defence University*, no. 4/2004.

Col.prof. Preda Ion, PhD ş.a., "The planning process in military operations", *Bulletin of „Carol I" National Defence University*, no. 4/2004.

https://armypubs.army.mil/ProductMaps/PubForm/FM.aspx

https://nso.nato.int/nso/

http://milengcoe.org/Pages/default.aspx

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-44

THE USE OF AEROSOLS, FORCE PROTECTION MEASURE IN THE DEFENCE OPERATION OF THE LARGE TACTICAL UNIT

Lt.Col. Ionel COTOARBĂ, PhD Candidate*

During the preparation and conduct of defence operations, the use of aerosol missions should be well planned and executed in a logical sequence and continuously. Smoke operations should lead to increase stability defence and reduce enemy opportunities to prepare and conduct offensive operations, being fully informed and having a clear conception.

Keywords: large tactical unit; defence operation; aerosols; force protection.

In modern warfare conditions, smoke has a special role both in masking combat actions of forces and objectives deployed in the country, and in thwarting the action of the enemy's reconnaissance and fire means, helping to reduce the losses of own forces.

All analyses performed with computer based applications and "war games" showed that the appropriate use of masking smoke, both in defence and offensive operations, reduces losses in forces and means by about 25% and reduces the effectiveness of the opponent's armament by 50%, particularly high percentages in the current conditions of endowment with technique and armament in modern armies.

The complex and complete accomplishment of the disinformation and masking actions can contribute to the secret fulfillment of the preparation of some military operations, to providing the surprise character of these activities and to the use of military technique with maximal efficiency.

The use of aerosols in the defence operation of the major tactical unit

The art of hiding and deceiving is universal, it has its origins in the early days of the primary history of armed conflicts, and it will be needed as long as conflicts exist.

In general, "to mask" means to hide something from people's eyes, to hide from sight or to conceal, to use a mask[1].

** Argeș District Military Center*
e-mail: *ionelcotoarba@yahoo.com*

Defensive operations delay the enemy, gain time, the enemy's access to an area is delayed, and attacking forces are destroyed or defeated. The use of masking aerosols multiplies the commander's ability to disrupt enemy attacks, take the initiative and fighting power at the critical time to defeat the enemy. The use of aerosols for masking will support any type of defensive operation. Used wisely, aerosols can combat any initial advantage of the attacker.

At the same time, masking is seen as "an action or a series of actions (measures, procedures) that aim to hide the troops (actions, objectives) from the reconnaissance of any kind performed by the enemy and deceive it with respect to the real actions (formation, objectives)" [2].

In order to successfully carry out aerosol missions, during the preparation and conduct of the defence operation, they must be well planned and carried out in a logical and continuous sequencing.

Military experts argue that, in the end, the use of aerosols must increase the stability of the defence and reduce the enemy's chances of preparing and conducting offensive combat actions in full situational awareness and in a coherent conception.

During World War II, a huge area masked by smoke blocked the German observation process for the correction of indirect fire on the 5th US Army at Anzio. The 24th DECON Company landed at Anzio area on D day, equipped with M 1 type smoke generators, M 4 smoke grenades and eight Besler type smoke generators used by the US Navy. On its first night on land, the unit masked with aerosols the beaches and the anchorage area. In two days, the

unit created a smokescreen about 3 km long. As the landing forces expanded, other smoking structures, including a British unit and the 179th Smoking US Company, moved to Anzio to increase the size of the smoke cloud.

Initially, smoke masking from Anzio was intended as part of the anti-aircraft masking system. This also included night-time masking actions, for example, when the rockets fired from airplanes seemed to go out as they entered the smoke blanket.

The 6th Corps of the 5th Army undertook an unsuccessful action. The Germans held the bridgehead from its inception on January 22nd, 1944 until the Allies forced its reduction in May[3].

Experience has shown that a favorite tactic of the enemy was to attack at low altitude with bombers at dawn and dusk. Therefore, it has automatically become a standard practice to provide smoke masking of the harbor at dawn and dusk, as well as during air defence alerts. The German army carried out at least one raid every night until mid-February, when the artillery fire increased in intensity.

The Allies used 203 mm howitzers to demolish buildings suspected of housing German observers. They realized smoke blinding with the support of chemical launchers and small-caliber artillery from nearby ridges and towers.

However, German observers had an unrestricted observation of the entire harbor due to the mountainous area nearby, allowing them to set targets and streamline long-range shooting. Although the entire bridgehead was within enemy range, the Allies failed to completely mask the bridgehead in January and February.

Commanders of the air defence, artillery and naval forces feared that the smoke masking of the bridgehead would disrupt the observation for the execution of friendly fire and the unloading of ships in the anchorage area. From January 22 to February 10, the Allies had an average daily loss of almost 28 tons of ammunition due to the execution of long-range fire and enemy bombing.

To reduce these losses, CBRN staff officers at the Corps level, along with chemical unit commanders, with the approval of 6th Corps Commander-in-Chief Lucian K. Truscott, developed a new technique for using smoke generators.

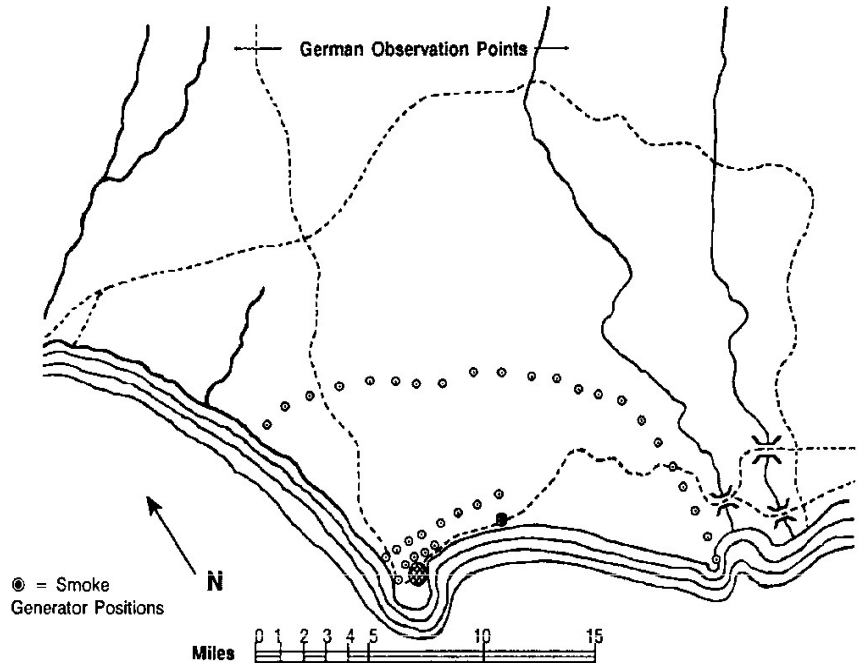


Figure 1 *The positions of the smoke structures at the head of the Anzio bridge after 18th March 1944*[4]

The technique used consisted of producing a thin fog between the port and the front lines. The opacity was designed well enough to allow normal operations within it and thick enough to prevent the observation of German forces from the heights.

On March 18, 1944, the US 179th Smoking Company moved from the harbor to advanced positions. The line of smoke formed an arc of a circle of about 25 kilometers around the harbor (Figure 1), with 22 possible positions on land. Taking into consideration the wind direction, 19

of the 22 positions were supported with smoke generators.

Two generators were also installed on naval patrol boats in the harbor area. The smoke generators were located at intervals of about 1000 meters, just beyond the anti-aircraft positions of the port and beyond the artillery observation posts. The latter action prevented the observation of the enemy on the flanks of the harbor.

The smoke subunits began aerosol masking operations half an hour before dawn which went on until after sunset, for about 14 hours each day, from March 18 until the May 1944 forcing. During this period, (Allied) troops at Anzio were able to unload an average of 3,500 tons of support material each day.

In the defence operation, the masking aerosols were to be used to hinder the opponent's activities, ensure the protection of friendly forces and increase their own possibilities of action on the battlefield in order to disorganize the enemy's offensive and promote the destruction of his forces.

The actions for the use of masking aerosols will aim at:

- masking the positions of own forces;
- interdicting activities and actions for preparation of the offensive operation by the enemy;
- preventing and delaying the enemy's units and large units to go on the offensive;
- ensuring the smoke masking of the regrouping, the withdrawal of some units and large units and taking of new defence positions;
- thwarting the maneuver of enemy forces and means in order to encircle, turn and invest their own forces and provide sally from the encirclement;
- ensuring the masking with smoke of some dams and obstacles executed on the advancing directions of the enemy;
- masking the evacuation actions of weapons and combat equipment damaged on the battlefield;
- camouflaging the maneuvers of the tank, infantry and artillery subunits;
- concealing engineer activities against the observation and reconnaissance of the enemy;
- concealing the replacement of the units from the first echelon, during normal visibility conditions;
- masking the approach of the subunits for the execution of a counterattack;
- ensuring the flank and the maneuver security at the interval between units;
- misleading the opponent on the position of the second echelon, of the reserves and of the planned counterattack directions;
- hiding the withdrawal of outposts;
- countering reconnaissance, surveillance and targets acquisition and reduction of the effectiveness and trajectory control of weapon systems with opto-electronic self-guidance to target;
- protecting targets against laser lighting (use of laser transmitters);
- blinding of observation posts, fire management posts and advanced observers;
- hiding the engineering operations to create corridors through the mine fields;
- aerosol masking of the movement of main columns of the second echelons and reserve during the arrival at the mandatory crossing points, as well as during their development on different alignments in order to execute some counterattacks;
- holding-up the advance of the enemy and ensuring the preparation and concealed passage of their own forces to the offense;
- preventing maneuvers and the use of communications by the enemy;
- maintaining the fighting capacity of own subunits for the accomplishment of the missions.

The use of masking aerosols supports the achievement of the tactical objectives of the defence by:

- selective concealment of air and ground research routes;
- forcing the enemy to group in small formations, thus becoming vulnerable targets.

Aerosol masking actions for preparation of the defence are performed both when the own forces are in direct contact and without contact with the enemy.

When the defence preparation is carried out in contact with the enemy, provisions are made that units and subunits especially designed to ensure concealing of taking defence positions, artillery fire, transportation of combat equipment and ammunition, and other important in depth objectives. At the same time, the aviation and helicopters, using modules and smoke bombs, perform aerosol blinding actions on the enemy's positions, in order to prevent the movement and concentration of reserves and the second echelon,

the setting-up of firing positions of nuclear weapons and artillery, as well as takeoff and landing of aviation on airfields.

When the preparation of the defensive operation is carried out without contact with the enemy, with the organization of an security strip, it is demanded to conduct aerosol curtains on successive phase lines by the infantry and tanks units aimed to fight in the security strip.

As the enemy approaches the Forward Line of Own Troops (FLOT), artillery comes into action, firing smoke projectiles at the enemy's direct-fire artillery and at its artillery groups firing positions.

Military experts say that the aerosol curtains in front of FLOT must be achieved from the moment the enemy began fire and aviation preparation of the offensive and cease at the moment of the attack beginning.

If the enemy has breached the defence system and continues to advance in depth, the retreat of units and large units is performed by infantry subunits and tanks intended for this purpose, using grenades and firing smoke projectiles.

In order to avoid the encirclement, roadblocks and obstacles that are concealed with aerosols are planned and executed on the flanks on the main directions of attack of the enemy.

When it is found that the enemy's assault has lost intensity, measures are taken to execute layers of blinding aerosols on the main directions of attack of the enemy in order to thwart and stop its advance and conceal the actions of its own regrouping forces to realize the adequate structure to shortly proceed to attack.

Blind aerosol curtains are realized directly in front of the opponent's front or directly upon its positions, in the areas of observation posts, command-observation points, fire points to suddenly decrease its visibility and thus prevent the observation and execution of fire by direct sighting, disorganization of attack formations and making it difficult to lead the troops.

In order to achieve maximum efficiency, blinding aerosol curtains must be realized simultaneously on all observation posts and fire points or on the entire attack formation of the opponent's subunits acting in that direction.

Blind smoke curtains are created with the support of projectiles, bombs, grenades and smoke candles; the dimensions of the aerosol curtain must ensure complete blinding of the objective throughout the execution of the maneuver by its own forces.

It turns out that, as a rule, the blinding smoke is made with the help of aviation and artillery, and complementary with grenades and smoke candles used by the fighting units in contact.

Masking blankets are made to hide the maneuver of the own units performed in order to take new combat positions.

Also, masking sprays will be used when crossing critical areas and on the flanks to limit the opponent's observation possibilities and reduce its chances of engaging in combat, in front of the units in the security strip to allow them to break the fight and perform maneuvers, and in the rear to hide the arrangement and composition of the support elements.

Protective aerosol blankets are used to disrupt an opponent's weapon systems with directional energy and consist of creating aerosol blankets around their own forces to mitigate the effects of these weapons.

Therefore, protective aerosol blankets are used to mask armored combat equipment.

The marking smoke is used to mark the targets and to identify the position of the own forces, being realized with the smoke grenades with different colored smoke and with the artillery projectiles.

False smoke (for deception) will be used to distract the opponent from the main defence effort regarding the areas where the counterattack is being executed or those of small/unimportant areas for the defence operation.

Deception smoke can also be used in defence operations to hide the real positions and to deceive the enemy with respect to the actions of own forces.

In this situation, the size of the smoked area/ line must be close to the real ones in order to be realistic.

Regardless of the way to go on defence, the units of the first echelon use grenades and smoke candles in front of FLOT in order to blind the means of observation and enemy shooters, for protection of the technique against anti-tank missile systems, to mask movements, exits/ regrouping and supporting actions to deceive the enemy; marking smoke is used by artillery and aviation; smoke modules are used by special purpose

helicopters, usually at the level of large units in the second echelon for masking and protecting their maneuvers (movements) and mandatory crossing points in the area of responsibility, as well as for misleading (deception) of the enemy.

The nature of the action to be performed by the large tactical unit determines the type of aerosol masking blankets, which can be linear and for areas.

Linear smoke curtains (frontal, oblique and flanking) are made in order to conceal the combat formation, maneuver and actions of the forces from ground observation of the enemy[5].

An important moment of the defensive operation of the large tactical unit is the counterattack carried out with its second echelon for the restoration of the previous FLOT.

For this moment, the large units from the first echelon provide the linear aerosol masking of the counterattack line with smoke candles for 15-20 minutes.

The period of the aerosol masking of this line is based on the time elapsed from the moment of forming the second echelon columns and the time of the beginning of the movement from the area until their arrival on the ordered line to carry out the mission.

The smoke curtains to the surface at the level of the large tactical unit are made with smoke modules for 10-20 minutes, for the benefit of the second echelon, at the exit of the counterattack disposal area, combined with false aerosol masking missions. When the large tactical unit moves from the rear to the front, it can perform aerosol masking missions at the exit of the large units from the concentration area and at the crossing of the mandatory points on the approach routes.

From the aspects presented above, it results that at the level of the major tactical unit, the use of aerosols ensures the blinding, masking, protection and deception of the enemy, usually in the visible and near infrared spectrum.

If the aerosols are composed of phosphorus of different types and dust, the masking spectrum will include the medium and far infrared range, and aerosols based on phenolic, polyester, silicone or urethane resins disrupt the operation of radar stations.

The conclusion that emerges is that in the current conditions, in the defence of the large tactical unit smoke is used to ensure blindness, masking, deceit in the near visible and infrared spectrum and less protection of the means of combat.

Conclusions

In the current context, in which military operations take place in an extremely complex operational environment, characterized by ambiguity, volatility and hybridity, the question arises whether smoke operations are still relevant. This is also debatable from the perspective of the Romanian Army disbandment of the smoke subunits, which a few years ago still existed at the level of CBRN defence battalions.

Our approach to address the issue of the use of masking smoke in military operations, especially at the tactical level, is in the context of concerns that exist globally, which is why we believe that it is necessary to have masking structures at the level of the Romanian armed forces, which we consider that aerosol masking subunits should also be part of. Moreover, in modern armies there are such structures, which act independently or together with DECON units, as is the case with the United States Army.

NOTES:

1 *Mic dicționar enciclopedic*, Stientific and Enciclopedic Publishing House, Bucharest, 1978, p. 591.

2 *Lexicon militar*, Military Publishing House, Bucharest, 1980, pp. 437-438.

3 FM 3-50, *Smoke Operations*, Washington DC, 1996, p. 36.

4 *Ibidem*, p. 37.

5 Ion Mitulețu, Alexandru Herciu, *Apărarea CBRN în operația brigăzii mecanizate*, "Carol I" National Defence University, Bucharest, 2014, p. 98.

REFERENCES

*** *Doctrina Armatei României*, Bucharest, 2012.

*** SMG-3, *Manualul de planificare a operaţiilor*, Bucharest, 2016.

*** *Manualul de luptă al diviziei de infanterie, (proiect)*, Bucharest, 2006.

*** C-25, *Instrucţiuni privind cunoaşterea şi folosirea materialelor chimice de instrucţie*, Comandamentul Trupelor Chimice, Bucharest, 1979.

*** *Memorator asupra cunoaşterii şi întrebuinţării fumului de mascare, în acţiunile de luptă, în concepţia forţelor armate ale ţărilor membre NATO*, Bucharest, 1973.

*** *Lexicon militar*, Military Publishing House, Bucharest, 1980.

*** *Mic dicţionar enciclopedic*, Stientific and Enciclopedic Publishing House, Bucharest, 1978.

*** FM 20-3, Camouflage, Concealment, and Decoys, Washington DC, 1999.

*** FM 3-50, *Smoke Operations*, Washington DC, 1996.

*** FM 3-6, *Field Behavior of NBC Agents (Including Smoke and Incendiaries)*, Washington DC, 1986.

*** AAP-2/2007, Glosar NATO de termeni şi definiţii.

Herciu Alexandru, *Sprijinul CBRN în operaţiile intermediare ale diviziei*, "Carol I" National Defence University, Bucharest, 2017.

Mituleţu Ion, Herciu Alexandru, *Apărarea CBRN în operaţia brigăzii mecanizate*, "Carol I" National Defence University, Bucharest, 2014.

Plotuna Gheorghe Petre, „Metode moderne de realizare a camuflării", *Romanian Journal of Optoelectronics*, no. 1/2006.

Popescu E. George, *Întrebuinţarea fumului pe câmpul de luptă*, Bucharest, 1927.

http://www.scoalanbc.ro/continut/scdra/revista_files/rev_6.

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-45

THE IMPORTANCE AND NECESSITY OF USING EMOTIONAL INTELLIGENCE (EI) IN A PR CAREER

Assis.Prof. Luminița CRĂCIUN, PhD*

Emotional intelligence has come to the attention of researchers in the humanities as technology has conquered more and more areas of human activity. Even if many of the cognitive abilities have been successfully taken over by robots, as happens in companies producing goods and services, in artistic, creative or social relations activities, the affective capacity is important, which cannot yet be supplemented by digitalization.

The field of public relations is intended to establish inter-institutional links, between companies and partners (stakeholders) or between organizations and the media. Emotional intelligence is capitalized in the sense of increasing the ability to persuade. Therefore, in the entire activity carried out by public relations specialists and in which they use modern technology to transmit information (photo or video images), the abilities of emotional intelligence are concretized.

Keywords: emotional intelligence; amygdala; public relations specialist; communication; influence.

A relatively new concept, which appeared as a topic of interest with the work of American authors P. Salovey and J. Mayer (*Emotional intelligence,* 1990), but especially after the much-promoted book by Daniel Goleman (*Emotional intelligence. Why It Can Matter More Than IQ*, 1995), emotional intelligence is a concern for research and study in many fields of activity.

Psychologists, sociologists, and anthropologists from all over the world conducted various research and comparative analyses where they identified the emotions which contribute to the increase of professional performances. They were interested not only in the impact that emotional intelligence can have on the organization's well-being in general, but also in the role it has in obtaining job performances or its importance in leading the organization. Besides this, they emphasized the fact that emotional intelligence has a very important role in a person's social integration and creating interpersonal relations. Thus, articles and studies were published in specialized magazines or papers were presented in international scientific conferences highlighting the growing interest in the concept. The interest is all the greater as it could highlight the superior abilities of humans to robots proposed to supplement human activity in various fields (in arts – painting, music or psychology, religion, philosophy, even in some specializations in medicine areas, where empathy is the basis of professional success).

***"Carol I" National Defence University**
e-mail: *craciun.luminita@myunap.net*

History

Introduced by the American psychologist Edward Lee Thorndike, the term *Emotional Intelligence* dates back from the 1920s. At that moment, it was related to social intelligence, meaning that human ability to identify own internal emotions, motivations and behaviour and the ability to interact with others in an optimal manner. In the following period, the psychologists opened the way towards the research of the emotional aspects related to interactions or to the professional activity in the following way[1]:

After 1990, especially in the American environment, there was an increased interest for the affective aspects of human personality and for their role in human interaction. Through powerful scientific arguments, researchers emphasized the importance of emotional intelligence in every aspect of human activity.

Thus, from a physiological aspect of the human brain, it is demonstrated that the activity belongs to the amygdala nucleus[2] located behind the limbic system, responsible for memory and environment adaptation. Researchers realized that the section called rational brain evolved from the visceral

Year/ Period	Author/Paper	Contribution
1940	**David Wechsler**	Suggests that the affective elements of the intelligence could be essential for being successful in life.
1950	**Carl Rogers** and other psychologists	Describe how people can harvest their emotional power.
1975	**Howard Gardner**, *The Shattered Mind*	Proposes the idea of multiple intelligences: • Intrapersonal intelligence, introspective own knowledge which allows conscious handling of own emotions; • Interpersonal intelligence, the ability to identify other people's emotions (even the hidden ones) and to understand them in order to better manage relationships
1985	**Wayne Payne,** in his PhD thesis *A study of emotion: developing emotional intelligence; self-integration, relating to fear, pain and desire (theory, structure of reality, problem solving, contraction/expansion, tuning in/coming out/letting go*	Introduces the term *emotional intelligence*
1987	**Keith Beasley**, article from *Mensa Magazine*	Uses the phrase emotional quotient (emotional factor EQ is considered to be an EI measure).
1990	**Peter Salovey and David R. Caruso** in the paper *Emotional Intelligence*	They introduce and formalize the emotional intelligence concept in order to describe the capacity to understand and handle emotions, and to take into consideration one's ability to adapt to the environment.
1995	**Daniel Goleman** publishes *Emotional Intelligence. Why It Can Matter More Than IQ*	Promotes the concept emotional intelligence which became a field of studies in schools and universities.

Figure 1 *History of Emotional Intelligence research*

brain, a neuron and neural network conglomerate called brainstem, located at the end of the spine towards the cranial box. The neocortex, which appeared later in human development, specialized for thinking, reasoning and decision making, is in interaction with the amygdala, which makes most of the emotions be controllable. In other words, human activity is coordinated by distinct parts of the brain, and "the affective and cognitive processes, although they are different by their nature, are inseparable within the activity of the individual, thus being in close interaction"[3].

Even if, until recently, cognitive intelligence[4] (familiar IQ, measured using specific tests) was considered a classification criterion used to differentiate individuals when participating in certain competitions (insight or employment), life has shown that success was not conditioned by high scores at the IQ test, but rather by the ability to respond to social challenges, interact with others, and adapt to all environmental challenges.

Daniel Goleman[5], one of the psychologists dedicated to the study of behavioral sciences, listed in his paper the skills that a person should cultivate to demonstrate that he is emotionally connected with those around him, because emotional intelligence (EI) falls into the category of interrelated skills[6]:

- to recognize their own emotions and analyze them (self-awareness);
- to have the ability to control their emotions, even in difficult situations (self-control);
- to have the ability to persevere, despite discouragement (motivation);
- to recognize the emotions of others and share them (empathy);
- to have the ability to interact with others, listening to them, understanding them and evaluating their emotions (social ability)[7].

Peter Salovey and David R. Caruso mentioned that understanding emotional intelligence involves identifying, using, understanding, and controlling emotions[8].

providing solutions to solve critical situations. Even if scientific theories mention that a concept is valid if it can be measured, for emotional intelligence there is, so far, no precise variant of measurement

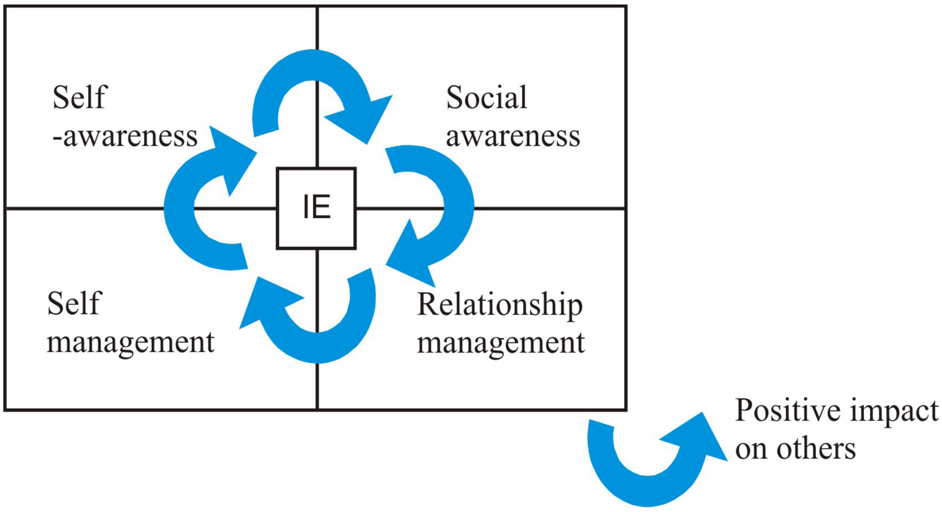


Figure 2 *Emotional intelligence: Goleman's model*

(test, questionnaire, application, etc.) as it is for IQ. Apparently, the Internet offers, for a fee, a corpus of questions that are said to generate a result, but these questionnaires are not recognized by researchers in the field, so far.

The paradigm of the emotional intelligence concept could be summarized in the models proposed by researchers which are structured on four generic fields, thus demonstrating the dynamics and evolution it has had in recent years[9]:

The need for research regarding emotional intelligence is determined by the particularity of the human being as a social being. In the interaction with the others, the emotions represent the link between the participants with a well-established role (whether it is a children's game, meeting with friends, activity at work, team sports, watching shows, group excursions, etc.). Joy, anger, fear, disgust, interest, surprise or acceptance appear for many reasons; they have a different intensity depending on the event[10] or the personality and cultural context of the individual. These feelings are also found in the organizational context, at work. A salary increase, a promotion or a restructuring of the activity in the organization are triggers of emotions, and the reaction that occurs is related to the emotional intelligence.

If the idea of cognitive intelligence has been formulated as a genetic fact (although it has been shown that without additional training effort – about 10,000 hours, success is not guaranteed), emotional intelligence is a capacity that can be amplified through counseling, questionnaire administration, interpretations, case studies and

It is certain, however, that efficiency at work, the pleasure felt when watching theater shows, movies and concerts or family happiness are conditioned by the emotions received, experienced and transmitted during interactions. Communication (verbal, non-verbal, paraverbal) is the way to materialize human interaction, the way to reach empathy (the ability to recognize and understand one's mood and emotions) and good collaboration. However, it is also necessary to actively listen to the participants in the act of communication, so that the message sent is correctly received[11].

Emotional intelligence, one of the qualities of the public relations specialist

For a public relations specialist, whose object of activity is communication (in organizations, with collaborators, with media representatives or in the online environment), emotional intelligence is a condition of professional success. This is because in addition to the qualities he must have (tact, patience, kindness, sense of humor, flexibility, honesty, objectivity, sense of organization, ability to analyze and synthesize, etc.)[12], emotional

intelligence helps him/her to achieve, together with the team management, a climate of trust and collaboration in the organization.

Empowered by professional training to build messages through words and symbols, the public relations specialist conducts internal communication with members of the organization, starting from explaining its mission in the social system, the purpose and objectives proposed for a limited period of time, but also the role that each of them has in this context. Dissemination of messages from the management team (vertical, top-down communication), along with taking on suggestions from employees and disseminate them to the management team (vertical, bottom-up communication) contributes to building and strengthening a trusting organizational climate, where collaboration and team spirit are real. For this type of communication, the public relations specialist must show empathy, understand the employees' feelings (upset, dissatisfaction, aspirations), select, analyze and evaluate the raised issues, so that he can offer solutions for solving them. In fact, Kenneth Goode stated that "the success of the relationship with people depends on understanding the other's point of view"[13]. The PR must use an assertive communication style, IE "know how to express their opinions in ways that are not critical or offensive to others"[14].

For external communication (with partners, clients, legislators), the emotional intelligence of the PR specialist is proven by using influential communication strategies, so that, with minimal financial effort to obtain maximum benefits for the organization (support for certain projects, priority in solving causes, material advantages and other priorities).

Media communication is a way to capitalize the emotional intelligence of the PR specialist because the image of the organization is built on articles published in the media and online. The right choice of style in formulating the press release or press conference' titles in order to make them attractive for journalists, but especially for the public, are elements related to creativity, but especially emotional intelligence. Also, the contents of articles sent for publication in newspapers/ magazines (printed or online), combining text with relevant images from the organization's activity, logos, internal publications are the result of the efforts of the PR specialist, knowledgeable of discursive techniques and semiotics with effects on the public's mood.

The entire public relations activity, starting with research, continuing with planning, action and evaluation, is carried out by virtue of the six principles of emotional intelligence listed by P. Salovey and D.R. Caruso. The first of these refers to the fact that emotion is information, interferes with thinking and occurs as a result of adaptation to everyday life. Being in direct contact with the latest information, the PR specialist perceives the flow of changes that may occur, but also their effects on the organization's employees. In this way it can anticipate possible crises of the organization, it can build appropriate messages for employees or stakeholders, and it can identify the elements necessary to develop the image of the organization. An example in this sense is the internal communication and the corroborated actions carried out on the occasion of the takeover of Billa shares by the Carrefour Group in 2015[15]. In addition to newsletters, newsgroups and video messages, welcome packages were created for Billa employees consisting of the Carrefour brochure (information on the Carrefour Group, dictionary of terms and abbreviations, welcome letter, message card), greetings from Carrefour colleagues, personalized agenda, notebook and pen with the text "Welcome, BILLA… yours, Carrefour!" The images in the brochure are photos with *Carrefour* employees taken for future colleagues in *Billa*, which contributed to reducing the formal distance among employees and to humanize the re-organization action. In addition, welcoming videos created by Carrefour employees were posted in the online environment (Facebook, Youtube). Thus, the fears of the employees from both companies related to the possibility of losing their jobs disappeared.

The second principle is the one that highlights the ubiquity of emotions, their existence in everything that involves human activity and interaction. In the case of the public relations specialist, his role is to identify and enhance the emotional aspects for the benefit of the organization he represents and for its members. The ability to interpret verbal and non-verbal messages, as well as the emotions that accompany them, are essential in the activities carried out by the PR specialist.

The messages he builds lead to the formation of opinions and decision-making, a two-way result of reasoning and emotions alike. Particularizing in the military environment, establishing links with reservist soldiers or organizing events dedicated to them involves using emotional intelligence skills in creating speeches, attracting participants, identifying sponsors who could support activities for veterans or even their daily life. An initiative with a special emotional impact is the Naval Forces Man Gala show, realized since 2017 with the support of the national television, where representatives with outstanding results of military and civilian personnel receive diplomas and applause from colleagues in the hall. The initiative of the Information and Public Relations Bureau of the Navy HQ has a stimulating effect in the training of military sailors.

The following principle stated by P. Salovey and D. Caruso refers to the fact that emotions cannot be repressed. The grief felt in the family (where the child hit himself while playing) is also transferred to the activity at work where it can turn into anger (due to the fact that a submitted project was rejected by the management team). The public relations specialist fulfills, here, the role of counselor through explanatory communication (presents the reasons for returning the project) and by offering creative solutions so as to determine the relaxation of the situation. A special example is that of the PR specialists from the army who informs the family members of a soldier wounded in the theater of operations or, worse, killed during the actions carried out there. In addition to sensitivity, compassion and patience, the skills of emotional intelligence help the PR specialist in choosing the most appropriate means of communication.

Decisions made in the activities carried out through interaction, in order to be effective, must also involve emotions or, as A.R. Damasio mentioned, "rational thinking is impossible without emotions"[16]. The communication strategy that underlies all PR activities in public institutions or the private sector, aims to raise the interest of various public categories or business partners for products or services offered by the organization. This can be achieved through new, attractive titles / slogans, which require public involvement in the organization's activity. Thus, through linguistic constructions such as: Energy Library, Vegetable School, Biosecured, Stop barbarism, Save the stork, Veterun (war veterans' cross), it is intended to appeal to the amygdala nucleus of individuals in the target public category responsible for affectivity.

Another principle of emotional intelligence is that it draws attention to the fact that emotions follow logical patterns, from those with low intensity to those that remain strong for a longer period in the memory of the individual. In the case of PR activities, especially those related to repetitive events, the specialist must always think of novelty elements that can add value.

The last principle formulated by American authors (P. Salovey and D. Caruso) is the one regarding the classification of emotions according to universal, but also specific criteria. These refer to cultural differences that introduce rules for the manifestation of emotions, to gender or age differences. The public relations specialist must know and take into account all the cultural peculiarities in the organization of events, in the formulation and transmission of correspondence, in the creation of representation or promotional materials. There are currently a multitude of international collaborations, and the Internet has generated the disappearance of physical borders, and people communicate freely indefinitely. Knowledge of the cultural specificity is also necessary for those who work in military institutions and to ensure the safety of citizens. The activities in the theatres of operations (Afghanistan, Kosovo, Syria, Iraq, etc.) are a challenge for PR members who must constantly pursue a good connection with the local media, but also information to adapt the military base to the specifics of the area.

Conclusion

The analysis undertaken in this article aims to highlight the importance of emotional intelligence in public relations activity, in everything that means establishing links between a public or private institution, on the one hand, and a partner or media, on the other. Emotional intelligence includes self-awareness, self-control, motivation, empathy and social skills, aspects worth remembering for the management and human resources teams which decide to assign a certain person for this position. The job interview could further highlight whether a person meets the qualities needed for the profession.

To be emotionally intelligent, there must be a connection between emotions and thinking, thus, reaching the creative thinking which the PR specialist needs for creating texts, audio-video material, organizing events or even conducting internal communication (with employees). In fact, an essential component of emotional intelligence is the ability to harmonize the mood with the situation. "The right mood is the key to creative thinking, vision and empathy"[17]. Relationships cannot be established without empathy, and in order to establish contact with others, whether they are employees, superiors or customers, it is necessary to understand their feelings[18]. On the other hand, the inability to have emotions indisputably denotes a rigid way of thinking[19], which would not be recommended for public relations. Having the ability to understand others, to communicate in all forms and on all possible channels, the PR specialist increases his/her professional value, implicitly the respect of employees and collaborators.

NOTES:

1 Christine Wilding, *Change your life with the help of emotional intelligence*, Litera Publishing House, Bucharest, 2018, pp. 29-30.

2 N. Gibbs, "What's Your EQ", *Time*, Oct. 1995, pp.60-68; P. Salovey, D.R. Caruso, *Emotional intelligence. How to develop and use the essential principles of leadership with the help of emotional intelligence,* BusinessTech International Publishing House, Bucharest, 2012, p. 47: "Emotions are processed by a part of the brain, called the limbic system, especially by an element of this system, called the amygdala, which generates pleasure, disgust, fear and anger. Millions of years ago, the neocortex emerged that gave us human beings the opportunity to plan, to learn, and to remember".

3 M. Zlate, *Fundamentele psihologiei*, Hyperion XXI Publishing House, Bucharest, 1991, pp. 68-69 apud Mihaela Roco, *Creativity and emotional intelligence,* Polirom Publishing House, Iași, 2001, p. 136.

4 The reason or ability of the individual to operate with various verbal concepts, to analyze and understand complex situations, to abstract or make decisions.

5 Following the publication of the bestseller Emotional Intelligence and Concerns for the Promotion of Behavioral Sciences, he was named an honorary member of the American Association for the Advancement of Science.

6 Christine Wilding, *Change your life with the help of emotional intelligence*, Litera Publishing House, Bucharest, 2018, pp. 22-23.

7 *Ibidem*, p. 32.

8 *Ibidem*, p. 24. *It is necessary to accurately identify the feelings, both in ourselves and in others, in order to express ourselves and communicate effectively*.

9 Daniel Goleman, *The brain and emotional intelligence*, Curtea veche Publishing House, Bucharest, 2014, p. 8.

10 Paul Eckman, *Emotions given to the face*, Trei Publishing House, Bucharest, 2019, pp. 384-392 apud P. Salovey, D.R. Caruso, op.cit., pp. 37: "Normally, the events that generate emotions are interpersonal actions".

11 Christine Wilding, *op.cit*., p. 192: "Communicating well and listening actively are essential components of IE".

12 Gary F. Frates apud S. M. Cutlip, 2010, p. 66. The public relations specialist must be "... honest, trustworthy, discreet, with solid analytical skills and an excellent insight and understanding of the main activity and important audiences. She/he will have the ability to listen, the ability to advise and the ability to help the CEO manage the priorities that require his or her attention. However, the most important qualities are interaction, trust and respect".

13 Kenneth Goode, *How to Turn People into Gold,* Harper & brothers, New York, 1929 apud Christine Wilding, *op.cit*., p. 193.

14 Christine Wilding, *op.cit.*, p. 202.

15 Dana Oancea (coord.), *The Golden Book of Romanian Public Relations. 15 years of practice and the landmarks of an industry*, Monitorul Oficial RA, Publishing House, 2017, pp.186-187.

16 A.R. Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain*, New York, Avon 1994, apud P. Salovey, D. Caruso, *op.cit.*, p. 46.

17 P. Salovey, D. Caruso, *op.cit.*, p. 161.

18 *Ibidem*, p. 90.

19 *Ibidem*, p. 83.

REFERENCES

Cutlip M. Scott, Center H. Allen, Broom M. Glen, *Efficient public relations*, Comunicare.ro Publishing House, Bucharest, 2010.

Dagenais Bernard, *Profession of relationist*, Polirom Publishing House, Iași, 2002.

Goleman Daniel, *Emotional Intelligence*, Curtea Veche Publishing House, Bucharest, 2008.

Goleman Daniel, *The Brain and Emotional Intelligence*, Curtea Veche Publishing House, Bucharest, 2014.

Newsom Doug, Haynes Jim, *Writing public relations materials*, Polirom Publishing House, Iași, 2011.

Oancea Dana (coord.), *The Dolden Book of Romanian Public Relations. 15 ani de practică și reperele unei industrii*, Monitorul Oficial RA Publishing House, 2017.

Roco Mihaela, *Creativity and emotional intelligence*, Polirom Publishing House, Iași, 2001.

Salovey Peter, Caruso David R., *Emotional intelligence. How to develop and use the essential principles of leadership with the help of emotional*

intelligence, BusinessTech International Publishing House, Bucharest, 2012.

Wilding Christine, *Change your life with the help of emotional intelligence*, Litera Publishing House, Bucharest, 2018.

https://www.michaelpage.lu/advice/conseils-de-carri%C3%A8re/d%C3%A9veloppement-de-carri%C3%A8re/l%E2%80%99importance-de-l%E2%80%99intelligence-%C3%A9motionnelle-au

https://rep2100.wordpress.com/2011/10/21/lintelligence-emotionnelle-au-service-des-relations-publiques/

https://www.odef.ch/relation-action/intelligence-emotionnelle-une-competence-fondamentale-des-professionnels/

https://www.hbrfrance.fr/chroniques-experts/2019/05/26061-lintelligence-emotionnelle-le-nouvel-allie-des-managers/

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-46

STATIC AND DYNAMIC FACTORS OF COMBAT POWER IN THE LAND MILITARY OPERATIONS

Lt.Col. Florin-Ioan CIOANCĂ*

Over the last decade, land forces have undergone an extensive process of reform and modernization in order to create credible and efficient capabilities, adapted to the new security environment.

The transition from the specific concepts of territorial defence to collective defence and counteracting asymmetric risks does not exclude the responsibility of defending the national territory, and to meet strategic requirements Romania needs a modern and permanently adaptable ground forces structure based on the principle of combat power, a principle by which the forces are configured according to the missions and objectives to be accomplished.

Keywords: combat power; static factors; dynamic factors; transformation; interest; configuration.

The contemporary international environment is characterized by substantial transformations, new challenges are seen on the horizons of international security, and the challenges generated by the overlapping of some events, such as globalization and fragmentation, are added classic events of regional risks and vulnerabilities. In the current context, traditional outbreaks of tension remain, their development being naturally influenced by the emergence of unconventional and cross-border risks, such as terrorism, organized crime, the proliferation of weapons of mass destruction and last but not least cyber terrorism.

Major changes in the relations between states and groups of states, due to the events that took place in the late twentieth and early twenty-first century, highlighted the transition from the "bipolar" system to the "unipolar" system, and the tendency of states to group in blocks with their own political, economic and financial interests, it requires an updating and enrichment of the concept of national interest. The phrase "national interests" is often used in different contexts, and Romania's Defence Strategy emphasizes that "national interests are those needs and aspirations essential for asserting national identity and values, the existence of the state and ensuring its fundamental functions"[1].

Starting from a different definition and understanding, for each state actor, of the phrase *national interest*, as well as taking into account all the elements of the international environment, we can say that at the beginning of the third millennium, the physiognomy of the modern battlefield acquires new values with deep changes of structure, composition, distribution and employment of forces, as well as in the content of the management of military and civilian structures, which are directly or indirectly engaged in violent confrontations dominated mainly by risk and uncertainty.

In analyzing the impact of the international environment on the modern battlefield, the analysis and evolution of science must be weighed. Given the dynamic nature of science and technology, we can say that technologies do not stand still, they are constantly evolving, marking a pronounced impact on the configuration of the combat power of military structures by the possibility of using their branches to obtain an optimal configuration of forces or force structure.

The information explosion and the new products of science and technology have always had a great impact on the military field both in terms of strategic doctrines and the concepts of preparation and conduct of military actions.

The changes that have taken place domestically and internationally in the political, economic and military fields in recent decades have led to contradictory developments, but the military field is perhaps the one that has undergone the most spectacular developments. All this requires reorientation, re-evaluation and reorganization in the system of organization and conduct of military actions, including in the manner or methods of

Battalion 405 "Năsăud" Logistical Support
e-mail: *heniu@yahoo.com*

organization, equipment, configuration and use of military structures in military operations.

The complexity of military actions in the modern battlefield, highlighted by current operational-strategic concepts, adopted in NATO and other armies, in which their own means must "see" and "attack" with all available resources, determined the factors of military leadership in modern armies to change their conception of operations by transforming in some situations the elements of combat protection into elements of combat power. A relevant example is the transformation of electronic, computer or electromechanical capabilities into essential elements of combat power.

The local military conflicts of the last decade have shown that, during the war, there is a shift of effort towards the informational and electronic confrontation unfolding in the widening electromagnetic spectrum, the military capacity of states becoming increasingly dependent on the possibilities of collection, processing, transmission, use and protection of information to the opponent. As a result, gaining superiority in the use of information and electromagnetic spectrum for military needs is becoming a priority, and the asymmetry in this area is more than obvious. A new orientation is the establishment and configuration of military structures that can make the most of information and electromagnetic capabilities.

All these changes in the international environment, which in turn have led to changes in the way conflicts are conducted, as well as the development of technology, force us to re-evaluate the organization and configuration of military structures to obtain the minimum combat power needed to achieve victory, as well as an optimum of the land operations they carry out.

No matter what type of land military operation we are talking about, its success is conditioned by the combat power of the military structure engaged in the operation.

For a good analysis of the combat power it is strictly necessary to determine and analyze two categories of factors that contribute to its increase or decrease, respectively *static factors* and *dynamic factors*, which define and give the value of the combat power.

Combat power is a concept that is making more and more room in the usual language, and the preoccupations of specialists are more and more intense in determining the efficiency of military structures, from the smallest to the largest echelon.

Depending on the affiliation of military specialists, the combat power is represented, according to ADRP 3-0[2], as the total of destructive, constructive means and information capabilities that a military structure can use at a specific time. In other words, combat power can be understood as the potential of military capability to carry out an effective action at the time and place established with the planned effect or in the vision of other specialists[3], combat power defines the possibility of an army to fight and has three interdependent components: conceptual, moral and physical. In 2015, the definition of combat power was changed and was stated as the effect created by combining eight components in combat, namely: leadership, information, mission command, movement and maneuver, research, firepower, logistic support and protection[4].

Static and dynamic factors are those elements that contribute to the organization and endowment of a military structure of tactical level, and dynamic factors are those elements that contribute essentially to the training and employment in combat of a force or force structures.

"In the situation in which it expresses the static, the combat power is a potentiality that represents the resultant of a set of factors (elements), having the following components: human, technical, managerial and logistic"[5].

The human component is the most important static factor and the most important source of combat power of a military entity or structure. The elements of the human component that contribute to the generation of combat power are the quality of human resources, the level of theoretical and practical training and instruction, both individual and collective, and the level of its moral state. All these elements must be compared with those of the opponent.

The technical component is represented by the factors or elements that highlight the quantity and quality of military equipment and systems forming the endowment of a military structure. The technical component depends to a large extent on the organization of the military structure and needs to be defined by the missions and objectives that military structure must fulfill at a specific time.

The technical factor influences, through the way it is approached and used, the result of a military action or operation.

The managerial component consists of those factors or elements that can quantify the ability to organize and lead a military structure. The management and organization of a military structure must include, as determining factors, the ability to adapt to new situations that arise in the battlespace of military structures and their resilience. Resilience is generally accepted as "the ability of a community, service, field, or infrastructure to detect, prevent, and, if necessary, resist, cope with, and recover from disruptive challenges"[6]. The resilience of an entity and especially of a military structure is essential for maintaining it in the dynamics of conducting military operations.

The logistic component is a complex process of activities that provides all the material goods and services necessary for the organization and operation of a military structure in optimal conditions, as well as ensuring freedom of action, operational expansion gained and prolonged support in military operations. The logistic factor determines, due to the multitude of processes and activities that are planned and executed for the supply, uninterrupted and especially in due time, the result of a military action or operation. The logistic component must be continuously maintained at high parameters to meet the demands of the military structure during military operations.

When we refer to the dynamics of combat and *dynamic factors*, the combat power of a military structure is determined by the following factors[7]:

a) the factors (functions) of the fight: mission command, the information advantage, the morale of the fighters, the firepower, the maneuver, the protection, the vulnerability, the surprise;

b) environmental factors: terrain, weather, season.

The dynamic factors of the combat are those elements that integrated and coordinated under a unitary leadership contribute essentially to the success of the military action or operation. They must be very well defined and understood to achieve the desired results.

The mission command, considered as its function, requires the existence of a rigorous planning of the military action or operation so that it can be applied without syncope and with very good results.

The information advantage facilitates understanding the enemy, the terrain, the weather, civilian considerations and other significant aspects of the operational environment and synchronizes the collection of information with primary tactical tasks of reconnaissance, surveillance and security. The information involves the collection and analysis of data from all possible sources and is used both in the process of planning operations and in their management.

Army morale is an important dynamic factor in obtaining a high combat power of a military structure. One of the parameters that underlies morale is the motivation of both the individual military and the collective militaries. Motivation is the set of states of necessity that determine an individual or group of individuals to satisfy them. Much closer to our subject, the motivation is that state of the military that gives them the will to fight. Motivation can be both moral and material and depending on the influence of the weight of each of them on the military as an individual and especially on the collective or military of the structure; it can be quantified.

Firepower, as a function of combat, consists in the quantity and effectiveness of fire and in the possibilities of executing the firing maneuver by a structure or weapon system in a time interval on an enemy target.

The effectiveness of the fire is obtained by judiciously choosing the fire execution procedure, choosing the moment of opening and the type of fire, increasing the accuracy, speed of firing, concentration and timely execution of the fire in any conditions, its judicious management. The effectiveness of fire in the case of artillery is determined using the parameters of firing effectiveness.

Maneuver is an essential dynamic factor of combat power, a factor that implements the concept of military operation.

Maneuver[8] is the combination of movement supported by fire, potential fire or other abilities adopted in order to gain an advantageous position in relation to the opponent, the application and concentration of the effects of combat power.

The maneuver consists in moving and deploying tactical level military forces and their military equipment and systems in the battlespace to apply their combat power, spatially and temporally,

against enemy forces, in order to gain a tactical, operational or strategic advantage.

The maneuver represents the procedure or the form of positioning one's own forces in decisive points in order to surprise, gain tactical advantage, focus firepower and strike power on the enemy's vulnerable point, gain battlespace and to force the enemy to submit to the will of own forces. By maneuvering own tactical level military forces it imposes on the enemy where, when and under what conditions the battle will take place.

Protection ensures the integrity of the force throughout the planning and conduct of military operations so that the commander can apply maximum combat power to fulfill the mission received. In order to ensure the protection of the force, all possible physical measures will be taken so that the threats to the forces are mitigated or eliminated.

Vulnerability is a dynamic factor of the fight that, treated superficially, can put own forces at a disadvantage, starting from the existence of gaps in the security and defence system and up to the disorganization of the command and control system of the military structure. Vulnerability is given by one or more weaknesses or areas of a military structure and as such should be ameliorated or eliminated if possible.

Surprising the opponent as a tactical action can lead to a decrease in his combat power, which allows our own forces to achieve success with fewer forces than would be necessary in its absence.

Surprise can be achieved using different methods and techniques, that are often simple, and has major effects on the morale of the opponent's forces leading to large losses of human and material resources.

Another dynamic factor of combat power that must be taken into account is the *factor of degradation or reduction* of the dynamic potential of combat power throughout the planning and execution of the military action or operation by a military structure.

Dynamic environmental factors are elements of major importance on the battlefield and can favor or hinder the conduct of combat actions by both our own forces and the forces of the enemy.

The terrain has effects on mobility, defensive position, infantry armament, aviation effectiveness, armor, etc. The terrain is taken into account by the degree of engineering preparations and it is considered that its influence is different according to the categories of weapons.

Weather is another factor of the battlefield that can influence the actions of the battle. Temperature, humidity, wind are the climatic elements that inter-condition and influence the mobility of troops and the way of actions.

The season can influence the fighting actions, as in the case of atmospheric conditions. Military analysts believe that the season must be taken into account in the planning, organization and conduct of military actions or operations with a considerable impact on their results.

Conclusion

Combat power as an integrated set of combat functions is influenced by static or dynamic factors that exist or can be generated in the battlespace both during planning and conducting of military actions or operations of land forces.

Static and dynamic factors must be quantified in a realistic way to have a correct picture of the value of the combat power of a tactical level military structure. Also, when they are generated, they must be used, on the whole or in part, to the advantage of our own forces. It is to avoid generating a dynamic factor of combat power without being able to be it subsequently controlled by our own forces.

The most important of the static factors is the human resource, which must be trained, continuously prepared, and on which depends, in most cases, the success of a military action or operation.

The most important dynamic factor is the maneuver that integrates the other factors and that planned and executed at the right time and place ensures the success of the military structure that performs the military action or operation.

NOTES:

1 *Strategia de Apărare a României*, Bucharest, 2010, p. 8.

2 ADRP 3-0, *Unified Land operations*, Headquarters, Department of theArmy, 2012, 3-1.

3 Army Doctrine Publication, *Operations*, Army code 71632, 2010, 2-2.

4 The Battle Staff Smartbook, *The fourth revised edition*, (ADRP 5-0/6-0/1-02 SMARTupdate), 2015, pp. 1-22.

5 Viorel Buța, Gelu Alexandrescu, Daniel Dumitru, *Elemente dinamice ale câmpului de luptă modern – Puterea de luptă,* "Carol I" National Defence University Publishing House, Bucharest, 2004, p. 28.

6 Guillaume Lasconjarias, *Descurajare prin reziliență. NATO, națiunile și provocările relative la a fi pregătit*, Gândirea Militară Românească Magazine, no. 3/2018, p. 48.

7 Viorel Buța, Gelu Alexandrescu, Daniel Dumitru, *op.cit.*, p. 28.

8 FT-3, *Manualul de tactică generală a forţelor terestre,* Bucharest, 2013, p. I-15.

REFERENCES

*** Army Doctrine Publication, *Operations*, Army code 71632, 2010.

*** *Strategia de Apărare a României*, Bucharest, 2010.

*** *Strategia de securitate naţională a României*, Bucharest, 2007.

*** *Strategia de transformare a Armatei României*, Bucharest, 2007.

*** FT-3, *Manualul de tactică generală a forţelor terestre,* Bucharest, 2013.

*** *The Battle Staff Smartbook*, The fourth revised edition, (ADRP 5-0/6-0/1-02 SMARTupdate), 2015.

*** ADRP 3-0, *Unified Land operations*, Headquarters, Department of the Army, 2012.

Buşe Dorel, *Geopolitică şi Geostrategie*, "Carol I" National Defence University Publishing House, Bucharest, 2010.

Buța Viorel, Alexandrescu Gelu, Dumitru Daniel, *Elemente dinamice ale câmpului de luptă modern – Puterea de luptă,* "Carol I" National Defence University Publishing House, Bucharest, 2004.

DuBois Edmund L., *A Concise Theory of Combat*, The Military Conflict Institute, Edition 1997.

Frunzeti Teodor, Zodian Vladimir, *Lumea 2013, Enciclopedie Politică şi Militară, Studii strategice şi de securitate*, RAO Publishing House, 2013.

Lasconjarias Guillaume, „Descurajare prin reziliență. NATO, națiunile și provocările relative la a fi pregătit", *Gândirea Militară Românească Magazine*, no. 3/2018.

Nicolaescu Gheorghe, *Geopolitica securităţii*, "Carol I" National Defence University Publishing House, Bucharest, 2010.

Stăncilă Lucian, *Apărarea teritoriului naţional în actualul mediu de securitate*, Moroşan Publishing House, Bucharest, 2011.

https://fas.org/nuke/guide/usa/doctrine/army/fm3-100/CH2.PDF

https://books.google.ro/books?id=lfgICAAAQBAJ&pg=PA328&lpg=PA328&dq=static+combat+power+factor&source=bl&ots=6Dw8eA4mje&sig=ACfU3U38ihrsibKtg3qP42UGhAIWjqHLYQ&hl=ro&sa=X&ved=2ahUKEwjwjojK9s_pAhVu16YKHZHDDO8Q6AEwDnoECAcQAQ#v=onepage&q=static%20combat%20power%20factor&f=false

10.12753/2284-9378-20-47

THE STRATEGIC SHOCK IN THE DESIGN OF WAR BETWEEN CLASSIC AND CONTEMPORARY: COVID-19

Lt.Col. Valentin-Claudiu JORĂSCU, PhD Candidate*
Maj.Eng. Teodora ZECHERU, PhD**
Lt.Eng. Laviniu-Octavian HALLER, PhD Candidate***

The hybrid warfare concept developed in many ways during the past twenty years. What we are facing today is a new component, limited previously by its potential worldwide impact. Biological weapons have the advantages of facile and silent spread, are very difficult to detect and deter in terms of individual and collective protection equipment. The consequences of biological weapons use have implications at political and diplomatic level, but also operationally and tactically-wise. The main aim in these difficult times is to maintain combat readiness and to strengthen national defence.

Keywords: CBRN; pandemic; defence; combat readiness; hybrid warfare.

Within the past twenty years, the greatest politologists, strategic thinkers and defence futurists acknowledged the tremendous prominence of war dimensions[1,2,3,4], especially the so-called "hybrid" one. And, together with this hybridity, they emphasized the special place that nuclear weapon systems have in the global war space. We did highlight in some of our previous papers the importance that chemical, biological, radiological and nuclear weapons have together with the explosives (CBRN) within the hybrid war, next to the space and cyber facilities[5,6,7].

In the modern history, the highlight was on the chemical and nuclear dimension, with the well-known examples from World War I and World War II, from Vietnam, the US and Japan. Less attention was given to the biological side, where actually even natural diseases significantly influence policies and strategies, and, consequently, the military strategies, thus illustrating the potential worldwide impact of a deliberate release of biological agents or use of biological weapons.

In this respect, intentional release of various bacteria or viruses represents an important dimension of threat, as part of conflict and hybrid war. Biological weapons have the advantages of facile and silent spread, are very difficult to detect and deter in terms of individual and collective protection equipment. Moreover, the enemy owing a biological weapon may use it in any stage of the conflict, with respect to the technical parameters, the environment conditions and the envisaged effects.

***"Carol I" National Defence University*
e-mail: *jorascuvali@yahoo.com*
**** "Ferdinand I" Military Technical Academy*
e-mail: *teodora.zecheru@yahoo.com*
*****"Carol I" National Defence University*
e-mail: *laviniu.haller@gmail.com*

COVID-19 pandemic

The consequences of biological weapons use have implications at political and diplomatic level, but also operationally and tactically-wise. Biological contamination does not choose between military and civilians, between geographic areas or time of the day. But it does reduce force protection operational resources and the morale, redirecting logistics for nonproliferation in spite of operations in due course.

Until this year, no threat of biological input raised real concerns of a pandemic or biological war. Yet, here it is: SARS-CoV-2 and, consequently, COVID-19 appeared as a paradigm shift in the modern war, an invisible enemy that targets every human being alive, regardless gender, age, nationality, religion, health or financial situation, the great powers, the US, Russia and China accusing each other of bioterrorism[8].

COVID-19 pandemic came with respect to the definition of the real strategic shock, both against wealthy and poor nations, despite the useless efforts from the beginning of the pandemic to disregard its

power. Next to the disruption in everyday habits, break-outs and shortages in supplies, the highest impact of this pandemic is, incontestably, on the governmental priorities, and, consequently, the international organizations priorities.

Why COVID-19, together with the media empowerment, may be defined as the strategic shock of the century? Due to the fact that it came unexpectedly, it disrupted the world as we used to know it and made a significant shift in the worlds' strategic priorities. Even with a low mortality rate, the additional costs that came worldwide together with COVID-19 are far higher.

We are able to see for ourselves the pandemic's impact on industry and economy, from domestic production to tourism and transport, from professional fairs to leisure events. In due respect, governments will be forced to reassess their monetary and fiscal policies, to balance between opportunities and contentions, to shift from foreign to national policy, from border security to medical security.

time and resources required to recover from this strategic shock?

Thus, two questions arise: at the scientific and technological level of 2020, why the humanity is not able to mitigate a naturally-occurring virus? Or, if this virus is a synthetic one, who would have been so forward-thinking to tailor a biological weapon and, of course, to undertake the risks associated with? And which state or non-state entity may benefit from the pandemic?

In Figure 1, considerations on the observed effects at governmental level and on the consequences at military strategic level are highlighted.

It is clear that policies and strategies available early in 2020 are dismissed, while at UN, NATO and EU level new ones are under discussion. Further on, would it be still available for the NATO member states, by the end of 2020, to allocate the due 2% GDP for military expenditure, while the unemployment rate in the NATO countries increases dramatically? Or is it the beginning of a new era, where the artificial intelligence (AI) creators/ supporters are pushing towards AI employment instead of humans in various sectors, including in military operations?

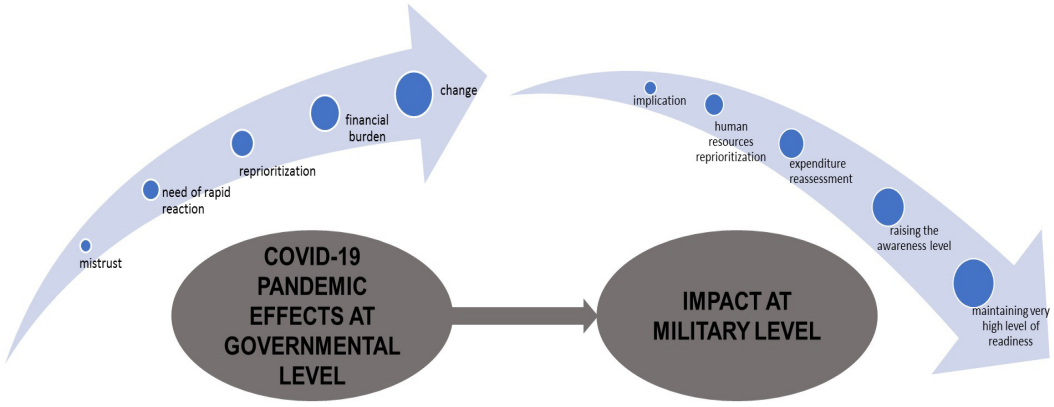


Figure 1 *COVID-19 pandemic seen from a strategic level*

Influences of COVID-19 at strategic level

Most likely, COVID-19 is going to have also an important impact on the defence budget. While within the past 5 years, at global level a record in defence expenditure has been highlighted, the year 2020 and the COVID-19 economic impact will, most likely, weigh down on next years' budget plans. Is any government able to justify now additional defence expenditure, to the detriment of weakened national industries needing reconstruction, while no one is able to quantify yet the deeds and the

Who is going to gain from this shift? Or, better, is anyone going to gain anything?

For the time being, we are surrounded by a huge amount of uncertainties, both from a medical and health organizations and security viewpoint. Thus, we can only observe the rupture between institutions, non-coherence between scientists and strategies. And, of course, the small amount of attention that is to be paid to the possibility of a

real hybrid war, with many unknowns to determine and/or to deter.

NATO member states face a great vulnerability against biological weapons at strategic and operational level, since state or non-state actors may balance the forces by using exactly this type of weapons of mass destruction, due to the low fabrication cost and resources employed.

Thus, in order to cope with the present health crisis, both at NATO and the EU level, coordinated actions have been considered in terms of regulatory framework flexibility, budget use, monetary policy and financial support for the most weakened member states, in order to enable them to absorb the COVID-19 shock.

In a press release from 02 April, one may see that NATO stated that its ability to conduct military operations has not been weakened by the COVID-19 pandemic[9]. Still, in due time, an objective analysis on COVID-19 military impact clearly shows that the pandemic has a significant three-fold impact on defence: reduction or even cancellation of defence expenditure, cancellation or postponement of planned exercises and diversion of operational resources toward COVID-19 fighting: logistic and human resources as support for patients' air and ground transport, field hospitals, decontamination and borders security.

The Stockholm International Peace Research Institute (SIPRI) published the figures for the global military spending in 2019, which reached $1,917bn, as the largest defence budget within the past decade, with a 3.6% increase versus 2018. It is hard to believe that a similar budget would be still available for 2020, especially having in mind that worldwide the armed forces were involved in maintaining the citizens' security and the financial resources and manufacture facilities made a turn towards COVID-19 mitigation. Moreover, that large-scale DEFENDER Europe 2020 military exercise has been initially cancelled[10], together with national field exercises, daily training exercises or military courses which are not crucial for the sustainment of combat capabilities and the obligations assumed at organizational or international level, and only at after three months being reloaded at a smaller scale[11]. The armed forces worldwide reduce deployments at a minimum for peacekeeping operations and withdraw military personnel from various operation theatres.

The main aim in these difficult times is to maintain combat readiness and to strengthen national defence even during the state of emergency. But we are facing a very rough financial crisis, and thus, even if until now the defence spending has been considered a priority, NATO officials state that every nation's budget relies on state-of-the-art social requirements and political priorities. Consequently, a balance between investments in the armed forces and the public health should be made.

Coordinated measures against COVID-19

Every strategic shock conducts to a major imbalance. At present, what we are able to see is a disturbed world, with citizens tired of having their fundamental human rights disrupted, claiming medical, financial and political solutions. We see shared and opposite opinions from the most powerful people in the world regarding the source and the aim of COVID-19, we see a media covered by fake news, instability and lack of coherent policies at global level.

What is happening behind that?

At NATO level, coordinated efforts come to fulfill the requests of Allies or PfPs which requested assistance[12]. Further, NATO is starting this month a scientific research project for the development of new devices for COVID-19 diagnosis[13]. Meanwhile, the US Navy just directed three warships in the Barents Sea, USS Donald Cook, USS Porter and USS Roosevelt, close to the Russian Arctic shore, and HMS Kent frigate of the UK Royal Marine joined shortly, assuming together the support of the Alliance and freedom of navigation[14]. This occurs after last month events, when Pentagon accused Moscow of endangering a surveillance US Marine aircraft in the international air space from East Mediterranean Sea, after a Russian aircraft made an "unsecure and unprofessional interception maneuver".

In Russia, the armed forces performed in late March a readiness assessment across all branches, emphasizing the role of CBRN branches and the medical support in emergency situations and anti-epidemic mitigation, claiming a full readiness of the troops[15]. Furthermore, Kremlin stated that its defence industry (the main sector of the national economy) remains open, in order to sustain the defence requirements according to the current procurement strategy.

Meanwhile, the European Union is coordinating a common response focused on the health and economic sectors. It came the time to highlight the growing need to create non-dependencies over non-EU countries, to reorient production to protective and medical equipment and devices, to relax certain trans-border /transshipment management regulatory frameworks, to facilitate procurement through "green lanes", to involve airline companies to support air cargo and medical care personnel/volunteering operations, and, also to raise awareness on environmental issues.

Together with the aim to mitigate the direct health effects of the pandemic, solidarity in countering the socio-economic impact is requested, since the financial forecasts are very dark. Over €11bn funding is directed to support research on diagnostic and treatment, joint COVID-19 – related procurements, the medical care system and the first common stockpile of equipment[16]. Meanwhile, over €3,4tn are mobilized to mitigate unemployment, to support companies, to provide liquidities, to reorient budget towards businesses, to protect Member States companies from foreign acquisition or influence.

Also, the European Commission promotes "authoritative content" of information in the media and stands against misleading conspiracy-wise theories on the COVID-19 origin and release.

However, there is no information on the European Defence Fund (EDF), which was supposed to begin in 2021, after having concluded the budget negotiations this year – a research program coming to sustain the European Union's necessity of independence in terms of defence industry and defence technology.

Conclusions

With all the questions raised here and such poor data at strategic level, it is difficult to predict the follow-ups. In most countries, the containment will end soon, policy-makers will reconsider their positions and measures will be taken worldwide to survive the crisis raised by the pandemic.

At the social level, the current activities will be resumed, in agreement with the national customs, and strategic projects and programs will continue. The economy will be affected in the short and medium term, with some areas diminishing in importance and others returning to the forefront, especially in the immediate support of the fight against COVID-19. Governments will seek to strengthen their positions also in pandemic effects countering, will develop material and human resources in the medical field and will take measures to build reliable national production capabilities for the future.

What remains for military strategists is to be able to reinforce and to maintain the armed forces' high readiness, for the case this strategic shock is only the tip of the iceberg, and this crisis has been artificially created, with an offensive purpose.

NOTES:

1 Howard Zinn, *Howard Zinn on War*, Seven Stories Publishing House, 2011, https://www.zinnedproject.org/materials/howard-zinn-on-war/, accessed on 7 April 2020.

2 Michael J. Boyle, *The Costs and Consequences of Drone Warfare*, International Affairs, vol. 89, no. 1, 2013, pp. 1-29.

3 Roger Brent, *Testimony Before the Subcommittee on Prevention of Nuclear and Biological Attack*, House Committee on Homeland Security, 109th Cong., 1st Sess., Washington DC, July 13, 2005, https://www.fas.org/irp/congress/2005_hr/bioterror.html, accessed on 12 April 2020.

4 Frank G. Hoffman, *Conflict in the 21st Century: The Rise of Hybrid Wars*, Arlington, Va.: Potomac Institute for Policy Studies, 2007.

5 Teodora Zecheru, "Importanţa economică a dezvoltării de noi materiale energetice (Economic Prominence of Energetic Materials Development)", *Impactul transformărilor socio-economice şi tehnologice la nivel naţional, european şi mondial*, no. 8, 2015.

6 Răzvan Petre et al., "Polyurea-based hybrid composites for CBRN protection", *Materiale Plastice*, vol. 56, no. 4, 2019, pp. 715-720.

7 Cătălin Săracu, Teodora Zecheru, "Necesitatea dezvoltării de capabilităţi comune EOD-CBRN la nivelul Ministerului Apărării Naţionale", *Revista Armei Geniu*, no. 1, 2016, pp. 28-32.

8 https://moderndiplomacy.eu/2020/04/27/covid19-and-a-need-for-a-paradigm-shift-in-the-field-of-academia/, accessed on 29 April 2020.

9 https://www.army-technology.com/news/covid-19-outbreak-impact-military-readiness/, accessed on 10 May 2020.

10 https://www.fpri.org/article/2020/03/military-exercise-defender-europe-20-is-cancelled-what-does-it-mean-for-the-baltic-states/ This article was updated on April 30, 2020. An earlier version of this article, published on March 30, 2020, noted that Defender Europe 2020 was cancelled. Many of the planned activities and troop activities were halted, though some exercises were modified in size and scope, accessed on 10 May 2020.

11 https://shape.nato.int/defender-europe, accessed on 31 May 2020.

12 https://www.nato.int/, accessed on 08 May 2020.

13 https://www.nato.int/cps/en/natohq/news_175619.htm, *Coronavirus response: NATO supports practical scientific cooperation with Allies and partners to enhance COVID-19 diagnosis*, accessed on 06 May 2020.

14 Mihnea Tălău, *Războiul rece, reîncălzit! SUA mută o flotă de război în coasta lui Putin*, 5 May 2020.

15https://warontherocks.com/2020/05/how-is-the-russian-military-responding-to-covid-19/, accessed on 09 May 2020.

16 https://ec.europa.eu/commission/presscorner/detail/en/ip_20_797, accessed on 2 May 2020.

REFERENCES

Boyle Michael J., "The Costs and Consequences of Drone Warfare", *International Affairs*, vol. 89, no. 1, 2013.

Brent Roger, *Testimony Before the Subcommittee on Prevention of Nuclear and Biological Attack*, House Committee on Homeland Security, 109th Cong., 1st Sess., Washington DC, July 13, 2005.

Fleming B.P., *The Hybrid Threat Concept: Contemporary War*, Military Planning and the Advent of Unrestricted Operational Art., Fort Leavenworth, 2011.

Hoffman F.G., *Conflict in the 21st Century: The Rise of Hybrid Wars*, Arlington, Va. Potomac Institute for Policy Studies, 2007.

Hoffman F.G., "Future Thoughts on Hybrid Threats", *Small Wars Journal*, 2009.

Hoffman F.G., *Hybrid warfare and challenges*, Joint Force Quarterly, 2009, pp. 34-48.

Mattis J.N., Hoffman F.G, "Future Warfare: The Rise of Hybrid Wars", *Proceedings*, 2005.

Petre Răzvan, Zecheru Teodora, Petrea N., Ginghină R., Bugean I., "Polyurea-based Hybrid Composites for CBRN Protection", *Materiale Plastice*, vol. 56, no. 4, 2019.

Săracu Cătălin, Zecheru Teodora, „Necesitatea dezvoltării de capabilităţi comune EOD-CBRN la nivelul Ministerului Apărării Naţionale", *Revista Armei Geniu*, no. 1, 2016.

Tălău M., „Războiul Rece, reîncălzit! SUA mută o flotă de război în coasta lui Putin", evz.ro, 5 May 2020.

Toffler A., *Future shock*, Politic Publishing House, Bucharest, 1970.

Zecheru T., „Importanţa economică a dezvoltării de noi materiale energetice" (Economic Prominence of Energetic Materials Development), *Impactul transformărilor socio-economice şi tehnologice la nivel naţional, european şi mondial*, no. 8, 2015.

Zinn Howard, *Howard Zinn on War*, Editura Seven Stories, 2011.

http://www.ec.europa.eu/info/live-work-travel-eu/health/coronavirus-response_en

http://www.evz.ro/razboiul-rece-reincalzit-sua-muta-o-flota-de-razboi-in-coasta-lui-putin.html

http://www.moderndiplomacy.eu/2020/04/27/covid19-and-a-need-for-a-paradigm-shift-in-the-field-of-academia/

http://www.warontherocks.com/2020/05/how-is-the-russian-military-responding-to-covid-19/

http://www.army-technology.com/news/covid-19-outbreak-impact-military-readiness/

http://www.fpri.org/article/2020/03/military-exercise-defender-europe-20-is-cancelled-what-does-it-mean-for-the-baltic-states/

http://www.nato.int/

http://www.nato.int/cps/en/natohq/news_175619.htm, Coronavirus response: NATO supports practical scientific cooperation with Allies and partners to enhance COVID-19 diagnosis

http://www.ndc.nato.int/

http://www.shape.nato.int/defender-europe

http://www.sipri.org

http://www.who.int/emergencies/diseases/novel-coronavirus-2019?gclid=CjwKCAjwh472BRAGEiwAvHVfGqHdZHoVX2IF_2ap8EAmsMULEhHGijAr4n4PzqkoxN228m3VgbQW-BoCfrMQAvD_BwE

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-48

PROLIFERATION OF BALLISTIC AND CRUISE MISSILES, AN INCREASING THREAT UPON THE EASTERN EUROPEAN'S OPERATIONAL ENVIRONMENT STABILITY

Lt.Col. Valentin PETRESCU, PhD Candidate*
Col. (ret) Prof. Ion BĂLĂCEANU, PhD**

The threat posed by the proliferation of ballistic and cruise missiles to NATO states and forces in Europe has become an intensely debated topic recently, especially amid the US exit from the Nuclear Forces Treaty and the relaunch of a new arms race especially due to some states' desire to reaffirm themselves as regional and world military powers, states that have repeatedly shown their willingness to use military force, including the available arsenals of missiles, in order to achieve their objectives. This real threat is supported by the ballistic and cruise missile development programs carried out by states such as Russia and Iran, countries that consider the US and NATO as the main threats to their security.

Keywords: ballistic missiles; cruise missiles; threat; operational environment.

The Eastern European operational environment is dynamic and complex, with a multidimensional, multinational and interinstitutional character. It includes all the environments in which military action can take place and is an "arena" in which existing actors, state or non-state, allies or enemies, act to achieve the proposed objectives, using all available tools and means (political, economic, military, etc.).

The risks and threats to the Eastern European operational environment are various and cover the entire existing range, from classical to asymmetric and hybrid threats, which are used against NATO's vulnerabilities in its Eastern flanking states to create a framework leading to the aggressor's strategic set goals achievement. Out of the multitude of existing threats, the ballistic and cruise missiles continue to increase their importance nowadays, especially due to their destructive potential, as they represent a multiplier of military power and a deterrent factor used by most state and non-state actors. Although stability and security are priorities within the European states' agenda, as they are two necessary conditions for evolution and prosperity, the European operational environment, and in particular Eastern Europe, faces a number of risks and threats that directly and indirectly affect the physical, economic and social security of the population.

*"Carol I" National Defence University
e-mail: *valipetrescu23@yahoo.com*
**"Carol I" National Defence University
e-mail: *balaceanugion@yahoo.com*

Ballistic and cruise missiles – multiplier of military power

Although the beginning of the use of missiles in combat date back to 1232 (China), the first ballistic and cruise missiles used in an armed conflict were the V-1 missiles (the first cruise missile) and V-2 (the first ballistic missile), of German origins, used in World War II to bomb London (about 1500 V-1 and V-2 missiles used). With a range of up to 300 km and a classic payload of one tone, these missiles sowed panic among the population and caused significant human casualties (over 23,000 dead and wounded[1]) and material losses, being considered „weapons of terror" at that time. In order to destroy German's infrastructure of the production and launch of cruise and ballistic missiles, the Allies carried out a large-scale air operation launching over 32,000 tons of bombs[2], managing to reduce but not stop their production and usage. Everything would end only after the conquest of the launch positions and production facilities by the allied land forces.

After the end of World War II, ballistic and cruise missiles experienced an accelerated development, with the world's great military and economic powers understanding the benefits of having such weapons systems and the fact that

they are "an instrument of power in international relations whose specific gravity increases in proportion to the range of the ballistic missile and the destructive power of the combat payload"[3]. Basically, there was an arms race between the two superpowers (USA and USSR), which invested heavily in the development of ballistic and cruise missiles, significantly improving all the parameters that characterize these missiles (range, combat payload and accuracy) and they have created considerable arsenals of destruction. Along with the two great military powers of the world, other countries have been concerned with the acquisition and development of these missiles also, motivated by the fact that the possession of such weapons discourages states with aggressive intentions from acting against them.

Due to their destructive potential, ballistic and cruise missiles were used in four of the last six major wars: the Arab-Israeli War (1973), the Iran-Iraq War (1980-1988), the Gulf War (1990-1991) and the War in Afghanistan[4]. However, the most recent conflict involving the use of ballistic and cruise missiles is the Yemeni Civil War (which began in 2015), in which Iran-supported Houthi rebels fired hundreds of ballistic missiles at Arab coalition bases, several populated centers and infrastructure elements. Moreover, the rebels used cruise missiles to attack coalition ships, US Navy warships, and transport ships, including oil tanks. The common element of these conflicts is the fact that the use of ballistic and cruise missiles caused significant losses, especially among the civilian population, and destroyed the existing infrastructure in large urban centers, causing very large material losses.

The evolution of ballistic and cruise missiles has been a spectacular one, especially after the '80s, reaching nowadays to missiles that cover impressive distances, intercontinental (up to 16,000 km[5]), with supersonic speeds and that carry a varied load, with MIRV – Multiple Independently targetable Re-entry Vehicle), capable of hitting a large number of important targets and with warheads that can be activated on the last flight portion of the missile (MARV – Maneuverable Re-entry Vehicle), used especially against mobile targets. Missiles can also carry nuclear, bacteriological and chemical payloads, making them even more dangerous.

The devastating effect of nuclear payloads was proved in 1945, during the bombing of the two Japanese cities: Hiroshima and Nagasaki, when more than 120,000 people lost their lives and more than 90% of the buildings were destroyed. Realizing the destructive effect of nuclear missiles, the world began to strive to limit and reduce nuclear arsenals, "the strategy based on the threat of mutual nuclear destruction" no longer being so often used in the dialogue between the great powers"[6]. However, the nuclear component of military power will continue to be a main pillar and will continue to offer nuclear-weapon states the opportunity to negotiate from advantageous positions with other states at the international level.

Ballistic and cruise missiles can be used in all confrontational environments: land, air, sea and more recently, cosmic. Although most of them are launched from the ground/underground (by fixed or mobile systems), they can also be launched from ships, submarines, aircrafts and more recently even from military satellites (the great military powers of the world being concerned with equipping satellites with offensive weapons systems). Possession of a wide range of ballistic and cruise missiles, capable of being launched from already established confrontation environments (land, sea, air, space), considerably amplifies the military power held and discourages the aggressive intentions of other states, eager to expand their influence beyond their borders.

If the monopoly on cruise missiles is held by countries such as the USA, Russia and China, which rely on advanced military technology (space technology), in the case concerning ballistic missiles, other countries have emerged, such as Pakistan, North Korea and Iran, which do not have access to very advanced technology, but which produce and introduce them into their arsenals owning these missiles allowing them to negotiate from other positions and show inflexibility within international negotiations. A conclusive example in this regard is Iran's attack on US bases in Iraq (January 8, 2020) with ballistic missiles (15-22 short-range ballistic missiles[7]), the attack representing a retaliation for the death of General Qasem Soleiman (commander of the Force Quds of the Iranian Revolutionary Guards) caused by the American special forces. This attack impressed by the fact that Iran, although not a state in the top 10 of the world military powers, but with a significant arsenal of ballistic and cruise missiles (4th place in the world in the number of missile launchers[8]),

attacked US military bases, the world's largest military power.

Possessing impressive arsenals of ballistic and cruise missiles, whether or not they carry nuclear payloads, is a tool capable of influencing the outcome of international relations in favor of their own interests and offers the possibility of projecting military power over long and very long distances. Despite not being one of the world's major economic powers, the Russian Federation has the largest arsenal of ballistic and cruise missiles in the world, and in this context is among the states capable of influencing global and regional policy for their own interests. Its actions over the last ten years (the Chechen War, the Georgian War, the illegal annexation of the Crimean Peninsula and the destabilizing actions in eastern Ukraine) demonstrate its desire to reaffirm its status as a major regional and global power, to restore the sphere of the ex-Soviet influence based on the use of military power and threats with using the arsenal of ballistic and cruise missiles, to achieve its set objectives.

Russian ballistic and cruise missiles – an emerging threat to the Eastern European operational environment

Following the illegal annexation of the Crimean Peninsula, which was "the most important event on the European scene in recent times"[9], the Russian Federation has begun an extensive process of militarizing the region by deploying numerous ballistic and cruise missiles systems, which can be launched from the ground / underground, air, water or under the water, transforming the peninsula into an A2/AD (Anti Access/Area Denial) area, obtaining total control of the Black Sea basin.

Below there are several types of ballistic and cruise missiles deployed in Crimea:

• *the SS-26 Iskander missile system,* equipped with short-range ballistic missiles (SRBM) – 400-500 km), launched from a mobile carrier, capable of carrying multiple warheads, including nuclear, with the possibility to easily hit targets located in NATO's eastern flank;

• *the Kh-47M2 Kinzhal missile system*, equipped with Air-Launched Ballistic Missiles (ALBM), on MiG-31K / Tu-22M3 aircraft, with a range of 1,500-2,000 km[10], entered in service in 2017, developing supersonic speeds (Mach 10);

• *the Kh-101 / Kh-102 missile system*, equipped with air-launched cruise missiles (ALCM – Air Launched Cruise Missile), with a range of 2,500-2,800 km, which fly at very low altitudes and are made of a composite material that absorbs electromagnetic waves, being very difficult to be detected by radars;

• *the Kalibr missile system*, equipped with cruise missiles with a range of up to 2,500 km, which can be launched from the ground, ships or submarines.

By deploying these missiles, the Russian Federation has the opportunity to hit important targets anywhere in Europe and can hit naval targets as far as the Marmara Sea, beyond the Bosphorus Strait.

The category of ballistic and cruise missiles with an impact on the Eastern European operational environment also includes Bulava missiles, ballistic missiles launched from the submarine SLBM (Submarine Launched Ballistic Missile) with a range of 8,300 km, each missile having the ability of carrying up to 10 warheads. These ballistic missiles are intended for Borey-class nuclear submarines, each submarine being able to carry 16 launch facilities[11], with the possibility of hitting various strategic objectives in Europe.

Another category of missiles with impact upon the European operational environment are *TOPOL-M missiles*, intercontinental ballistic missiles with a range of 11,000 km, capable of carrying a single nuclear warhead, with the possibility of being launched from a silo or from mobile launchers, most of the fixed launchers being located in the Western Military District, near the eastern flank of NATO. As their technology is relatively old (1997), the Russians developed and improved them by new types of ballistic missiles *RS-24 Yars* (2010), capable of carrying three nuclear warheads instead of one and which are planned to gradually replace the intercontinental ballistic missiles TOPOL -M.

In addition, the Russian Federation is preoccupied with the development of missiles of very high speed, hypersonic, which can reach 20 Mach, and are difficult to detect and very difficult to intercept/counter. The technology of these missiles involves two ways of launching: the first involves the use of a ballistic missile that carries the hypersonic missile on the initial part of the

trajectory, and at some point it detaches following sinuous trajectories; the second involves the use of a rocket engine capable of printing hypersonic speeds throughout the flight, in this case cruising missiles[12].

From the category of Russian hypersonic missiles, developed or under development we can mention: *Avangard missiles*, developing missiles, with a range of over 6,000 km, which will be transported to the target by the famous intercontinental ballistic missiles RS-28 SARMAT (radius up to 18,000 km), which are also being tested and developed; *3M22 Zircon* / SS-N-33 missiles, anti-ship cruise missiles with a range of 1,000 km[13], which during their flight are covered by a plasma cloud that absorbs electromagnetic waves thus becoming invisible to radars. Basically, by owning these supersonic missiles, Russia is ahead of the USA, the main competitor in the field, which will present the first supersonic missile in 2021.

Considering the context in which the relations between Russia and the West are not very good at this moment, mainly due to the crisis in Ukraine and Syria, but also the installation of the anti-missile system in Europe, a system that according to the Russian Federation has offensive potential being able to deploy ballistic missiles (missiles successfully tested by the US, after leaving the INF-Intermediate Nuclear Forces Treaty), the use of ballistic and cruise missiles is a major threat to the Eastern European operational environment, for countries such as Poland and Romania which host elements of the anti-missile system, objectives of strategic importance targeted by the ballistic / cruise missiles of the Russian Federation.

Ballistic and cruise missiles –
a tool at the fingertips of unstable states
in the Middle East

One of the countries of the Middle East that is characterized by high instability, due to internal problems, strong links with a number of banned terrorist and militant groups in the region and due to its foreign anti-US policy and against its allies, but with the largest arsenal of ballistic and cruise missiles in the Middle East, is Iran. This state-actor is a country that throughout its history has been in conflict with most of its neighbors, especially due to its aspirations for the status of regional military power, leader in the control of energy resources in the area or control of transport routes of these resources.

Iran, as a military power, has the largest arsenal of ballistic and cruise missiles in the Middle East and it uses it to design power in its areas of interest. Although Iran's desire to develop ballistic missiles dates back to the 1960s, it did not begin to develop the infrastructure needed to produce them until the late 1980s, when it received a SCUD missile production facility from North Korea. Thus began the program of development and production of Iranian missiles, ballistic and cruise missiles that became the mainstay of its deterrence and response strategy.

Iran's arsenal is rich and diverse, with thousands of ballistic and cruise missiles, some capable of hitting targets in Israel and southeastern Europe. Among the most important missiles, relevant to our study, we may mention:

- *Ghadr missiles* (Shahab-3 version), intermediate-range ballistic missiles (1,950 km[14]) entered service in 2007, capable of carrying conventional, chemical and nuclear payloads;
- *Emad missiles* (version of the well-known Iranian Shahab-3 missile), intermediate-range ballistic missiles (1,700 km[15], some sources say they can reach up to 2,500 km), entered service in 2015, can be guided and controlled to the target (according to statements made by the Iranian Minister of Defence) and can carry the same cargo as Ghadr missiles;
- *Soumar missiles*, cruise missiles with a range of 2,000-3,000 km[16], capable of carrying conventional and nuclear cargo (some experts say that these missiles originate from the Russian Kh-55 missiles, and in this context could carry nuclear payload[17]);
- *Sejjil missiles*, ballistic missiles with a range of 2,000 km, launched from mobile conveyors, capable of carrying conventional and nuclear payloads.

All the above presented ballistic and cruise missiles have the possibility to hit targets within several countries on the eastern flank of NATO (Bulgaria, Romania, Hungary, etc.), representing a real danger to the Eastern European region, especially in the context of the US forces stationed within these areas and amid strained relations between Iran and the United States. Iran has shown that it is capable of retaliating, having as

proof the attacks on US bases in Iraq, and from this point of view this emerging threat must be taken very seriously, even if the US / NATO anticipated the danger and installed an anti-missile system in Europe. Moreover, Iran is one of the countries that supports several international terrorist organizations such as Hezbollah and Houthi with missiles, as well as some terrorist groups that along with ISIS play a major role in destabilizing the Middle East, which already is quite volatile.

Iran is a country with aggressive behavior that does not hesitate to use its arsenal to achieve its goals. In the period 2017-2020, Iran launched several ballistic and cruise missile attacks on Syria (targeting ISIS positions in 2017), on Saudi Arabia (targeting the oil facilities at Abqaiq and Khurais, which provide 5-7% of daily oil in the world, in 2019) and on Iraq (targeting the headquarters of the Democratic Party of Iranian Kurdistan located in Koya, in 2018 and the American bases in Al-Assad and Erbil, in 2020)[18].

Iran's interest to develop intercontinental ballistic missiles with a range of more than 5,500 km is a major threat to the European operational environment as Iran sees the United States and its allies as the biggest threat to its security and an obstacle to its assertion towards a regional power. Also worrying is the cooperation between the Russian Federation and Iran (in 2015 Iran provided the Russian Federation with the Hamadan air base for airstrikes against Syria[19]), the Iranian side wanting to import military equipment and technology from Russia, the first acquisition being SA 20 anti-aircraft missile system (modernized S-300 system). The acquisition of long-range ballistic missiles or the technology needed to develop them would be a major challenge for the Alliance, but especially for NATO's Eastern flank states, which are the first to be targeted in the event of a possible attack.

In conclusion, considering the US withdrawal from the Intermediate Nuclear Forces Treaty, a treaty between the United States and the Soviet Union to control and limit nuclear-loaded ballistic missiles, a new arms race is being relaunched, allowing several states to purchase and develop new ballistic and cruise missiles, with multiple payloads and high accuracy. In this context, European security is in danger, with some experts saying it is possible that in the near future we will return to the 1980s situation when Russian missiles were aimed west. Against the background of this new arms race, in which the main actors (Russia, USA, China and Iran) have shown their interest for the development of new ballistic and cruise missiles, the stability and security of the Eastern European operational environment is threatened, with the possibility of a missile attack being increasingly plausible. In this new context, there is a need for an effective strategic air defence system on NATO's eastern flank, an integrated system that can deter and counter attacks conducted with ballistic and cruise missiles.

NOTES:

1 Atanasiu Mirela, *Evaluarea impactului implementării sistemului de apărare antirachetă asupra securității naționale și globale,* "Carol I" National Defence University Publishing House, Bucharest, 2014, p. 53.

2 Leopold Cerassel Lungu, "Istoricul întrebuințării rachetelor balistice și a rachetelor de croazieră", *Gândirea Militară Românească Magazine*, no. 1-2/2018, Technic-Editorial Center of Romanian Army, Bucharest, 2018, p. 192.

3 Ion Puricel, *Amenințarea balistică și combaterea ei*, Military Science Magazine, Vol. 11, no. 1(22), Romanian Scientists Academy Publishing House, Bucharest, 2011, p. 96.

4 Andrew W. Hull, *Role of ballistic missiles in third world defence strategies*, Institute for Defence Analyses, USA, June 1991, p. S-1.

5 SS-18 *Satan intercontinental ballistic missile, of Russian origins*, https://missilethreat.csis.org/missile/ss-18, accessed on 25.06.2020.

6 Marius Moldovan, Ion Bălăceanu, *Reconfigurarea balanței de putere militară în zona estică de interes strategic a României*, "Carol I" National Defence University Publishing House, Bucharest, 2018, p. 85.

7 https://missilethreat.csis.org/uncomfortable-lessons-reassessing-irans-missile-attack, accessed on 25.06.2020.

8 https://www.globalfirepower.com/armor-mlrs-total.asp, accessed on 26.06.2020.

9 Marius Moldovan, Ion Bălăceanu, *op.cit.*, p. 93.

10 https://missilethreat.csis.org/russia-tests-kinzhal-missile-in-arctic, accessed on 26.06.2020.

11 Romulus Hâldan, *Puterea militară a Rusiei*, https://www.academia.edu/33939954/Puterea_Militara_A_Rusiei.doc, accessed on 26.06.2020.

12 Cristian Eremia, *Cursa pentru rachete hipersonice continuă*, https://monitorulapararii.ro/cursa-pentru-rachete-hipersonice-continua-1-30168, accessed on 26.06.2020.

13 https://missiledefenceadvocacy.org/missile-threat-and-proliferation/missile-proliferation/russia/3m22-zircon, accessed on 27.06.2020.

14 https://missilethreat.csis.org/missile/emad, accessed on 27.06.2020.

15 *Ibidem*.

16 *Ibidem*..

17 *Ibidem*.

18 *Ibidem*..

19 Robert P. Ashley Jr., *Iran Military Power*, https://www.dia.mil/Military-Power-Publications, accessed on 28.06.2020.

REFERENCES

*** *Dicționarul explicativ al limbii române*, Univers Enciclopedic Publishing House, Second Edition, Bucharest, 1998.

Ashley P. Robert Jr., *Iran Military Power*, https://www.dia.mil/Military-Power-Publications.

Atanasiu Mirela, *Evaluarea impactului implementării sistemului de apărare antirachetă asupra securității naţionale şi globale*, "Carol I" National Defence University Publishing House, Bucharest, 2014.

Eremia Cristian, *Cursa pentru rachete hipersonice continuă*, https://monitorulapararii.ro/cursa-pentru-rachete-hipersonice-continua-1-30168.

Hâldan Romulus, *Puterea militară a Rusiei*, https://www.academia.edu/33939954/puterea_militara_a_rusiei.doc.

Hull W. Andrew, *Role of ballistic missiles in third world defence strategies*, Institute for Defence Analyses, USA, June 1991.

Lungu Cerassel Leopold, „Istoricul întrebuințării rachetelor balistice și a rachetelor de croazieră", *Gândirea Militară Românească* Magazine, no.1-2/2018, Technic-Editorial Center of Romanian Army, Bucharest, 2018.

Moldovan Marius, Bălăceanu Ion, *Reconfigurarea balanței de putere militară în zona estică de interes strategic a României*, "Carol I" National Defence University Publishing House, Bucharest, 2018.

Puricel Ion, „Amenințarea balistică și combaterea ei", *Științe Militare Magazine*, Vol. 11, no 1(22), Romanian Scientists Academy Publishing House, Bucharest, 2011.

Roman Daniel, Nicolaescu Constantin, „Mediul de securitate actual – realități și perspective", *Bulletin of "Carol I" National National Defence University*, December 2017.

https://missilethreat.csis.org

https://www.globalfirepower.com

https://missiledefenceadvocacy.org

http://www.nato.int

https://missilethreat.csis.org

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-49

MOBILITY – COUNTERMOBILITY CORRELATION IN MILITARY ENGINEERING

Col. Adrian-Robert GHEORGHE, PhD Candidate*

The movement and maneuver have been and will remain over time imperative requirements of military structures in the tactical field. Technological progress has offered high possibilities to maneuvering structures for maintaining their freedom of movement in the tactical field, simultaneously with interdicting/hindering the maneuverability of the opponent. The need to ensure increased mobility of own combat structures in the tactical field, led to the emergence of a new generation of combat engineer support forces, modular and standardized, with a doctrine in line with the requirements of the modern battlefield and especially with an increased adaptation and integration capability of external resource, in order to fulfill its specific tasks.

Keywords: mobility; countermobility; movement; maneuver; obstacles.

In the treaties that study armed conflicts, the concepts of mobility and countermobility have occupied a special place, a well-deserved one, given their importance in the confrontations that have taken place throughout military history. Most of the time, these concepts have been studied together and this thing has certainly not been done without a reason. Military theorists have noticed that mobility and countermobility have been permanently interconnected and only a unitary approach to them has generated a significant increase in the success rate of military actions.

General considerations regarding the conceptual framework underlying the notions of mobility and countermobility

In military actions, the armed forces need the possibility of rapid execution of *movements* in order to occupy some new areas or in order to execute the *maneuvers* imposed by the situation on the battlefield.

From what was mentioned above, one can distinguish two concepts that must be treated in close connection: *movement* and *maneuver*.

Movement is the action by which groups of forces are dislocated from one place to another. This can be done by march, transport or a combination of them, and according to the Military Encyclopedic Dictionary, "the movement of forces is a military action in which forces perform a movement, in order to move from one area to another, to take part in battle or to maneuver, performed by march, transport or a combination of them" [1].

Before talking about the maneuver, firepower should be defined. Firepower is a powerful tool in weakening the opponent's ability and will to fight and is used to destroy, neutralize and / or disorganize opposing forces.

Firepower and *movement* complement each other and perform the *maneuver* together.

The importance of maneuvering on the battlefield is well-known, but, in order to emphasize the connection between movement and maneuver, one can quote from the Explanatory Dictionary of the Romanian Language, the 2nd edition of Univers Enciclopedic Publishing House, Bucharest, 1996. "The maneuver is an organized and rapid movement of some military units, intended to strike the enemy or to withdraw from his action"[2].

Maneuvering according to modern military concepts is one of the seven combat functions available to commanders; it is used "to create the necessary conditions for the success of the operation, by moving forces in relation to the opponent, so as to put him in a position unfavorable by the movement of forces and means" (FT-1 Doctrine of Land Forces Operations).

The doctrine of land forces operations defines maneuvering as "the process by which combat power is concentrated where its effect is decisive in overtaking and disorganizing the opponent's actions and requires mutually compensating actions – loss of speed to gain time, breadth for depth, concentration for dispersion".

***„Dunărea de Jos" 10 Gen Brigade**
e-mail: *gheorghe.adrian@forter.ro*

Aspects that define mobility and countermobility in NATO member armies

In order to execute *movements* or *maneuvers* on the battlefield, the forces must overcome natural or artificial obstacles, this capability being conferred by *mobility*.

Mobility is necessary to achieve effort concentration and rapid deployment, to engage the enemy, or to achieve retreat. *Mobility* achieved at a higher and well-coordinated level can compensate for numerical inferiority. The criterion of *mobility* is an important factor in determining the technique and vehicles used by the fighting forces.

In the American specialized literature, it is stated that: "*Mobility operations* are those combined arms activities that mitigate the effects of natural and man-made obstacles, to ensure freedom of movement and maneuver (ATTP 3-90.4). The primary purpose of mobility is to mitigate the effects of natural and man-made obstacles. Mobility operations include reducing, bypassing, or clearing obstacles (including gaps) and marking lanes and trails, to enable own forces to freely move and maneuver. These tasks frequently occur under conditions that require combat engineer units and most frequently, they occur when conducted at the tactical level, for maneuver support. The support for early-entry operations includes reconnaissance that mitigates antiaccess and area – denial mechanisms to clear and open aerial ports and seaports of debarkation. These tasks are often considered combat engineering tasks, even though general engineering units can perform them when the conditions allow"[3].

US military experts believe that in order to increase the maneuverability of their troops, engineer forces must improve their *mobility* by performing the following main types of tasks:

- conducting obstacle crossing;
- conducting area and route clearance;
- conducting the crossing of deep and narrow obstacles;
- constructing and maintaining combat routes and trails;
- constructing and maintaining airfields and landing areas;
- conducting and implementing traffic on communication network, in the managed area[4].

To highlight the correlation between *mobility-countermobility* in the modern battlefield, we will analyze the phrase "fighting power" of a joint force.

The fighting power of a joint force is a result of the combination of the following elements: information, *maneuver*, striking power, protection and command. The fighting power expresses the ability of a joint force to perform operations.

The superior *mobility* used to occupy key positions in the field at the proper moment of the battle, in order to catch the opponent's attention, using fire can determine a substantial increase of the fighting power of one's own forces which will have as an effect the moral domination of the opponent.

Maintaining increased *mobility* during maneuvering depends mainly on: anticipating the possibility of removing obstacles, deploying forces in the most appropriate manner, to overcome obstacles quickly, properly determining the obstacles, and the existence of effective procedures and skills for overcoming them.

A better fighting power can be obtained both by *mobility* (movement) as well as by *countermobility*.

About the *countermobility* operations, military engineering specialists from the American army state that: "they are those combined arms activities that use or enhance the effects of natural and man-made obstacles, to deny the enemy's freedom of movement and maneuver. The main purpose of *countermobility* is to slow down or divert the enemy, in order to improve the target acquisition time and to increase weapon effectiveness. The existence of networked engineering munitions that can be rapidly placed, and remotely controlled, enables engineers to conduct effective *countermobility* operations as part of offensive, defensive, and stability tasks and during the transition periods of time between these operations" [5].

Countermobility influences two elements of a joint force fighting power: *maneuvering* and force protection.

Countermobility can produce effects similar to those generated by mobility, and one of them is to increase combat power. This can result from actions generating countermobility, when these actions cause the opponent to be in a disadvantageous position.

Countermobility actions and measures are planned and executed to ensure the ingenious use

of planimetry and relief details, in the establishment and location of obstacles, including the proper use of mines for flank protection.

To achieve countermobility, the combat engineer troops together with the other categories of forces, integrating natural obstacles in the field, perform barriers (explosive, non-explosive or mixed), demolitions and camouflage – CCD (Camouflage, Concealment and Deception) tasks. Simultaneously with the execution of these actions, the units destroy by fire the forces and the means of the enemy. In the view of military specialists from the North Atlantic Treaty Organization, mine barrages are the main element of countermobility, and within it, one can conceptually include some of the natural/man-made obstacles existing in the area of operations or responsibility.

In the main modern NATO armies, modern barrage systems have been designed and built; by rapid means of dispersal (artillery, missiles, aviation, helicopters), as well as by mines and intelligent explosive means of the second, third or even fourth generation, they considerably increased their effect on the opponent's armoured vehicles and fighting technique.

In the design and the execution of a modern system of mine barrage, three important elements are taken into account:

1) mine fields – their center of gravity being represented by anti-armored mine fields;

2) own forces – specialized or non-specialized, but possessing the ability to quickly plant a wide range of mines;

3) the period of time in which the self-destruction of mines positioned in the tactical field can be set, depending on the requirements of the military actions.

In the conception and the doctrine of using the mine barrages, it is extremely important to have them engaged in combat, as a dynamic component of the own troops' fight against the aggressor's armoured vehicles.

In point of their combat utility, mine barrages can be used in three ways:

1) depending on the terrain;

2) situation oriented;

3) target oriented.

Taking into account the arguments previously mentioned, it can be stated that mine barrages, in the conception of modern armies, constitute the main element of *countermobility*. The concept of their execution differs from one army to another, but regardless of the type of mines and explosives used, regardless of the characteristics of dispersal means, actions follow mandatory elements of compatibility and interoperability established by NATO for achieving these obstacles.

To deny the opponent's freedom of movement and maneuver, the US engineer forces perform the following main types of tasks:

- placing obstacles;
- constructing, placing, or detonating obstacles;
- marking, reporting, and recording the existence of obstacles;
- maintaining the integrity of obstacles [6].

It is very important that as operations within the NATO Alliance become more expeditionary, so do the requirements for effective engineering support to all participating forces.

Because the *mobility* of own troops and the *countermobility* of enemy troops require a large amount of labor, resources, and time, early identification of engineering support requirements will help establish important constraints at all levels, from the strategical to the tactical one. In addition, engineers must be consulted in the process of selecting objectives/targets, in order for the combat area to be established and prepared in accordance with the commander's intention.

Engineers' recommendations must be valid for all branches/specialties, and their involvement in expeditionary operations will be considerable.

It is highlighted that the objectives of engineering support in NATO require that the activity of engineers be managed, following three main factors: the availability of capabilities and the interoperability of engineer forces; command and control of engineer forces and the task of engineer forces to support the sustainability of NATO forces.

The actual use and the support of combat power elements, in a unitary manner is likely to decide the final result of any kind of operations. Commanders and staffs will mainly aim at using *mobility* and *countermobility* to integrate maneuverability, striking power and protection in the optimum alternative for the situation created.

The data presented on *mobility* and *countermobility* so far, lead us to say that planning

and ensuring the *mobility* of own forces must be designed in close correlation with the reduction/ annihilation of enemy *countermobility*, and vice versa, when referring to defense, respectively achieving *countermobility* while reducing enemy *mobility*.

The tendency of permanent modernization existing in the armies of NATO states is obvious, considering the fact that proper organization and endowment represents a solid base for the success of military operations.

All branches depend, to a certain extent, on the existence of some technical platforms (vehicles) able to provide *mobility*, protection and last, but not least, the ability to design the capability needed to produce the desired effect on the battlefield, in order to accomplish the mission.

Advanced approaches regarding the mobility and countermobility of military engineering structures

For a better understanding of the correlation between *mobility* and *countermobility* in engineer forces, it is necessary to present the main tasks of engineer forces in *mobility* and *countermobility* operations performed by modern armies and thus they are specially selected to manage obstacles and *mobility* corridors in a unitary concept and in full agreement with the maneuver performed by own troops. Continuing the analysis, it can be seen that the management of *mobility* corridors and obstacles on the battlefield requires increased mobility of engineer forces, as well as a special logistical capacity to ensure the considerable resources needed to place obstacles or perform road construction/maintenance work.

The *mobility* of engineer forces must be at least equal to that of maneuvering structures, and this condition is still a remarkable challenge for engineers who design engineering equipment platforms.

Why is it still a challenge to build such equipment? Because the requirements in the tactical field are not only very varied, but may also require a very large volume of work, and this requires oversized dimensions and large masses.

Modern technical solutions have led to the creation of universal engineering platforms that are usually on tank chassis for combat engineer forces, and for general support engineer forces wheeled multifunctional vehicles have been chosen, some of them having the possibility to be equipped with shield plates providing adequate protection to the servant. The evolution of technology has made it possible to reduce the size of some equipment simultaneously with the increase of the values of technical–tactical characteristics of the equipment.

Taking into account the high volume of engineering works, as well as the impossibility of providing a large number of engineering equipment at the level of maneuvering forces, specialists have developed technical solutions that require the existence of equipment (minesweepers, assault bridges, etc.) that can be mounted/attached to combat vehicles or transport vehicles before entering the obstacle area. This equipment is meant to increase their maneuverability in the tactical field, without using specialized engineering means.

The factors on which *mobility* depends in this situation are: the early detection of possible obstacles; the deployment of forces in an appropriate manner, to quickly overcome obstacles; early detection and execution of obstacle reconnaissance; adopting the most effective passing procedures.

Engineering equipment has also been developed, to create *countermobility* to the opponent. They are mounted on tanks or infantry vehicles and can launch mines to protect the flanks during a maneuver.

Yet, the most important aspect we can notice today when we talk about modern engineer forces refers to the tendency of reducing their logistic print.

This involves smaller and more efficient engineering ammunition, small multifunctional equipment with high technical and tactical capabilities and low consumption, equipment with superior characteristics that require being operated by a small number of military personnel and regarding this equipment it is intended to modularize and standardize it, in order to obtain full interoperability among all types of existing military forces at the level of the alliance.

Conclusions

As an important conclusion, within the land forces of the NATO member armies there is a permanent tendency to modularize and standardize the structural elements of the engineer forces, having as main objectives: direct support of troops

engaged in combat, satisfying as much as possible the engineering support needs of the engaged forces, reorganizing specific combat missions, but also limited specialization of engineer forces.

From what is presented in this article, we can notice that this *mobility–countermobility* correlation ensures a higher level of combat capability and directly influences the combat power of a joint force. The actions and measures of *mobility–countermobility,* judiciously and efficiently used, in a unitary conception during operations, can determine the achievement of success both in combat and operations.

In conclusion, it can be said that *mobility* and *countermobility* are two very important concepts that military planners and experts in this field must take into account, especially during the planning of military actions (at all levels), and the commanders when planning and conducting military operations.

NOTES:

1 *** *Dicţionar enciclopedic militar,* Academy for Higher Military Studies Publishing House, Bucharest, 2001, p. 25.

2 *** *Dicţionarul explicativ al limbii române*, 2nd Edition, Univers Enciclopedic Publishing House, Bucharest, 1996, p. 242.

3 *** *FM 3-34, Engineer Operations* , Washington DC, April, 2014, p. 31.

4 *Ibidem*, p. 32.

5 *Ibidem*, p. 33.

6 *Ibidem*.

REFERENCES

*** *Dicţionar enciclopedic militar*, Academy for Higher Military Studies Publishing House, Bucharest, 2001.

*** *Dicţionarul explicativ al limbii române*, 2nd Edition, Univers Enciclopedic Publishing House, Bucharest, 1996.

*** *FT-1 Doctrina operaţiilor forţelor terestre*.

*** *FM 3-34, Engeneer Operations,* Washington DC, April, 2014.

Gl.bg. Grecu Petre, *Amenajarea genistică a acţiunilor militare*, Ars Docendi Publishing House, Bucharest, 2002

Col.Prof. Preda Ion, PhD ş.a., „Procesul de planificare în operaţiile militare", *Bulletin of "Carol I" National Defence University*, no. 4/2004.

Gl.mr. Frunzeti Teodor, PhD, „Mobilitatea fortelor – condiţie importantă pentru creşterea capacităţii de autoprotecţie şi de atac a forţelor terestre", seminary *România – membru al Alianţei Nord-Atalantice*, Bucharest, 2004.

Gl.bg. Visarion Neagoe, PhD ş.a., *Experienţă acumulată – Operaţii de geniu*, Technic-Editorial Center of Romanian Army, Bucharest, 2006.

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-50

BRIEF HISTORICAL MILESTONES ON THE EVOLUTION OF UAV SYSTEMS: 1914 - 1939

Lt.Col.Eng. Grigore Eduard JELER, PhD*

Unmanned aerial vehicles (UAV), such as remotely piloted vehicle (RPV), are weapon systems widely used în nowadays armies. It may seem surprisingly, but this weapon has its origins în the beginning of World War I. The aim of this article is to pursue the development of the unmanned aircrafts from the 1914 to 1939. This article represents a continuation of the article published in Bulletin of "Carol I" National Defence University, No. 2/2018.

Keywords: UAV; aerial torpedo; Kettering Bug; Sperry Aerial Torpedo; Argus As 292.

UAV (Unmanned Aerial Vehicle) is defined as an aircraft without a human pilot on board. UAVs are a component of an UAS (Unmanned Aerial System) which includes a UAV, a CS (Control Station), positioned on the surface of the earth or on an aircraft in the air, and a communication system between those two. UAV can fly with different degrees of autonomy as follows: either remotely controlled by a human operator, or independently due to the computers on board. The unpiloted systems have known an exponential development and use in the last two decades, leading to what can be seen as the biggest change of paradigm in the human evolution someday. Military UAV have changed forever the behavior of warfare, offering a permanent aerial surveillance, high capabilities of command and control and high precision capacity of assault without the possibility of human crew loss. UAVs in civil domain are already a permanent component in commercial activities, industrial activities, entertainment and emergency services. Against popular opinion, though, the historical interest for UAV goes far beyond the observations of people because many states had hired military unpiloted systems one century ago, beginning with World War I. This article represents a continuation of the article published in Bulletin of "Carol I" National Defence University, No. 2 (2018).

The history of UAV during World War I

Although the success of unpiloted aerial vehicles in test flights was irregular, during the WWI their potential in the warfare was recognized by the army. So, after just 16 years since the flight of the Wright brothers in 1916-1917, the British army developed Ruston Proctor Aerial Target (AT) using the radio controlling system of A.M. Low[1] (considered the father of radio navigation system). AT is a radio-controlled airplane, without any crew on board, made for two purposes: the defence against Zeppelins (where it should be controlled from the ground) and as a flying bomb (controlled from a piloted aircraft). It was built in the aircraft factory P. Hare Royal from Putman. After a few failed prototypes, the British army chose to give up[2]. But it gave opportunities for similar projects to develop, such as Kettering Bug and it paved the way for modern military drones nowadays.

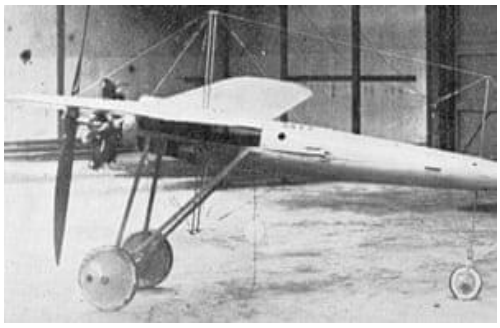


Figure 1 *Ruston Proctor Aerial Target*[3]

In USA on 2nd October 1918, the unmanned aircraft under the name of Kettering Bug, designed by Charles F. Kettering from the General Motors Company had the first flight. This UAV (more precisely a flying bomb) was a small biplan, made of wood and canvas, designed to carry a bomb having the same weight – 300 pounds. The aircraft took off from a wheel trolley and then it detached

***"Ferdinand I" Military Technical Academy**
e-mail: *eduard_jeler@yahoo.ro*

its wings, allowing the hull (the bomb) to vertically attack a pre-programmed target. The USA army ordered big supply of this model in the last months of WWI, but the end of the war lead to the cancelling of this order. Anyway, this type of UAV was the forerunner of the modern cruise missiles[4].

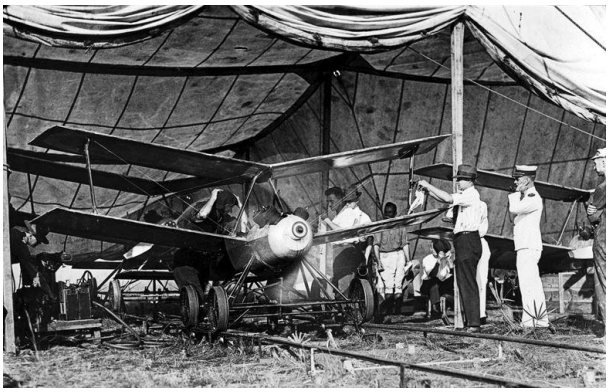


Figure 2 *Kettering Bug Aerial Torpedo*[5]

Meanwhile, in SUA, where the idea of radio-controlled unmanned aircrafts began to take shape more and more, a team of engineers is working on a similar project: the Hewitt-Sperry Automatic aircraft. In 1917, Dr. Peter Cooper and Elmer A. Sperry invented the automatic gyroscopic stabilizer, which helps the straight and horizontal flight of an aircraft. Cooper and Sperry used this technological discover of converting training aircrafts Curtis N9 of U.S navy for the first remote-controlled UAV. The aircraft had the wingspan equal to 6.7 meters, the length of 4.57 meters and it was equipped with a Curtiss OX-5 engine which produces a 22 CP power. The aircraft was able to reach a maximum speed of 70 miles/h. Sperry Aerial Torpedo flew 50 miles carrying a 300 pounds bomb on several test flights, although it was never used in the battle[6].

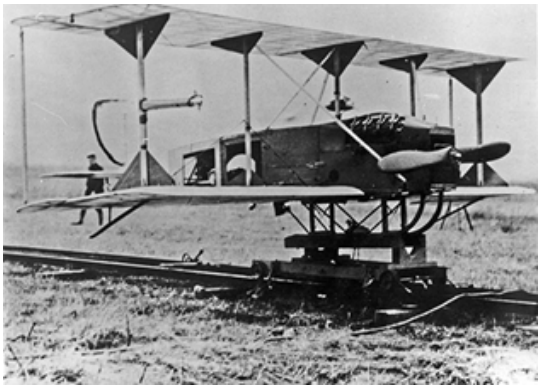


Figure 3 *Sperry Aerial Torpedo*[7]

But France, which considers itself a big military power did not want to be left behind. So, on the 2nd of July 1917, captain Max Boucher managed to fly with a Voison plane "without a human pilot" over 1 km, then the plane landed slowly because it had only 2 liters of fuel. Captain Max Boucher resumed the work of Octave Détable, which took place in 1894, which due to a wing equipped with divergent cones, he brought the automatic stabilization of the plane. This fact pushed George Clémenceau, who was the president of the army senate committee, to launch a competition for an unmanned plane in 1918 because he considered the pilot who needs a long training more important than the plane, which can be rapidly produced in large quantities. Max Boucher managed to improve the system and to fly using a Voisin BN3 plane on the 14th of September 1918 for 51 minutes on a 100 km route. He continued his work with the engineer Maurice Percheron and he was able to put in use an improved radio-controlled plane on the 17th of April 1923 on Etampes air base. But the war was over and the military was no longer interested in this idea[8].

Figure 4 *The unmanned aircraft Voisin BN3*[9]

At the same time, Germany did not stand still. Since the beginning of the war, the German military had shown great interest in remotely controlled vehicles. On the 5th of November 1914, the Ministry of War ordered the Commission for the Evaluation of Transport Technology (Verkehrstechnische Prüfungs-Kommission / VPK) to develop remote-controlled systems that could be installed both in ships and planes. In January 1915, Siemens & Halske company registered a certificate which approached some of the main problems involved in remote control of aircrafts. Thus, the aircraft equipped with wings and control surfaces (helm

and elevator) was going to be launched from an ordinary plane, the commands being transmitted through electric impulses. The electric impulses were transmitted through a wire connected to a device on the board of an aircraft consisted of human crew. Even if at the beginning, the project was based on a monoplane design, with the increase in size and loads, this would be partially replaced by biplane projects. By the end of 1916, a total of 66 aircrafts had been launched. In 1916 a biplane model was launched, called Torpedo Planor (Torpedogleiter). However, the end of the war led to the end of the project too[10].

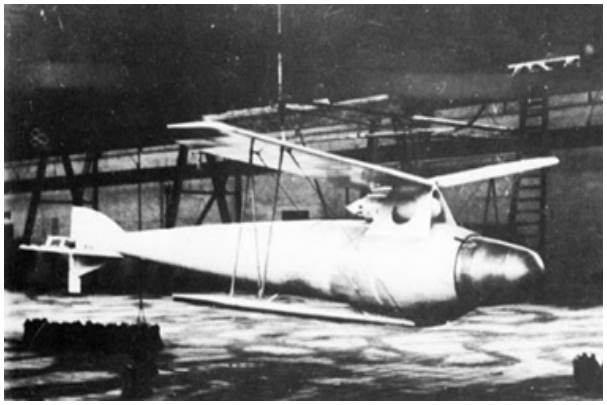


Figure 5 *Torpedo drone realized by Siemens-Schuckert in 1917-18*[11]

The interwar period 1919-1939

After World War I, there was much interest in producing and improving remote-controlled flying weapons. In 1925, the British Royal Navy developed and tested aerial torpedo projects, such as RAE Larynx (Royal Aircraft Establishment Larynx). This was an unmanned aircraft that was going to be used as a guided anti-ship weapon. It was a small monoplane powered by a 200 CP Armstrong Siddeley Lynx IV, it reached the maximum speed of 200 km/h (320 km/h) being guided by an automatic pilot, developed on the fundamentals of the professor Low Archibald. After two years of development, the first launch was done by a catapult from the HMS Stronghold destroyer in the Bristol Channel. Subsequent tests were performed in the English Channel and at the Portland Bill. The tests extended until 1928 and a complete series of tests was performed in 1929 using six aircrafts in Mesopotamia[12].

Figure 6 *Larynx No3, the catapult from the HMS Stronghold destroyer on the 19th of October 1927*[13]

The early successes of unmanned aircraft led to the development in the UK and US in the 1930s of certain unmanned aerial vehicles. After the war, three standard E-1 biplanes were converted into UAVs. In 1931, the British stayed in the aircraft or controlled the radio under the name of Fairey Queen from the Fairey IIIF seaplane, building a small three-aircraft aircraft. It is a recreational base for the Queen Bee, the first modern UAV model. In the mid-1930s, Queen Bee emerged as an important tool for training air defence crews. It was the first returnable and reusable UAV, a charging concept for rapid air use during the operation of anti-aircraft training missions. Made of spruce and fast plywood biplane and flown for the first time in 1935, they were equipped with wheels or floats. D. H. Queen Bee were to be controlled by radio, being able to do so within 17,000 feet and the maximum range of 300 miles at speeds of over 100 km / h. A total of 380 D.H. Queen Bees served the country's drone in the Royal Air Force and Navy Royal until they retired in 1947. Practically, it was the first modern radio-controlled UAV[14].

Figure 7 *The radio-controlled plane D.H.82B Queen Bee*[15]

The British Army tried to replace the D.H Queen Bee with a modern aircraft. Therefore, the Aircraft AS 30 Queen Wasp appeared as a British target plane with no pilot designed by Airspeed Limited at Portsmouth. In May 1936, two prototypes were ordered, one of which had wheels for Royal Air force and another which contained floaters especially made for Royal Navy. 65 is the exact number of the prototypes that were ordered depending on the success that the testing program was going to have. The aircraft was a single Armstrong Siddeley Cheetah engine biplane constructed from wood with sharp tapered wings and fabric-covered control surfaces, with a range of 9.45 m, a total length of 7.42 m and a total weight of 1,588 kg. The first take-off from the ground took place on 11 June 1937 and from the sea on 19 October 1937. In November 1937 it was successfully catapulted from the HMS Pegasus hydroplane warship. The flight tests found that the aircraft had low power and difficulties regarding water landing, which required redesigning the floaters. Although it was intended for use by both Royal Air force and Royal Navy, the aircraft did not start to be mass-produced[16].

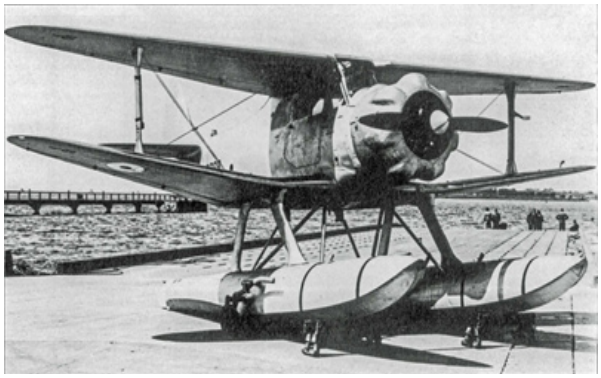


Figure 8 *A. S.30_Queen_Wasp*[17]

During this time, the Luftwaffe was presented under the direction of Dr. Eng. Fritz Gosslau at Argus Motoren GmbH a UAV model under the name Argus As 292. Work on the drones began in 1937 at the Argus-Flugmotorenwerke (Argus aircraft engine factory) in Berlin-Reinickendorf. Initially called the Flakzielgerät 43 (Flak-Target Apparat 43), it was used as a training target for anti-aircraft defence. The body of the aircraft was of simple tubular construction and the detachable high dihedral wings were detachable for transport.

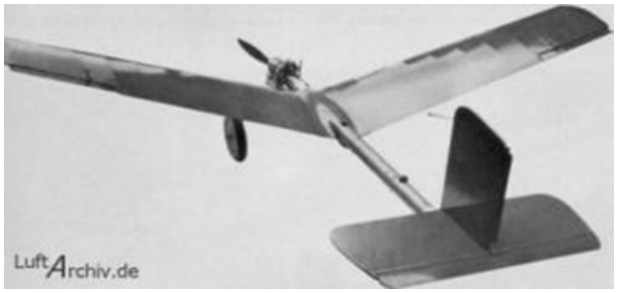


Figure 9 Argus As 292[18]

The first unguided flight was on June 9, 1937 and was remotely controlled on May 14, 1939. But German forces considered the aircraft a loss (debris) after being shot at by anti-aircraft gunners. To find a new destination during flight testing, two cameras were mounted on an As 292 prototype. The design of the original drone was slightly changed; the engine, radio control equipment and camera were covered. Secondly, the engine was more powerful and provided an autonomy of 30 minutes. The recovery of the aircraft was done by sending a command to stop the engine and open a parachute. But Nazi Germany started the war and the Argus Company was busy fulfilling orders for aircraft engines. Therefore, the manufacture of the drone somehow managed to start only in 1942[19].

Figure 10 *The recovery of a research aircraft As 292*[20]

In parallel with the Argus project, in 1937 Nazi Germany attempted to develop a radio-controlled target drone the size of a large aircraft. Fieseler designed and built the Fi.157 target aircraft in a short time. It was a single-engine, low-power plane with two-blade metal propellers and fixed gear. The aircraft was about to be suspended under a carrier bomber and detached in flight from it. In 1937, three prototypes were built, which were soon destroyed for various reasons[21].

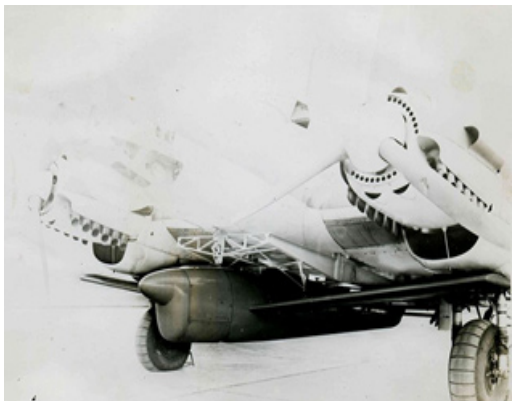


Figure 11 *Fi.157 drone attached to an He 111*[22]

In the late 1930s, the United States returned to the stage of unmanned aircraft, with the development of a target for training US Navy anti-aircraft gunners under the name Curtiss N2C-2. This unmanned aerial vehicle was remotely controlled from another manned aircraft, which made the design revolutionary. With the help of this biplane, the deficiencies in the naval air defence were discovered (The Utah battleship did not take down any N2C2-2 drone). The US Navy named this class of drones NOLO (No Live Operator On Board). The USAAF adopted this concept and began to improve it. However, as America prepared for war, the research was redirected for use in combat[23].

Figure 12 *Curtiss N2C-2*[24]

But the most famous drones of that period, both due the large number of pieces built and the advertisement with Marylin Monroe, were those made by the Radioplane Company led by Reginald Denny. In this article I will present only some of the drones made by this company. The interest of Reginald Denny, former British pilot in WW1, a Hollywood actor for the remote flight began one day in the early 1930s, when he offered to help a neighbor's son to play with a radio-controlled toy plane. The plane crashed and Denny insisted on building a new one for the boy. That experience led the actor in 1934 to open an aero models store selling models with their own design. It quickly expanded into a business, Reginald Denny Industries, through which he marketed its own aircraft models under the name Denny Plane. Denny also sold miniature petrol engines for aircraft designed and built by Walter Righter. In 1936, Denny and the financier Paul Whittier founded the Radioplane Company with the goal of developing radio-controlled aircraft for being use by military as air targets. The first controlled air target from Denny Industries was RP-1 (Radio Plane 1), a 42-kilogram monoplane with a 3 hp engine, two-strokes and 2-cylinder engine built by Walter Righter.

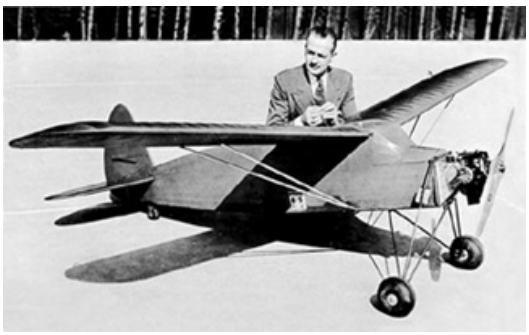


Figure 13 *Reginald Denny with the drone RP-1 (1935)*[25]

After a demonstration in front of the army in February 1938, the military became interested in the model. After a series of improved models, the army accepted the RP-4 model, a number of 53 of these were ordered in May 1939 under the name OQ-1. The drone was launched by a catapult and, although it was equipped with a landing gear with wheels, the recovery was usually done with a parachute[26].

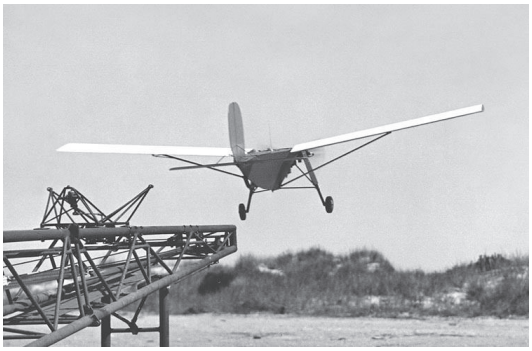


Figure 14 *The QQ2 model*[27]

Conclusions

• Less than 16 years after the Wright brothers' first flight, the major military powers began considering unmanned aircraft systems, initially as air bombs, then as training targets for air defence and then as reconnaissance systems.

• The capabilities of each version of generated UAVs have contributed to the evolutionary process, not the revolutionary one, of target-to-reconnaissance aircraft systems and, ultimately, attack platforms.

• Unmanned on-board systems have been continuously developed offering a major advantage: the ability to operate in hazardous environments without human risks.

NOTES:

1 https://www.bis-space.com/what-we-do/the-british-interplanetary-society/history/a-m-low, accessed on 11.11.2019.

2 Luke Dormehl, *The history of drones in 10 milestones*, September 11, 2018, https: //www.digitaltrends.com/cool-tech/ history-of-drones/, accessed on 03.01.2020.

3 https://www.theguardian.com/world/shortcuts/2013/feb/10/secret-history-of-drones-1916, accessed on 03.01.2020.

4 Larry Holzwarth, *The story of the Kettering Bug, the World's First Aerial Drone*, https:// historycollection.co / the-story-of-the-kettering-bug-the-worlds-first-aerial-drone/, accessed on 04.01.2020.

5 https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article /198095/ kettering - aerial- torpedo-bug/, accessed on 04.01.2020.

6 Joshua Stoff, *The Historic Aircraft and Spacecraft in the Cradle of Aviation Museum*, Dover Publication, Inc. Mineola, New York, 2001, p. 16.

7 https://www.warhistoryonline.com/military-vehicle-news/short-history-drones-part-1-x.html, accessed on 10.01.2020.

8 https://www.industrie-techno.com/article/le-drone-a-100-ans.36883, accessed on 12.01.2020.

9 https://www.science-et-vie.com/archives/2-juillet-1917-un-premier-drone-militaire-decolle-en-france-40147, accessed on 13.01.2020.

10 Gunther Sollinger, "The Development of Unmanned Aerial Vehicles in Germany (1914 - 1918)", *Scientific Journal of Riga* ,Technical University, 2010, Volume 16, pp. 24-26.

11 http://twaddle.gorod.tomsk.ru/index-1383058235.php, accessed on 16.01.2020.

12 https://www.warhistoryonline.com/military-vehicle-news/short-history-drones-part-1.html, accessed on 17.01.2020.

13 [Aviation Science & Development at Farnborough], *History and Learning Briefings*, No. 3 – A Brief History of Farnborough, Part 3, 1918-1939, pp. 3.

14 https://www.pbs.org/wgbh/nova/spiesfly/uavs_05.html, accessed on 22.01.2020.

15 https://www.baesystems.com/en/heritage/de-havilland-tiger-moth---queen-bee, accessed on 23.01.2020.

16 https://www.skytamer.com/Airspeed_AS.30_Queen_Wasp.html, accessed on 23.01.2020.

17 https://www.baesystems.com/en/heritage/airspeed-as30-queen-wasp, accessed on 25.01.2020.

18 http://www.luftarchiv.de/index.htm?/bordgerate/drohne.htm, accessed on 27.01.2020.

19 http://histomil.com/viewtopic.php?t=12896, accessed on 02.02.2020.

20 http://www.luftarchiv.de/index.htm?/bordgerate/drohne.htm, accessed on 03.02.2020.

21 http://www.airwar.ru/enc/other2/fi157.html, accessed on 04.02.2020.

22 http://www.luftarchiv.de/index.htm?/flugzeuge/fieseler/fi157.htm, accessed on 10.02.2020.

23 https://www.warhistoryonline.com/military-vehicle-news/short-history-drones-part-1-m.html, accessed on 15.02.2020.

24 https://commons.wikimedia.org/wiki/File:Curtiss_N2C-2_NAF_drone_1938-39.jpg, accessed on 20.020.2020.

25 http://www.ctie.monash.edu.au/hargrave/rpav_radioplane.html, accessed on 03.03.2020.

26 https://www.historynet.com/drones-hollywood-connection.html, accessed on 05.03.2020.

27 https://alchetron.com/Radioplane-OQ-2, accessed on 15.03.2020.

REFERENCES

[Aviation Science & Development at Farnborough], *History and Learning Briefings*, No. 3 – A Brief History of Farnborough, Part 3, 1918-1939.

Dormehl Luke, The history of drones în 10 milestones, September 11, 2018, https: //www.digitaltrends.com/cool-tech/ history-of-drones/

Holzwarth Larry, *The story of the Kettering Bug, the World's First Aerial Drone*, https:// historycollection.co /the-story-of-the-kettering-bug-the-worlds-first-aerial-drone/

Sollinger Gunther, "The Development of Unmanned Aerial Vehicles în Germany (1914 - 1918)", *Scientific Journal of Riga Technical University*, 2010, Vol. 16.

Stoff Joshua, *The Historic Aircraft and Spacecraft în the Cradle of Aviation Museum*, Dover Publication, Inc. Mineola, New York, 2001.

https://www.bis-space.com/what-we-do/the-british-interplanetary-society/history/a-m-low

https://www.theguardian.com/world/shortcuts/2013/feb/10/secret-history-of-drones-1916

https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article /198095/ kettering -aerial-torpedo-bug/

https://www.warhistoryonline.com/military-vehicle-news/short-history-drones-part-1-x.html

https://www.industrie-techno.com/article/le-drone-a-100-ans.36883
https://www.science-et-vie.com/archives/2-juillet-1917-un-premier-drone-militaire-decolle-en-france-40147
http://twaddle.gorod.tomsk.ru/index-1383058235.php
https://www.warhistoryonline.com/military-vehicle-news/short-history-drones-part-1.html
https://www.pbs.org/wgbh/nova/spiesfly/uavs_05.html
https://www.baesystems.com/en/heritage/de-havilland-tiger-moth---queen-bee
https://www.skytamer.com/Airspeed_AS.30_Queen_Wasp.html
https://www.baesystems.com/en/heritage/airspeed-as30-queen-wasp
http://www.luftarchiv.de/index.htm?/bordgerate/drohne.htm
http://histomil.com/viewtopic.php?t=12896
http://www.luftarchiv.de/index.htm?/bordgerate/drohne.htm
http://www.airwar.ru/enc/other2/fi157.html
http://www.luftarchiv.de/index.htm?/flugzeuge/fieseler/fi157.htm
https://www.warhistoryonline.com/military-vehicle-news/short-history-drones-part-1-m.html
https://commons.wikimedia.org/wiki/File:Curtiss_N2C-2_NAF_drone_1938-39.jpg
http://www.ctie.monash.edu.au/hargrave/rpav_radioplane.html
https://www.historynet.com/drones-hollywood-connection.htm
https://alchetron.com/Radioplane-OQ-2

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-51

OPINIONS REGARDING THE WAYS OF ENSURING EFFECTIVE MAINTENANCE OF LAND FORCES MILITARY TECHNIQUE IN PEACETIME

Capt. Grațiela-Elena VOICILĂ, PhD Candidate*
Lt.Col.Adv.Instr. Petre-Răzvan ENACHE, PhD**

In the present article will deal in detail with the role of maintenance, one of the most important areas of logistics, in maintaining and restoring military machinery and equipment, which is achieved through the continuous development, in peacetime, crisis or war, of two main activities, namely maintenance and repair. Maintenance is represented in the logistics system, in large units of the ground forces, in the management structure, by the technical deputy chief of logistics, and in the execution structures, depending on the echelon, by maintenance platoon structures, SMEM or SMME, from line I to level II logistical support. The arrangement of the execution elements is done with the observance, indicative of the tactical norms regarding the surfaces and the distances, so that the missions can be fulfilled making the most of the land and the local possibilities regarding the accomplishment of some maintenance works.

Keywords: maintenance; upkeep; repair; military equipments; areas.

"You won't find it difficult to prove that battles, campaigns, and even wars have been won or lost primarily because of logistics"[1], said general Dwight D. Eisenhower, supreme commander of allied forces in Europe during the second world war and the 34th president of United States.

We started the article with this quote precisely to draw attention to the particularly important role that logistics has in winning or losing a fight, regardless of the level at which it is carried out (tactical, operational or strategic). Without all the material resources/equipment provided by logistics, you cannot take any action regardless of the degree of preparation and well-executed plans.

Moreover, maintenance, as a functional field of logistics, plays an important role in ensuring the state of operation of military equipment and technique. In this material we have detailed those aspects considered by us to be essential that need to be analyzed in order to streamline activities specific to the functional field of logistics, maintenance of military equipment and technique.

** Base 1 Territorial Logistics "Carpatica"*
e-mail: *voicilagratiela@yahoo.com*
***"Carol I" National Defence University*
e-mail*: razvann_enache@yahoo.com*

The conceptual approach of maintenance

Starting from the definition of maintenance in the Explanatory Dictionary of the Romanian language which stipulates that maintenance represents "the totality of maintenance and repair operations of a technical system"[2], we deduce the two essential components of maintenance activity, namely: upkeep and repair, which makes us aware that maintenance is an activity that is planned and carried out continuously.

Going to the military field, maintenance is seen by specialists in the field as "the totality of principles, rules, human, material and financial resources, interdependent and forming a unitary whole, designed to carry out all actions taken to maintain and restore technical equipment to specific technical characteristics of operation"[3]. We also deduce from this approach the two main activities, namely maintenance and repair, which aim at maintaining and restoring the military technique and equipment in operation.

In the conception of the allies, maintenance means "all actions taken to keep equipment in or to restore it to specified conditions until the end of its use, including inspection, testing, servicing, modification(s), classification as to serviceability, repair, recovery, rebuilding, reclamation, salvage and cannibalization"[4].

Studying and analysing the main provisions in the field, we can say that the maintenance of military technique and equipment in the land forces has two specific objectives, namely:

• permanent maintenance and restoration of the state of operation of the technique and equipment already in the endowment of the land forces;

• implementation, for the technique and equipment introduced in the endowment, of the product management process, throughout its life in order to facilitate the development and integration of the following elements of logistic support for the acquisition and support of weapons systems:

- the requirements of technical-engineering personnel for operation / maintenance;
- training staff for operation and maintenance;
- providing a package of information, such as the product technical book, repair manual, spare parts catalogue, packaging documentation, preservation and operations required for its storage / preservation, technical data, operating parameters and operational reliability sheet;
- providing testing and diagnostic equipment;
- supply of spare parts and accessories;
- elements regarding the capitalization and scrapping of decommissioned equipment;
- ensuring a package of "feedback" information on monitoring the reliability of the product in the operation process.

The planning of maintenance works is carried out based on a maintenance program. Depending on the state of the military technique and equipment, as well as the time of the works, maintenance is: preventive, corrective, predictive, planned or postponed.

"Preventive maintenance includes a set of activities undertaken to maintain the technical systems in normal operating conditions, by periodically replacing consumables and performing periodic overhaul, adjustment, diagnosis and control, planned at regular intervals, depending on the duration of use or service"[5]. These works are mandatory, are established by the manufacturer or by experts within the structures that have the equipment in operation and are approved by the maintenance structures within the land forces.

Corrective maintenance includes a set of complex activities carried out to "restore the normal capacity of defective systems, which aim to restore the operation of defective and/or damaged equipment due to normal wear and tear or participation in military action"[6]. These include operations such as: testing/diagnosis, small, medium or large-scale repairs, checking and executing settings, etc. Depending on the size and costs, it can be performed at the place of deployment, by specialized structures subordinated to the logistics base or by economic operators.

Predictive maintenance is maintenance performed in response to a signal given by a sensor that shows a possible degradation of the material.

Planned maintenance includes predictive maintenance, preventive maintenance, as well as the activity of changing the aggregates that reach the life limit.

Postponed maintenance applies where minor defects have been detected during daily inspections that do not affect mission readiness or security of action. It is used only when there is no time, staff and resources to implement the planned maintenance.

Maintenance at the tactical level land forces structures

From our point of view, it is essential that in order to discuss the efficiency of ensuring maintenance in peacetime, we start from what it entails in time of war because we are training as we will fight. The efficiency of these types of activities is closely related to the need to ensure a state of operation of military technique and equipment during the war.

Regarding the tactical structures within the land forces that have their own logistics elements, we find/identify in the combat disposal, the logistic support line that has a different spatial development depending on the echelon and the form of combat that is adopted. In principle, the logistic support line consists of medical elements, maintenance elements and logistic support elements. In the following we approached only the issue of maintenance execution elements, part of the logistic support line and, implicitly, of the logistic system of the tactical structures within the land forces.

The maintenance support of the military equipment of the large tactical units has an essential role in the operation because it ensures the mobility of the troops and their combat capability (firepower). In this sense, we appreciate that the maintenance interventions, respectively the organization, planning and execution of the

maintenance works, contribute to obtaining the maximum efficacity/efficiency of the operations supported by the large tactical units in the battle space.

Depending on the mission received, the commander, at the proposal of the technical deputy of the head of the logistics module, requests maintenance support from the upper echelon and/or calls on the services of economic operators providing services in the area of logistics responsibility.

For the second line of logistic support, the large tactical units usually benefit from a module of execution of the logistic support, from the Logistic Base, of which it is part and a Mobile Section of Maintenance and Evacuation/SMME and sometimes also capacities of territorial maintenance.

In addition, for the large units and subordinated units, it also receives, for the first logistic support line, military equipment maintenance sections/ SMEM and, depending on the existence of their areas of responsibility, some territorial maintenance capacities, which will could work within the collection districts of their damaged equipment/ RAED.

Usually, the SMME works in a RAED, within line II of logistical support.

Planning and organizing the maintenance of military equipment at all large units and units of a large tactical unit is done depending on the quantity, complexity and technical condition and maintenance of military equipment, weather and field conditions, resource reserve, time also available to the mission entrusted to the division, in order to ensure a high level of operability of the military equipment of the large units and units. The responsibility for this lies with the commander, but the direct responsibility for the maintenance of the division lies with the head of logistics and his technical deputy, who must execute the orders of logistical support of the upper echelon and the decision of the commander.

The SMME from the Maintenance Center/ CM of the upper echelon is under the operational command/OPCOM of the Logistic Support Execution Module within the second line of logistic support and mainly executes repairs of low complexity/RC, but also repairs of medium complexity/RM for the restoration of military equipment for the continuation of the missions of large units and units. The level of combat maintenance ensures for the operational logistics a minimum technical condition of the military equipment for fulfilling the mission of the division in operation.

SMME is equipped with repair subunits (workshops) for different categories of equipment (tanks, APCs, cars, artillery tractors, etc.), namely: for armored vehicles, cars and tractors and engineering, armament, missiles, artillery equipment and communications and informatics, CBRN equipment, equipment and fuel-lubricants/ CL, fabrications and special works, a mechanic-energetic group, an evacuation platoon and a station of periodic technical maintenance and diagnostics.

On each axis of evacuation and repair of the infantry division, areas for the assembly of damaged equipment/RAEDs are organized, as a rule, in a former RAED of large unit, in which a module of SMME is carried out for the work or on the other axis. evacuation allocated by the SMME of the upper echelon.

In RAED, damaged equipment is collected and put back into operation, except for those that exceed the actual competence and possibilities (due to the large scale of the works and the excessive volume of labor required and which are handed over/taken over by the SMME of the Logistic Command Jointly organized and constituted within the third line of logistical support. The election of RAED is made according to the provisions of the regulation of maintenance of military equipment or in accordance with the provisions of the logistical support order of the infantry division.

SMME benefits from the operational logistic support provided by the large tactical unit.

For the maintenance flow in the RAED, the standard operating procedures must be followed, based on which the specialized structures in the SEM/maintenance execution structures act for the recovery/disposal of damaged military equipment and their repair.

The repair activities of SMEM and SMME are performed only on the basis of technical documentation of repairs, fabrications, reconditioning, etc. (execution drawings, technological flows of repairs, fabrications, reconditioning, etc., specific consumption norms of spare parts and materials, time norms broken down by operations, illustrated composition nomenclature, supply nomenclature, running-in norms, etc.).

RAED includes the following main elements: a number of stations for the control of contamination of military personnel and equipment; places for decontamination; places for washing and cleaning military equipment; 2-3 positions for receiving and sorting military equipment by categories/ repair skills; places for the disposal of damaged military equipment that will be handed over to the upper echelons, of those that will be repaired in RAED, as well as of the repaired ones that will be handed over to the delegates of the large units and units; places of disposition and execution of works for repair shops (armored vehicles, automobiles, tractors and engineering machinery; weapons, missiles, artillery equipment and communications and computer equipment; CBRN equipment, equipment and CL; manufacturing and special works), for the mechanical-energetic group; for the periodic technical maintenance and diagnostic station, as well as for the evacuation company; itineraries for road tests; places to store spare parts and materials, ammunition and C-L; space for staff rest in RAED; command point; means of transmission; power supply station; household point; disposal places for means of evacuation and transport; access roads; shelters; firing trenches; masking works; sentry posts and patrol routes.

Studying and analyzing maintenance within the war logistic support line we can identify certain aspects that can be improved since peacetime in order to streamline this field of logistics. We cannot ignore the reality of the modern battle space and the need to provide logistical support for operations when discussing peacetime maintenance.

Efficiency in ensuring peacetime maintenance

Since peacetime, maintenance specific activities must be planned and executed in a unitary way and within certain limits so that the transition from a state of peace to a state of war does not involve many changes in the procedures that will be put in place.

As the analysis shows, as a field of operational logistics, maintenance directly contributes to maintaining and restoring the combat capacity of large units and units playing an important role in the success of operations and obviously fulfilling the missions received.

Currently, specific procedures for peacekeeping, crisis and war are being regulated by updating instructions, regulations and manuals, which are developed based on the logistical doctrine of the Romanian Army and in close accordance with the logistical doctrine of the Land Forces of NATO, in the new concept of restructuring the maintenance system in the Romanian Army.

It is clear that the maintenance of land forces must be organized in such a way as to be able to support the requirements of the forces at strategic, operational and tactical level, as well as in the event of an asymmetric military conflict, taking place in all environments.

Thus, we believe that it is necessary for all maintenance activities to go through a program that has clear objectives and benefits from adequate financial funds.

In our opinion, the achievement of the objectives of the maintenance system of the technique is influenced by the following three groups of quality indicators, as follows:

- indicators regarding the initial general quality of the technical systems, which include the characteristics of performance, reliability, maintainability and availability;
- durability indicators in use, which define the service life of the systems and components and optimal rational strategies for renewing the technical fleet;
- indicators that reflect the efficiency of the application of the maintenance system in the process of using the technique, availability, repair intensity, average repair time, etc.

Studying and analyzing the specific literature, but also the main regulations in force, we can say that in order to implement a viable and effective maintenance system, it is necessary to achieve the following main aspects in the land forces:

- modular and flexible maintenance structures that perform on time and in full volume maintenance works;
- ensuring, at the level provided by the manufacturers of military equipment, the operational reliability based on the experimental one in the conditions of a rational consumption of materials and labor;
- the correct determination of the maintenance support (qualified personnel, means of work, technical infrastructure, documentation and materials for maintenance) in order to guarantee the performance of the necessary works and operations in a minimum time and at a high quality;

• the design of the technological process for the maintenance works, so that the maximum accessibility of the tools, devices, verifiers and of the documentation elaborated in this respect can be ensured;

• ensuring the flexibility of the methods of organizing the maintenance works depending on the conditions of use, construction, quality and reliability of the technique.

The concept of reorganizing the maintenance system in the structures of the land forces creates the legal framework for the achievement of a viable and effective system, leading to the fulfillment of the main objectives of maintenance, such as:

• decrease in the number of failures due to improper use of the technique;

• ensuring the quality of maintenance and repairs;

• increasing the availability, by respecting the immobilization times in repairs and even reducing them. In combat space this goal means maximizing the number of repairs per unit time to increase the number of vehicles that can participate in combat;

• maintaining a high coefficient of technical condition and efficiency;

• ensuring the safety of work during the execution of maintenance, evacuation and repair activities;

• maintaining an optimal ratio between the fall rate and maintenance costs (reliability criterion - costs);

• environmental protection, by creating the optimal conditions for carrying out maintenance operations (collection of used oils and greases, classification of noxious substances and noise levels within the allowed limits, etc.).

In order to achieve the objectives, within the limits imposed by the maintenance support, a unitary and efficient strategy must be promoted throughout the life of the product, which should be the basis for formulating and implementing the decisions of the maintenance system management through planning, organization, command, coordination and control.

Taking into account all these aspects, we consider realistic the opinion of those who claim that highlighting the measured diagnostic parameters and maintenance costs based on mileage/hours of operation, the number of shots fired (for combat vehicles) can contribute to: increasing the quality of the act management in the field of maintenance by making the best decisions, aiming at decreasing maintenance costs and increasing the availability of equipment through proper use and quality maintenance.

From our point of view, all peacetime maintenance activities should be planned and carried out in the same way as in war situations. We consider it appropriate that the techniques, tactics and procedures issued to be applied in time of war be implemented in peacetime so that both training and maintenance specific activities are carried out in accordance with them, and, in this regard, a higher level of training and, at the same time, a maximum level of operability. As mentioned above, the transition from a state of peace to a state of war should not involve many changes, but only those that result from the analysis of the situation and the particularities of the operation in which the units and large tactical units of the land forces participate.

Conclusions

Therefore, in conclusion, we can say that maintenance is an integrated activity in logistics, throughout the life cycle of a product, and refers mainly to the following services to be provided by the supplier: complex level maintenance, supply of spare parts and accessories, delivery of maintenance documentation, updating it and the list of spare parts, training of military personnel through courses of operation and maintenance or provision of means necessary for its preparation, software update, and implementation of changes and upgrades.

We support the idea that maintenance becomes a power factor, a force multiplier if all specific operations are performed in time and quality, especially those of restoring the defective, jammed or damaged products in various situations in peacetime.

In order to adequately meet the fundamental objectives of the maintenance system, we believe that a unitary and efficient strategy must be promoted throughout the operation, which should underpin the management of the system, through its command, regulation and control functions. In our opinion, the following steps should be taken to develop the strategy of maintenance activities: setting the objectives of the maintenance system, collecting and storing information on equipment reliability by monitoring defects and highlighting systematic defects that involve a large volume

of work and materials for repair, processing and analysis of information and assessment of its veracity.

We also consider that the improvement of the maintenance management process can be achieved through the following measures:

- the standardized documents for the maintenance management to be included in a unitary instruction and to be used in the logistic automated information system;
- the management and execution activities to be based on procedures and standards in accordance with those of NATO, but which should take into account the particularities of the technique in the endowment of the land forces;
- the optimization programs based on mathematical modeling to be elaborated by the competent bodies and to be distributed to the operative units and structures.

Last but not least, we believe that an integrative treatment of all activities related to ensuring a high technical condition of the equipment is necessary, for the economic and functional design of the component assemblies, as well as for the most rational financing of all activities in order to maintain them perfectly.

NOTES:

1 *Logistics quotes, Collection of logistics quotes from CEOs, military leaders and logistic experts,* 27.09.2018, http://www.everythingsuppulychain.com/logistics-quotes, accessed on 03.06.2020.

2 http://www.dexonline.ro, accessed on 03.06.2020

3 *** *M 36/2008, Regulamentul logisticii operațiilor întrunite*, Monitorul Oficial, Part I, no. 353, from 07.05.2008.

4 *** *AJP 4 Allied Joint Doctrine for Logistics*, Edition B, Version 1, December 2018, p. Lexicon-5.

5 *** *M 36/2008, Regulamentul logisticii operațiilor întrunite*, Monitorul Oficial, Part I, no. 353, from 07.05.2008.

6 *Ibidem.*

REFERENCES

*** *Doctrina logisticii întrunite a Armatei României*, Bucharest, 2018.

*** *AJP 4 Allied Joint Doctrine for Logistics*, Edition B, Version 1, December 2018.

*** *M 36/2008, Regulamentul logisticii operațiilor întrunite*, Monitorul Oficial, Part I, no. 353, from 07.05.2008.

*** *Logistics quotes, Collection of logistics quotes from CEOs, military leaders and logistic experts,* 27.09.2018, http://www.everythingsuppulychain.com/logistics-quotes

Andronic Benone, Minculete Gheorghe, *Abordări relaționale ale sprijinului logistic al diviziei de infanterie în operația de apărare pe litoral*, "Carol I" National Defence University Publishing House, Bucharest, 2019.

Bălan Carmen, *Logistica*, IIIrd Edition, Uranus Publishing House, Bucharest, 2006.

Minculete Gheorghe, *Abordări moderne ale managementului logistic*, "Carol I" National Defence University Publishing House, Bucharest, 2015.

http://www.dexonline.ro

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-52

IDEAS ON THE DEVELOPMENT OF PHYSICAL EDUCATION IN THE ONLINE ENVIRONMENT

Lt.Col.Lect. Gabriel Constantin CIAPA, PhD*

Depriving society of freedom of expression through movement has led to the emergence of situations and possibilities to carry out current activities in completely unique ways, while creating the chance to find new solutions to the need to perform at work, to resist and survive in the economic environment, to have a positive, optimal purpose in the educational act. Affected by this type of freedom, the effects of coercion have not bypassed essential areas of social life, areas whose "end product" contributes to our existence and survival as a species. In this amalgam of changes and adjustments in all fields, the teaching activity was not bypassed by the adaptations required by the general situation, in which the transfer of information from teachers to pupils/students/learners acquires modern connotations, "the classic" reducing, sometimes, the dominant importance it had had until recently. This material aims to express some ideas regarding the development of physical education lessons in the online environment, an environment that will captivate all the attention in the next period.

Keywords: physical education; physical effort; online; adaptation; lesson.

Society, as we knew it a few months ago, has undergone profound changes, with obvious effects on the population, on people's behavior both from the perspective of the activities they carried out, in particular, and from that of collective manifestations. The changes that occurred have influenced man mentally, physically, morally and economically, causing extensive changes in our manifestations. The influences generated can be found in all areas of activity carried out by us, the concentration of attention and focus being mainly on the notion of "adaptation". Whether we are talking about the economic environment, whether we are addressing changes that each of us has to make from the perspective of our personal component, it must be acknowledged that society is subject to this notion of "adaptation".

This adaptation and, finally, the re-establishment of the values that define us, includes everything that means human and their existential space, it encompasses everything that means defining them as individuals and distinct entities, apart from the other life forms on Earth. Actually, a multitude of forms of instruction or specialized training contributes to this definition, carried out in different stages of life, especially during tuition, a special moment of life in which the most important components of the human psyche, intellect and physique are consolidated.

School is the place where we are transmitted useful information in everyday life, we are provided with ideas, concepts, thoughts about the world around us and society, it is the place where new skills and abilities necessary for our existence are created, it is the framework where real possibilities for forming friendships arise, it is the place where the educational act must be completed through the essential contribution of teachers (teachers, professors, educators, instructors etc.), through the unconditional, active participation and conscious involvement of pupils/students/learners in this act. In fact, the quality of the educational act can represent the foundation of our evolution as a society.

The changes to which society has been subjected lately, determined the use of a form of information transmission within the educational act, which, in many respects, has been neglected, has not been developed: the virtual one, the one in the online environment. If in some mainly theoretical didactic activities the transmission of information and the possibility of assimilating them through the online environment, apparently, can take place without too many obstacles, when subjects with mostly practical content must be approached, the transmission, acquisition and application of knowledge will definitely suffer.

"Ferdinand I" Military Technical Academy
e-mail: *gabriel.ciapa@mta.ro*

Ideas for conducting physical education in the online environment

One of the teaching activities that contributes to the education of pupils/students/learners is the one that is achieved through movement within a fundamental subject with essential contributions to the health of the individual: physical education. This form of education is a vital component of general education, due to the effects of its real conduct, which will eventually materialize in a good state of health at the level of the entire society. The purposefulness of physical education must be found in the sanogenetic needs of people, in their social interests (integration and relationships), in the need to satisfy motor experiences and achieve valuable goals, in cultivating the idea of spirituality and culture. In fact, in "Terminology of Physical Education and Sports", physical education is presented as "the activity that systematically capitalizes on all forms of physical exercise, in order to increase, mainly, the human biomotor potential in accordance with social requirements"[1].

In other words, physical education contributes to the formation of motor skills, to the acquisition of knowledge, to the education of human values and attitudes for adopting and maintaining a lifestyle as active and as healthy as possible, to increasing the level of confidence in one's own potential. Encouraging the adoption of a healthy lifestyle, complemented by essential motor activities, both among pre-school children, pupils/students/learners and adults, should be a national priority, especially since the "activities specific to physical education carried out in order to obtain an increased level of physical training, involve a complex, dynamic and long-term process, in which mental and physical factors intertwine and are inter-conditioned"[2].

A fundamental role belongs both to those who create and apply national development strategies and to those who lead the activity itself: educators, teachers, instructors, specialists in which emphasizing the relationship between theory and practice will promote healthy living, will develop pupils'/students'/learners' interest for the deep knowledge and understanding of this connection and of the applicability of movement on health and will contribute to the development of a positive attitude and well-being of people and, finally, of society as a whole. Conduct for all of them must be under the sign of morality, characterized by "honesty, loyalty, fairness, objectivity... attachment to those they educate, stimulation, without discrimination"[3].

The transmission of information by specialists is based on an educational curriculum, a program that must include elements from branches related to physical education: psychology, hygiene, anatomy, etc., but also information that can develop the communication skills of pupils/ students/learners, their creativity, rational but also critical thinking, imagination, etc., in conditions of safety and pleasure. The diversity and flexibility of an educational curriculum in physical education will allow normal knowledge, as it can be a way for advancing in the future towards careers in medicine, psychology, healthcare, occupational therapy, sports, etc.

By synthesizing the ideas that define this study program, real objectives of the physical education subject can be created, anchored in social requirements and that will allow to pupils/ students/ learners to acquire important knowledge from many more fields, to promote the understanding of the field for a future education or career, to apply the knowledge acquired in order to form an objective decision-making capacity with the aim of planning, organizing, carrying out and assessing sports and recreational activities, to develop their aesthetic sense and confidence in their own possibilities, to acquire concrete habits towards improving personal health, to become responsible, respectable citizens with rational manifestations and desirable behaviors, to develop a normal commitment to the improvement of the quality of personal life and the community to which they belong.

Given the above, in order to achieve the objectives, the intervention of educators, teachers, instructors or specialists is essential, regardless of whether we carry out the teaching activity in a classic way or if it is done in the online environment. If the classic teaching method is well known, the online environment is a real challenge, not only for those who teach physical education, especially since the main goal of the online school is to provide education, not socialization.

The act of teaching the physical education subject in the online environment depends on the use of the type of communication that uses both audio and video resources, simultaneously or alternatively, on devices for transmitting and

receiving data. Moreover, the realization of the educational act in optimal conditions involves access to efficient material resources, a very good quality of the Internet[4], especially that the information and/or content to be acquired or created is provided through it.

If, in the classic teaching style, the conduct of the physical education lesson and the dynamics of the physical effort is the attribute of the activity leader, entirely, in the case of the online lesson, depending on the type of lesson adopted, there is a distribution of responsibility for the task to be accomplished to pupils/students/learners, also. Deprivation of real interaction and the development of physical education in the online environment can be a plus for self-knowledge, self-control and self-leadership of those involved in the activity.

From my point of view, the physical education class can be theoretical, practical or mixed. In the case of a theoretical physical education lesson, taught in the online environment, the information transmitted must be mainly from this field, but also from other related fields, in which the accumulated knowledge can be capitalized in real life. The content to be transmitted must be very diversified, with multidisciplinary, interesting information, so that the tendency of monotony to be minimized as much as possible, especially in educational institutions that do not aim to specialize in physical education and sports. In support of teaching the theoretical content, the leader of the activity can use a series of technical means that facilitate the transmission of information: video and audio means. A technical element that can contribute to the diversification of the teaching method is the graphic tablet, very useful for the situation where specific knowledge must be explained, but also for the situation where certain movements or exercises must be indicated. This hardware accessory brings a plus to the attractiveness of the class.

Approaching theoretical materials with a definite and applied purpose, is an advantage for arousing curiosity, increasing attractiveness and interest shown by pupils/students/learners in this subject. The interaction between the teacher and the students, in the online environment, ends most of the time without having a feedback from the latter, as they cannot wait for the class to end. Therefore, I consider useful to end a theoretical lesson with a set of questions or an online questionnaire consisting of a maximum of 10 questions, from the topic addressed during the class, applied through dedicated platforms, to all the participants in the activity. Thus, it will be possible to receive an objective and fast answer, in real time, on the quality of the information transmitted, on the level of assimilation of the content transmitted and even on the interest shown by certain participants in the class.

The second method by which the lesson can be carried out is the practical one, even if apparently it seems abnormal to carry out physical education in the online environment, by performing sets of physical exercises simultaneously with the leader of the activity or using videos recorded by him/her or other specialists. The adoption of this type of lesson with practical content is conditioned by the simultaneous presence of audio and video media in the case of both the teacher and the students, as well as a high quality of data transmission. In these cases, the leader of the activity must make a brief processing of the students regarding data protection, the recordings that can be made and their distribution without the consent of the copyright rightful holder.

For the first situation, a defining element must be considered the preparation of the individual location where the entire motor activity will take place, on the part of both the activity leader and the pupils/students or learners. Also for this method, it is extremely useful for the teacher to use wireless audio headphones with a built-in microphone, through which he/she guide the class during the physical exercises, especially since the teacher and the students will work simultaneously. From the point of view of the content of the practical lesson, it is possible to use simple physical exercises, with a low degree of difficulty, which are performed without exerting great physical effort, in safe conditions, without the need to request external help. Such physical exercises can be specific to sports subjects such as gymnastics, martial arts, athletics, etc. Physical exercises can also be from the basic and utility-application motor skills, as well as from the motor abilities, motor qualities (*they represent qualities of the body, materialized in the ability to perform movement actions with certain indices of strength, speed, dexterity and endurance*[5]). Motor skills are "motor manifestations of human activity, performed voluntarily, which through practice

acquire a higher level of automation or are partially automated and are reflected in obtaining optimal results with minimal energy consumption"[6] while motor abilities "seek to capitalize on the intellectual and motor capacity of the subject by adapting them to new motor tasks"[7].

In the second option, that of the transmission of a physical training program in video format, it is essential to mention some aspects that can lead to the successful achievement of the lesson objectives. A first aspect concerns the training program. From my point of view, this program, if it aims to educate a motor quality, must cover the development of all muscle groups, it must follow a comprehensive training of the whole body, the level of difficulty chosen being suitable for the study group. Also, the actual duration of the program must be appropriate for the level of training and allow for preparatory and final activities for those who participate in the training sequence.

The sequence of steps in the case of such a class could be the following: organization of the group (classes) of pupils/students/learners, in which the following actions must be performed: greeting, presentation of topics, processing rules and safety measures to be observed during the meeting and finding out (through questions) about possible changes in the health of the lesson participants, which could prevent the implementation of physical training programs; the transmission of the physical training program by the teacher to the pupils/students/learners; watching the physical training program by the pupils/students/learners; preparing the location where each pupil/student/learner will carry out their motor activity; the preparation of the body for effort must be done by each participant, because "the transition from rest to intense physical exertion requires a certain amount of time to accommodate the body ... and proper warming up allows performers to make advantageous use of their energy reserves, stimulation and acceleration of respiratory and circulatory functions ... warming up muscle mass, removing the possibility of rupture of muscle fibres ... increasing the optimal excitability of the cerebral cortex (A/N – with a role in the process of analysis, synthesis and issuance of correct motor answers in relation to the practical requirement of the lesson)"[8]; individual execution and recording of the work method based on the physical training program received from the teacher; the transmission to the teacher, at the latest 15 minutes before the end of the lesson, by each pupil/student/learner, of the video recording showing that he/she has fully completed the training program; the video recording will be named as follows: *Homework no. ... efs/last name.first name/group* and it will be uploaded on the platform where the whole teaching process takes place, within the deadline previously established by the teacher; the organized conclusion of the meeting, during which the following actions must be performed: discussion of some aspects on the students' behavior during the respective lesson, recommendations for the future independent activity, communication of a homework, if necessary and the greeting at the end of the lesson.

In order to work safely, it is recommended that pupils/students/learners follow some basic rules: the training programs received in video format are first watched, then they are practically worked within the limits of individual physical possibilities; in case of a physical condition that does not allow the execution of the program without interruption, it is allowed to stop it, take longer breaks, a few extra minutes to recover, and continue the program from the moment it was stopped; everyone will work at its own pace, without speeding up the execution of the motor action; changing the basic working positions should not be done suddenly – for example, when moving from the supine position to the sitting position, it is advisable to go through an intermediate position; sports equipment is mandatory and it must be light and adapted for the exercises to be performed; jumps should not be made directly on the floor without sports shoes, and if one trains barefoot, there must be a soft carpet on the floor or a special one dedicated to fitness activities, useful in the case of physical exercises on the ground, also; work surfaces must be flat, non-slippery, free of obstacles or objects (tables, chairs, beds, other furniture and/or decorations, etc.) which impede the performance of motor actions; it is recommended to practice in a space as large as possible – at least one square with a side of 2 meters; it is not advisable to exercise under support beams, chandeliers or suspended objects; the room must be well ventilated in advance and, when practicing, the door and window must not be left open at the same time; if necessary, different containers with plain water and a towel can be used;

it is not recommended to exercise immediately after a meal, there must be a minimum of 90 minutes before the start of the physical training program; after the end of the program it is indicated to respect the individual hygiene, both the one regarding the body and the one of the sports equipment.

The assessment of the motor activity of each pupil/student/learner can be carried out either in real time, by direct viewing the participants' working method, or by accessing and watching the video files received from them at the end of the class. In the second situation, that of receiving video files, the assessment is made both during the current lesson if the time budget allows it, and at the beginning of the next lesson. The final assessment can follow the same pattern as the one presented above, either in real time or by transmitting a video material, if only the practical component is pursued, in which the final subject requirements can be distinguished, the standards to be met can be clearly observed, according to the documents for organizing and planning the physical education subject. In the case of a final theoretical assessment, the application of a multiple-choice test, created by means of special platforms, with limited answer time for each item, may be an applicable option.

For one working method and for the other, in the situation of approaching certain topics with practical content, I consider that the introduction of physical exercises specific to motion games and motor challenges, which can take place in the space available to each performer, without the use of substantial material resources, contributes to increasing the level of entertainment of the classes, captivating the attention of the participants in these lessons. Professor Epuran M. admits the game as "a free, autotelic (A/N – defined by one's own purpose having an inner aim) manifestation, producing health, joy of movement, physical and mental recreation, good mental tone, a better quality of life, in which the intentionality and pursuit of the specific goals of each type of activity are of multiple interest, theoretical, methodological, psychological, social and methodical, including the concepts of plan, forecast, strategy, decision, control, execution, assessment"[9].

An interesting element that we should focus on, as an auxiliary means for conducting physical education classes in the online environment, is the symbiosis between domestic and international educational platforms, specialty and educational applications and software. Carrying out the teaching activity in these conditions allows the study of such platforms and applications dedicated to the field of physical education, as well as the choice of those providing correct data and information considering specialized books and real research studies, finding the ones that are suitable for each performer and are a real support for personal evolution, discovering what is useful for teachers in this student-teacher relationship – for centralization-records, analysis and assessment. The use of educational software can also be a stimulus, an element of attraction and entertainment among participants in physical education lessons in the online environment.

Conclusions

Physical education involves a whole range of actions and activities, the purpose of which must be found in the individual or group development, the selection of the means used being a priority, regardless of whether the lessons are conducted traditionally or in the online environment. In the stage of online teaching, the lesson design and conduct, in the conditions of social distance, must encourage and promote participation in this activity. I consider it appropriate that the analytical programs and the other documents for planning the teaching activities be also made for the event in which the classes take place in the online environment. Also, extrapolating the way of conducting online lessons and the experience gained with this form of teaching in the current teaching activity can be considered, for the military environment, conducting career and level courses in the online environment, especially for those that are predominantly theoretical.

Another aspect that needs attention is the assessment, which, in my view, should not be done to create panic or to scare students, but rather to encourage them to practice physical exercises for pleasure, to combat the type of sedentary behavior, in order to improve their functional parameters even in this period of restrictions.

As for physical education teachers, I believe that this way they must establish a different type of connection with students, in the sense of coming close to them and directing them to meet individual, particular, motor requirements. This can be translated into attracting pupils/students/learners to practice physical exercises voluntarily, not as a result of a "legal constraint". Emphasizing

the effects of physical exercises in combating depression, anxiety, stress and uncertainty, can lead to an increase in the level of self-confidence, state of mind and the creation of a beneficial mood among practitioners. The physical and mental health of each pupil/student/learner must be a top priority for each physical education teacher/ instructor during the lessons he/she conducts.

The promotion of physical exercises, even if they are practiced at home or in the spaces next to it, within the limits of social distancing, can be based on their prioritization, planning them regularly in the daily rhythm. Another pillar for their practice is the support of family or closest friends. Exercising together is an element of spending free time with them, given that daily activities no longer allow that much this social aspect. Another foundation on which the practice of physical exercises can be based, in these new conditions, is to carry out activities that attract attention, that create pleasure, that contribute to the neuropsychic relaxation of the practitioner regardless of whether it is a voluntary activity or a didactic activity carried out by pupils/ students or learners.

NOTES:

1 *** *Terminology of Physical Education and Sports*, Stadion Publishing House, Bucharest, 1974, p. 5.

2 M. Istrate, *Scientific communications session – Land Forces Tactics and Operational Art*, Faculty of Command and Staff, "Carol I" National Defence University Publishing House, Bucharest, 2020, p. 546.

3 A.D. Pelmuș, *Military Physical Education – Past, Present and Perspective*, "Carol I" National Defence University Publishing House, Bucharest, 2020, p. 73.

4 "The Internet is the global system of interconnected computer networks that uses the Internet protocol suite (TCP/IP) to communicate between networks and devices. It is a network of networks that consists of private, public, academic, business and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries a vast range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (www), electronic mail, telephony, and file sharing", https://en.wikipedia.org/wiki/Internet, accessed on 03.07.2020.

5 I. Șiclovan, *Theory of Physical Education and Sports,* 3rd Edition, Sport-Turism Publishing House, Bucharest, 1979, p. 148.

6 G.C. Ciapa, *Guidelines and Opportunities for the Physical Training of Military Personnel,* "Carol I" National Defence University Publishing House, Bucharest, 2019, p. 30.

7 A. Dragnea and collaborators, *Physical Education and Sports – Theory and Didactics*, FEST Publishing House, Bucharest, 2006, p. 135.

8 G.F. Băițan, *Admission to Military Educational Institutions within the Ministry of National Defence – Sports Trials,* "Carol I" National Defence University Publishing House, Bucharest, 2020, p. 18.

9 M. Epuran, *Motor Skills and Psychism in Body Activities. Prolegomena to a Meta-Theory of Body Activities,* FEST Publishing House, Bucharest, 2011, p. 189.

REFERENCES

*** *Terminology of Physical Education and Sports*, Stadion Publishing House, Bucharest, 1974.

Băițan G.F., *Admission to Military Educational Institutions within the Ministry of National Defence – Sports Trials*, "Carol I" National Defence University Publishing House, Bucharest, 2020.

Băițan G.F., *Physical Training of the Romanian Military Personnel in the context of NATO Integration*, "Carol I" National Defence University Publishing House, Bucharest, 2019.

Cârstea Gh., *Theory and Methodology of Physical Education and Sports*, ANDA Publishing House, Bucharest, 2000.

Ciapa G.C., *Guidelines and Opportunities for the Physical Training of Military Personnel*, "Carol I" National Defence University Publishing House, Bucharest, 2019.

Ciapa G.C., *Physical Training of the Romanian Army Military Personnel in Modern Conflicts*, "Carol I" National Defence University Publishing House, Bucharest, 2018.

Dragnea Adrian and collaborators, *Physical Education and Sports – Theory and Didactics*, FEST Publishing House, Bucharest, 2006.

Epuran M., *Motor Skills and Psychism in Body Activities. Prolegomena to a Meta-Theory of Body Activities,* FESTPublishing House, Bucharest, 2011

Epuran M., Horghidan V., *Psychology of Physical Education,* National Academy of Physical Education and Sports, Bucharest, 1994.

Istrate M., *Scientific communications session – Land Forces Tactics and Operational Art*, Faculty of Command and Staff, "Carol I" National Defence University Publishing House, Bucharest, 2020.

Pelmuș A.D., *Military Physical Education – Past, Present and Perspective*, "Carol I" National Defence University Publishing House, Bucharest, 2020.

Theory of Physical Education and Sports, 3rd Edition, Sport-Turism Publishing House, Bucharest, 1979.

http://www.en.wikipedia.org

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-53

GAMES IN MILITARY PHYSICAL EDUCATION LESSONS

Lt.Col.Lect. Gabriel Constantin CIAPA, PhD*

The relationship between social reality and the formation of intellectual-educational and motor skills in participants in military education and not only, information and behavioral transfer between the two environments, is based on creating viable connections and finding applicable solutions from one environment to another, on a definite anchorage of the knowledge acquired for the real world. This relationship can be strengthened through a multidisciplinary approach, in which each field studied, each subject covered within the educational program can contribute to strengthening the reality-training bond. In military education, this relationship acquires complex valences and connotations, if we look at the purposefulness of the educational act, in which each subject covered will influence the finished product. This material offers another perspective of a means specific to the military physical education subject in military education, that of games in the training during physical education lessons.

Keywords: *game; movement; education; physical education; military.*

Expressing the option to access one of the forms of education in the military environment is a first step towards entering a world full of unknown, a particular environment, where intellectual, mental and physical development, based on the reality of the field, is the foundation for training those who will serve the interests of the country. This training requires a major involvement of both those who prepare and serve the training and education act and those to be trained.

If the transmission of specialized theoretical knowledge is still done in most of the learning process according to the classical model (teacher/ instructor – knowledge –"student") in classrooms and ends with a form of assessment, in the case of practical knowledge, the information must be transmitted in laboratories, on training grounds, in polygons, on fields and gyms etc. Creativity, the level of knowledge reached, the responsibility and the involvement of those who lead the training or teaching activities, either theoretical or practical, are essential factors for those in the training process to become proficient at the end of the educational stage. Whether we use classical teaching or learning methods, or we use the latest methods and resources, it is important to reach the right end in relation to the social requirement.

"Ferdinand I" Military Technical Academy
e-mail: *gabriel.ciapa@mta.ro*

The training of those accepted in military education must not be one based only on the transmission of theoretical and practical specialized knowledge, it must also manifest itself for cultivating the interests and passions of those who are trained, for extracurricular development, for awareness and expression of the biological model according to which, we, as human beings, work, for finding the optimal and efficient solutions of a correct relationship between psyche-body and social need.

The development and cultivation of this relationship can be achieved using a whole range of means in many fields but also those specific to the field of physical education and sports, by finding those solutions in military physical education lessons and sports activities which materialize the training act for real military life. In fact, Billie Jean King[1] stated that "sport teaches you to characterize, it teaches you to play by the rules, it teaches you to know how it feels when you win or lose, it teaches you about life".

Games in the military physical education lesson

The activity of high-performance training, of education, of the participants in military education, is conditioned by the rational behavior of teachers and instructors, by their concrete actions, by adapting the content to be transmitted according to real social requirements, by the existence of reality-

training/education relationship. In fact, the actions of teachers or instructors are obviously conditioned by the social and human environment in which the activity takes place, all on a rational-intellectual foundation. The actions and the result of their actions, that is "the end-product", are permanently assessed by society, in terms of their concretization according to the social need. Their actions "influence the persons themselves and/or their environment..., optimize the person-environment relationship, form the basis for material, personal or social experiences"[2].

Such actions, under the obvious influence of the mental and physical component, are all the more important when they take place in the military environment, where the maximum grade obtained is of little relevance compared to rescuing the comrade from difficult situations of a real fight, population at risk, intervention in special situations. The military environment requires a total mental and physical involvement of both those who lead the training/education activity and those who "undergo" this act, in absolutely all specialties of this system, because the military must train "the way they fight, because historical experiences show a direct correlation between realistic training and success on the battlefield"[3]. And military physical education[4], being a military specialty, whose importance is recognized by most of those in the system, is no exception to the need to involve all resources in order to achieve necessary and useful ends for the military environment.

Being an activity organized and structured on logical sequences, in which the basic unit where the information is transmitted is the military physical education lesson or session (the most used form of organizing the teaching act itself), it provides the right framework for creating basic and specific motor skills so necessary to the military environment. "Military physical education if carried out continuously and systematically (and if conducted on a scientific and solid bases) guarantees a good level of physical condition, which facilitates the execution of the missions entrusted in crisis or war situations, but also allows the accomplishment of tasks in time of peace or those imposed by everyday life"[5].Thus, its content is in a permanent modification and adaptation to the requested realities, the achievement of the established objectives and the proposed goals being the essence of the training act in this field. Their achievement can be done by finding adaptable solutions and implementing them in lesson s, by using training means, the means specific to military physical education (A/N−the fundamental means by which military physical education operates is physical exercise, "the recognized and standardized didactic instrument with the help of which the didactic tasks are performed"[6])that have a concrete purpose, closely related to the requirements of the military environment. By realistic training, "the forces are provided with the combat capability necessary for action in the conditions specific to contemporary war, in a dynamic, complex environment, characterized by danger, uncertainty, intense psychophysical demand"[7].

One of the specific means too little approached and used in physical education lessons is the game, not just the sports games themselves (football, handball, volleyball, hockey, basketball, rugby). The discovery and rediscovery of playful behavior and manifestations among young people creates an emulation around the physical education subject and, finally, the military specialty, a so much needed manifestation. The game is an essential feature of childhood, through which the little ones unconditionally express their feelings and joy, but also of other ages seeking to meet the movement needs. If in childhood and adolescence, when the child or young person defines himself/ herself as an entity, the game has an educational-formative role from a mental, motor and social point of view, during midlife, adulthood and senescence, the game is a motor complex with hedonic implications[8], mainly seeking neuropsychic relaxation, fun, socializing, entertainment, recreation, active rest, mental recovery etc.

Mihai Epuran considers game as "a free, autotelic (A/N – defined by one's own purpose having an inner aim) manifestation, producing health, joy of movement, physical and mental recreation, good mental tone, a better quality of life, in which the intentionality and pursuit of the specific goals of each type of activity are of multiple interest, theoretical, methodological, psychological, social and methodical, including the concepts of plan, forecast, strategy, decision, control, execution, assessment"[9].

Gheorghe Cârstea considers games to have "special implications on the development of

the executors' personality ... including that of contribution in terms of social integration"[10], while Ursula Șchiopu admits the importance of the game and places it on the same level of value with the learning and work activities.

Other theorists of humanism, in their specialized works, consider and explain the essence of game, regardless of the age of the participants, as follows[11]: H. Spencer considers game as a means of consuming unused energy surplus; Lazarus understands the game as an essential way to satisfy the desire for rest or relaxation/ recreation, addressability being predominant for adults; Karl Gross identifies the game in its own way, from a biological perspective, resembling the child's behavior during his time with the primary-instinctual expressions of animals, in which playing is an exercise for life. Carr H. considers playing as "the activity of acquiring a tendency of general variability of instructive reactions and skills"[12]. Adler understands the game as expressing a child's sense of inferiority to an adult. Chateau J. considers that by playing the child expresses his/ her desire to reach adulthood. Lange K. regards game as a substitute for real life, while Leshaft P. states that game creates optimal conditions for the child's development for life. Piaget J. sees game as a "process of assimilating impressions and reactions, but also one that improves development, functionality and mental organization"[13]. According to Freud S., game is a form of human adaptation as a result of which practitioners can get rid of some of the anxiety disorders, while Claparede E. understands game in terms of compensation (filling in certain shortcomings, failures) and restoring psychological balance.

Looking at these explanations or theories of the game it can be seen that each of the theorists tried in his own way to refine and revise the definition and finally the essence of the game. The role of the game itself, given the above theories, can be very well summarized and concluded in Figure 1, understanding by catharsis a spiritual and mental state obtained as a result of the release of feelings and passions, of purification through movement, through an active and intense involvement in the development of the game, provided that the partners (or opponents) in the game have not destroyed the sense of friendship, of camaraderie.

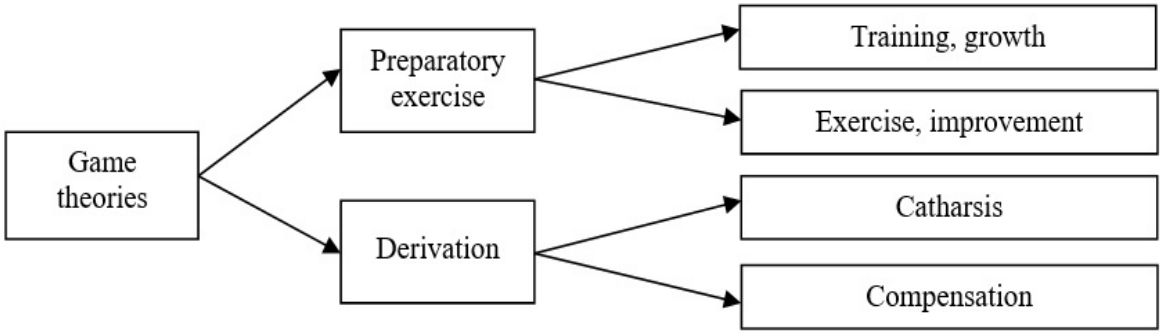


Figure 1 *The essence of game*[14]

In the context of military physical education, I consider game a specific means of objective attraction of participants in the training act and fulfillment of operational objectives by transforming and adapting the military reality to the peculiarities of the games, with viable results applicable to the military environment. The achievement of the goals proposed within the lesson must be done through a spontaneous, voluntary, active, conscious involvement on the aims, limited in time, all based on the concept of fun and entertainment of those involved in the activity.

Regardless of the theories mentioned above, regardless of the age of the practitioners or the nature of games, they have a number of features, in which the formation and mental and physical modeling of their social effect are essential elements to follow beyond their playful effect. Thus, games, as activities, are[15]: *natural* – its necessity springs from the human being itself, our evolution not being conditioned by playing as a mandatory requirement; *free* – in the game, outside the training framework, people participate voluntarily, the decision being

made without any constraint; *spontaneous* – we, humans, are willing to participate in various games whenever an opportunity arises; *attractive* – games have almost always created positive mental states in which success has always led to emulation around this concept; *total* – games engage the human being in all its aspects: mental, physical, social; *disinterested* – the purpose of the game differs from that of the mandatory social framework, seeking only the intrinsic joy of an independent activity; *recreational-compensatory* – man seeks release from the social tension to which one is exposed, both during work and in current activities.

From the perspective of the characteristics mentioned above, we can see that the game is a means used mainly by humans, to meet their various needs. The game, by its structure, aims to obtain results from a mental, physical and social point of view on humans. They perform a number of functions that can lead to the emergence of influences on the human personality. The functions of games[16], according to Ursula Șchiopu (1970), are essential or main, secondary and marginal.

Thus, *the knowledge function* "is expressed through the practical and intellectual acquisition of the properties of the surrounding world"[17], of reality. The function of stimulating complex growth and development represents, finally, the essence and purposefulness of movement, in the context of human biology according to the period of human development; the aims of the movements must be cultivated extremely early and continued even in the period of senescence. *The formative-educational function* expresses through this instrument, through the game, the modeling of the intellect, the education and cultivation of the personality, the formation of a conduct and an acceptance and integration social behavior.

The balancing and toning function, together with the *hedonic* and *compensatory* one, represents a cumulation of functions that, together, become very important in the context of a stressful social reality, in which we look for those moments of mental and physical rebalancing, of psychophysical compensations by carrying out recreational and fun activities using the game as the main tool for achieving neuromuscular relaxation. *The therapeutic function* can be best understood in the case of assisted application and in special conditions of games in patients in an unhealthy situation, which allows them to perform some basic movements.

Each historical period and geographical region influenced the diversity and typology of the games, each age through its peculiarities gave rise to games suitable for it or adapted the existing ones, obviously conditioned by the material basis available. The period, age, geographical region and material basis led to the creation of a multitude of games. The games have been classified, over time, according to several criteria, the systematic distribution itself being a real challenge.

From the multitude of classifications stated by the humanists mentioned above, from the perspective of this material, I consider that a mention of these types of games is not so relevant compared to trying to frame some of the types of games according to combat situations and basic and utility-application motor skills specific to the military environment (Table no. 1):

In support of the use of games for specific military purposes but also for entertainment, "Highland Games" sports competition can intervene, for example, held in TO Afghanistan in 2015. "This activity was attended by soldiers from 2 battalions, a Romanian one and an American one, combat structures forming at that time the Polar Bear-Dragons Task Force. The participants were divided into 10 mixed teams, consisting of eight competitors−4 Romanian soldiers and 4 American soldiers. The tests of the competition were varied: throwing a 4 m long log and a 25 kg weight at a given distance, running with their partner on their back, turning around a hammer tail followed by running, throwing and catching fresh eggs at various distances, carrying a fighting machine wheel, holding their breath underwater, carrying 8 different weights (ammunition crates, food packages) and pushing a bus...rope pulling, in teams"[19].

Methodical aspects of games

Games in their complexity have many features that can be useful or recommended in the training activity. In order to be effective, some very important aspects must be pursued in order to achieve the objectives.

Thus, a first idea that must be taken into account starts from the objectives of the training process and requires the correct choice of games

according to the purpose of the lesson. They must ensure complete training, both physically and mentally, morally and volitionally; captivate the interest of the participants; take into account their age and sex, physical training level, quantity and quality of motor skills and qualities possessed by that time; take into account safety and accident prevention rules, the ambiance must be in line with the proposed objectives; the material basis available must also be taken into account (land, spaces, objects and sports materials etc.). Another important aspect that we must take into account throughout the training process is represented by the health of those who participate in the activity.

When it comes to preparing for games, there are times when teams need to be made. When playing team games, one must follow a few rules: teams can be established by the game leader or even by the participants; as far as possible, there should be an equal number of participants in each team; also, where appropriate, a team captain may be appointed by the leader of the activity or he/she may be elected by the team members; they must be homogeneous in value, motor and anthropometric dimensions as far as possible; all participants must be involved in the activity; if they are special (combat) games, the weight and height of the participants must be taken into account; at an unequal number of participants in a team, a member can perform twice the task received; time should be allowed for the choice of tactics, if appropriate, and it must be made by either the team captain or determined by the team members.

The leader of the activity has a very clear role in coordinating and carrying out the game. He/she must specify the name of the game, explain the rules

Table no. 1

CORRESPONDENCE BETWEEN VARIOUS COMBAT SITUATIONS – GAME – BASIC AND UTILITY-APPLICATION MOTOR SKILLS[18]

POSSIBLE COMBAT SITUATIONS	TYPES OF GAME	PHYSICAL REQUIREMENTS
Throwing hand grenades	Games for learning, consolidating and improving basic and utility-application motor skills Handball-specific games Motion games Individual games Rules games Games in various geographical areas and environments	Walking, running and cargo carrying, jumping, crawling, climbing, pushing, pulling, crouching, lunging, starting, stopping, changing direction, throwing.
Individual movement techniques Movement from one point to another Movement u nder enemy fire	Games for learning, consolidating and improving basic and utility-application motor skills Individual games Special or hereditary games (hunting) Moments reproduction games Motion games Games in various geographical areas and environments	Walking, squatting, running and cargo carrying, jumping, crawling, climbing, pushing, pulling, crouching, lunging, starting, stopping, changing direction, ascending and descending.
Hand-to-hand combat	Special or hereditary games (combat) Moments reproduction games Motion games Games of will Individual games Games in various geographical areas and environments	Reactions in hand-to-hand combat: pushing, pulling, stepping, walking, running, rolling, throwing, lifting body weight, crouching, lunging, turning, bending, blocking, kicking, hitting, stopping, changing direction.
Assessment and response to threats Reaction to direct contact with the enemy	Special or hereditary games (combat) Moments reproduction games Motion games Collective games Games in various geographical areas and environments	Walking, squatting, pushing, pulling, running, rolling, throwing, lifting body weight, crouching, lunging, turning, bending, blocking, kicking, hitting, changing direction, weight carrying, jumping, crawling, ascending, starting, stopping.
Evacuation of the wounded	Moments reproduction games Motion games Individual games Collective games Rules games Games in various geographical areas and environments	Lunging, crouching, weightlifting, walking, running, carrying.

and how it takes place, the special actions during the game, the safety measures, where applicable, the conditions under which a game is won and, also, the score, penalties and sanctions, disqualifications, signals for the beginning, the interruption and the end of the game. If necessary, the leader of the activity will demonstrate parts or motor actions during the game for a correct understanding. He/she will follow during the game, the correctness and observance of the rules, applying the sanctions specified at the beginning if a violation of the rules is found, he/she must be impartial, pay attention to the evolution of the teams, follow the observance of discipline in a yet relaxed environment. If the effort is too great or too small for the participants, he/she can reduce the size of the playing field or increase it, reduce or increase the game time, repetitions, complicate or simplify the rules. At the end of the game, the leader must announce the winners. If the situation requires it, he/she can use the referees within the group available throughout the game.

Conclusions

I have previously presented a series of features of the games as well as their role in physical education lessons, elements that lead to awareness of the importance of this specific means in the training act. By involving the anatomical and functional component of the human body in the development of games, a series of benefits and favorable results can be obtained, starting from the sanogenetic effects of the motor activity itself. Thus, games can help maintain good overall health, contributing to the development of the body according to the age at which games are applied, remove excess fat, stimulate and proper functioning of the body's major systems.

By soliciting the psyche and intellect of the "practitioner", motion games contribute to better education and time management, being known that games take place, in many situations, against the clock, under its pressure, in which the possibility of making very fast action decisions appears. Also, the focus on accomplishing tasks and making decisions during a game creates premises for improving concentration and developing leadership skills as well as other directions of interest. Thus, the use of motion games can be a helpful and useful element in the long run.

By successfully fulfilling the duties, the encouragement received during the game, the level of confidence may substantially increase simultaneously with the sense of responsibility, thus strengthening self-esteem, satisfaction taking the place of dissatisfaction. Another important aspect of motion games is the fact that their conduct, in most cases, requires the presence of a larger number of participants, a larger group, in which the distribution of tasks and their achievement pursue the same purpose: team victory and, why not, individual satisfaction. Victory, in such situations, is determined by the involvement of team members, the interaction between them, teamwork and mutual help. All these elements lead to the increase of the level of socialization between the participants in the game, socialization that can be transposed in other moments of life, other than the physical education lesson and motion games.

NOTES:

1 Billie Jean King, former great field tennis player, winner of no less than 39 Grand Slam titles (12 singles titles, 16 women's doubles and 11 mixed doubles) and of the first edition of the Champions Tournament, in 1971.

2 M. Epuran, *Motor Skills and Psychism in Body Activities – Prolegomena to a Meta-Theory of Body Activities*, Vol. 1, FEST Publishing House, Bucharest, 2011, p. 125

3 *** *FM 7-0: Training the force*, Headquarters, Department of the Army, Washington DC, 2002, 1-2.

4 G.C. Ciapa, *Physical Training of the Romanian Army Military Personnel in Modern Conflicts*, "Carol I" National Defence University Publishing House, Bucharest, 2018, p. 40. "The planned, organized and individual or collective training activity, capitalizing on the system of forms of physical exercise in order to train, develop and improve the motor and mental skills of the military and civilian personnel in the army, in order to conduct armed combat and to improve their health".

5 G.F. Băițan *Physical Training of the Romanian Military Personnel in the context of NATO Integration,* "Carol I" National Defence University Publishing House, Bucharest, 2019, p. 31.

6 Gh. Cârstea, *Theory and Methodology of Physical Education and Sports*, ANDA Publishing House, Bucharest, 2000, p. 40.

7 A.D. Pelmuș, *The Influence of Effective Training in the Field of Military Physical Education on Combat Potential*, "Carol I" National Defence University Publishing House, Bucharest, 2020, p. 53.

8 Hedonism – "Ethical conception according to which the purpose of life is pleasure, release from suffering. 2 (Aesth.) Theory considering that the main function of art is to delight. 3 Exaggerated tendency to seek pleasure, common in manic states", www.dexonline.ro, accessed on 07.04.2020.

9 M. Epuran, *op.cit.*, p. 189.

10 Gh. Cârstea, *Theory and Methodology of Physical Education and Sports*, ANDA Publishing House, Bucharest, 2000, p. 128.

11 T. Predescu, E. Jianu, C. Grădinaru, S. Grădinaru, *Sports Games in School,* Polytechnic Publishing House, Timişoara, 2010, p. 73.

12 *Ibidem*, p. 70.

13 *Ibidem*, p. 75.

14 T. Predescu, E. Jianu, C. Grădinaru, S. Grădinaru, *op.cit.*, p. 75.

15 M. Epuran, V. Horghidan*, Psychology of Physical Education,* National Academy of Physical Education and Sports, Bucharest, 1994, p. 61.

16 U. Șchiopu, *Psychological Problems of Game and Entertainment,* Didactic and Pedagogical Publishing House, Bucharest, 1970 apud M. Epuran, V. Horghidan*, Psychology of Physical Education,* National Academy of Physical Education and Sports, Bucharest, 1994, p. 63,

17 T. Predescu, E. Jianu, C. Grădinaru, S. Grădinaru, *op.cit.*, p. 77.

18 *** *FM 7-22: Army Physical Readiness Training*, Headquarters, Department of the Army, Washington DC, 2013, pp. 1-4 and reinterpretation of game classifications.

19 M. Istrate, *Scientific communications session – Land Forces Tactics and Operational Art*, Faculty of Command and Staff, "Carol I" National Defence University Publishing House, Bucharest, 2020, p. 546.

REFERENCES

*** *FM 7-22: Army Physical Readiness Training*, Headquarters, Department of the Army, Washington DC, 2013.

*** *FM 7-0: Training the force*, Headquarters, Department of the Army, Washington DC, 2002.

Băiţan G.F., *Admiterea în instituţiile militare de învăţământ din Ministerul Apărării Naţionale – Probele sportive*, "Carol I" National Defence University Publishing House, Bucharest, 2020.

Băiţan G.F., *Pregătirea fizică a militarilor din Armata României în contextul integrării în NATO*, "Carol I" National Defence University Publishing House, Bucharest, 2019.

Bronikowski M. şi colab., *Teaching movement play and games – from the cultural, social and sporting perspective*, Podręcznik, Poznan, 2012.

Cârstea Gh., *Teoria şi metodica educaţiei fizice şi sportului*, Editura AN-DA, Bucureşti, 2000.

Ciapa G.C., *Orientări şi oportunităţi pentru pregătirea fizică a militarilor*, "Carol I" National Defence University Publishing House, Bucharest, 2019.

Ciapa G.C., *Pregătirea fizică a militarilor din armata României în conflictele moderne*, "Carol I" National Defence University Publishing House, Bucharest, 2018.

Epuran M., *Motricitate şi psihism în activităţile corporale. Prolegomene la o metateorie a activităţilor corporale,* FEST Publishing House, Bucharest, 2011.

Epuran M., Horghidan V.*, Psihologia educaţiei fizice,* National Academy of Physical Education and Sports, Bucharest, 1994.

Istrate M., *Sesiune de comunicări ştiinţifice – Tactică şi Artă Operativă Forţe Terestre*, Faculty of Command and Staff, "Carol I" National Defence University Publishing House, Bucharest, 2020.

Pelmuş A.D., *Influenţa instruirii eficiente în domeniul educaţiei fizice militare asupra potenţialului de luptă*, "Carol I" National Defence University Publishing House, Bucharest, 2020.

Predescu T., Jianu E., Grădinaru C., Grădinaru S., *Jocurile sportive în şcoală*, Polytechnic Publishing House, Timişoara, 2010.

Șchiopu U., *Probleme psihologice ale jocului şi distracţiilor,* Didactic and Pedagogical Publishing House, Bucharest, 1970.

Todea S.F., *Jocuri de mişcare*, "România de Mâine" Foundation Publishing House, Bucharest, 2002.

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-54

THE MOTOR CAPACITY – FOUNDATION OF MILITARY TRAINING

Col.Adv.Instr. Alin PELMUȘ, PhD*

The article emphasizes the place and role of motor capacity in the military training process. Thus, the motor capacity is the foundation, the pillar on which military training is based, and its development is an essential purpose of military physical education, which requires a multilateral training of motricity. This requires a large amount of knowledge, qualities, motor skills and abilities, which is achieved with various means specific to the activity of physical education and sports, but also other categories of military training.

Keywords: military training; motor capacity; motor qualities; motor skills; motor abilities.

Military training is a process characterized by the acquisition of specific knowledge and abilities in the military field, a process by which the resources available at a given time (human, material and financial) are transformed into operational capacity, maintained and periodically adapted to international geopolitical and military realities. Military training occupies the most important place in the process of building and maintaining a modern army.

Military training in the Romanian Army is thought of as "the activity carried out by the army to achieve the capacity of personnel/forces to perform specific duties/missions using military equipment"[1]. Therefore, it is a multilateral process, developed on interconnected systems and related to most activities specific to the military environment, as shown in the following figure:

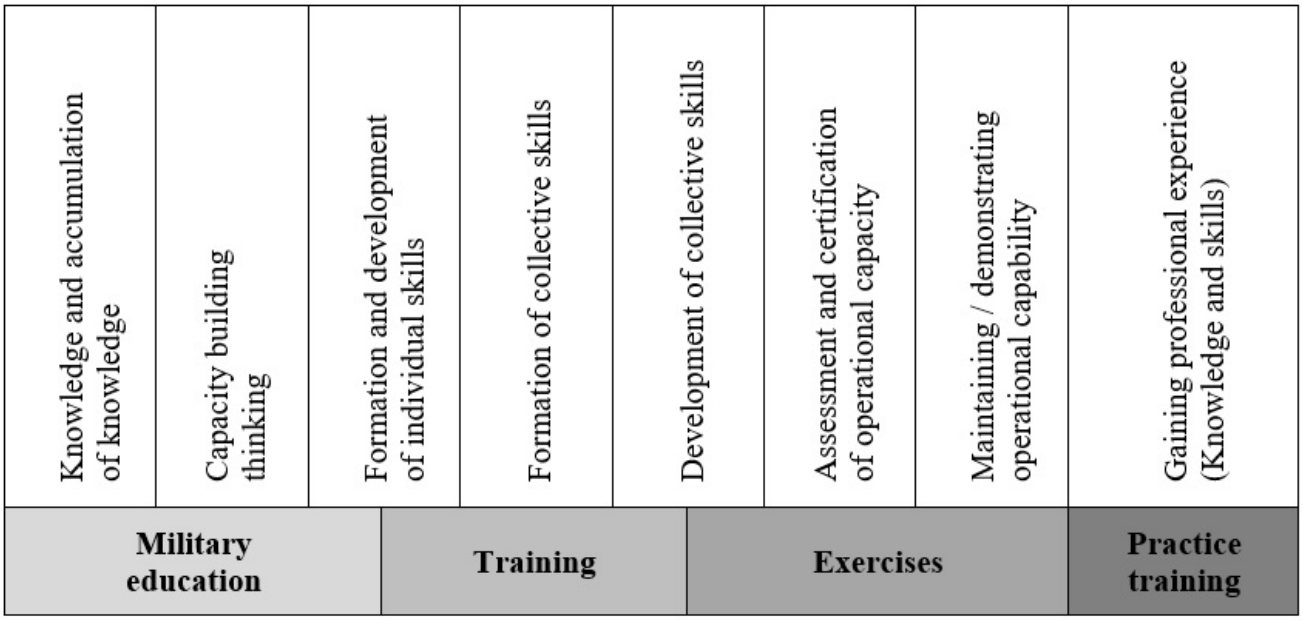


Figure 1 *The objectives of military training*[2]

Military training is structured on several very important areas, as follows: the theoretical side (it aims to acknowledge the particularities of the battlefield, training and development of effective thinking); the physical and psycho-moral side (it aims at the formation and development of the physical and psycho-moral capacity necessary for the personnel to fulfill the missions in extreme conditions of effort and stress, specific to the

***"Carol I" National Defence University**
e-mail: *pelmusalin@yahoo.com*

operational environment); the technical side (it aims at acknowledging the technique, weapons and military equipment, training and developing the skills necessary for their use in the tactical field); the tactical side (it aims at action skills, training and development of operational skills to accomplish missions).

The predominant feature of military training is the applicative practice, which involves the use of theoretical knowledge and individual skills accumulated in the training process by military personnel, in a specific context, according to the structure and the position they hold.

One of the fundamental factors in carrying out military activity and, obviously, for obtaining superior performances in the process of training the forces, is the motor capacity. As stated in the paper "Terminology of physical education and sports" (1978), motor capacity is "the set of natural and acquired motor possibilities through which various efforts can be made in terms of structure and dosage".

Also, in the literature specific to the field of physical education and sports we find various definitions of motor capacity, but, reported to this article, I consider that Professor Adrian Dragnea best captures this concept, defining it as a "complex of predominantly motor manifestations (skills and abilities), conditioned by the level of development of motor qualities, morpho-functional indices, psychic processes (cognitive, affective, motivational) and metabolic biochemical processes, all put together, correlated and mutually conditioned, resulting in efficient performance of actions and acts required by the specific conditions under which the motor activities are practiced"[3]. Thus, morpho-functional indices and metabolic biochemical processes can positively or negatively influence the development of motor capacity. In this sense, there are tests to assess the proper development of these elements, the starting point in planning effort in motor activities.

According to the same author, motor capacity includes stable components (abilities; motor qualities – speed, coordination, endurance, strength, mobility, flexibility; motor skills; operational structures; knowledge; experience) and state components (motivation, emotional states, which may promote, reduce or block the expression of motor capacity). This is a multifactorial resultant, a vector resulting from the interaction of the mentioned components, which evolves after an ascending curve, widens and restructures through maturation and education. In most cases, the motor capacity is not reduced to solving standard situations, but to various situations, through structuring and recombination of its components.[4]

Thus, motor capacity is obviously acquired, especially in the activity of military physical education and sports, but given the specifics of military action, it can also be developed in other categories of training depending on the military branches. In this respect, the motor capacity of the military becomes a complex represented by the following factors: strength (dynamic, static, explosive); speed (reaction, actuation); endurance (in different regimes, cardiopulmonary and local musculature); coordination (simple, multilateral, general, static precision, accuracy, static and dynamic balance).

Motor capacity is of two types: *general* and *specific*. The general motor capacity includes basic motor qualities (speed, coordination, endurance, strength and, according to some authors, flexibility) and basic and utility applicative motor skills or abilities. The specific motor capacity, which cannot be manifested without the general one, results from the unity of motor qualities and motor skills or abilities specific to some sports, in our case specific to some branches of sport and their tests with applicability in the army or certain categories of training specific to military branches.

Motor qualities, also called physical qualities in some specialized papers, are innate traits / characteristics of people and can be educated throughout life. In military action, given the wide range of missions in which the personnel is engaged, but also their diversity, we often encounter a combination of motor qualities.

The development level of motor qualities determines the fulfillment of the requirements provided by the training programs regarding the increase and improvement of the system of knowledge, skills and motor abilities in the military. To support this essential aspect in guiding the military training content in general and military physical education in particular, we can start from the analysis of the following example: throwing hand grenades accurately can be performed - correctly, from a technical point

of view, but inefficiently not having the strength and speed needed to hit the target; less accurately, but strongly enough and relatively precisely; very correctly, strongly enough and very sharply, thus very efficiently. Therefore, reaching the parameters specific to the last mode of execution is not possible if one acts only on the technique, but, first of all, due to the development of the general strength and the throwing arm, the speed and precision in execution, which all combined with different weights, determine improving the technique and efficiency of the process.

In order to determine the value and contribution of motor qualities to the accomplishment of different motor actions, each of them is associated to certain parameters. Thus, for determining the value of strength is used as a standard parameter – load, for speed – speed of movements, for endurance – duration of action, and for coordination capacity – complexity and accuracy of action. Noting the extent to which these parameters are present, to a different extent, in an action or in a chain of motor actions, we realize the role and contribution of the motor quality or qualities involved in the execution of those actions.

The development of motor qualities requires a rigorous objectification of the process of physical training of the military. This objectification refers to the establishment of concrete ways of quantitative and qualitative assessment of progress, on the basis of which the methods effectiveness, procedures and means used can also be assessed. The process of developing motor qualities offers us wide and concrete possibilities for objective assessment of the progress made by the military, but also of the quality of the pedagogical performance of the instructors. From this perspective, the objectification of the process of developing motor qualities requires the instructor to do the following: to know the level of military training, to know from which stage it starts; to establish tests and rules specific to each motor quality and to apply them periodically in the activity of the military; to develop exercise structures for the final model regarding the development of motor qualities, according to the *Military Physical Training Regulation*; to keep an accurate record of all the data obtained and to use it for the critical assessment of the activity carried out. Thus, the objectification of the process of development of motor qualities determines a clearer ordering of the instructor's activity, obliges him to permanently try to identify the most efficient means and organizational forms and ensure an increased efficiency to achieve the proposed goal.

Motor skills are "human motor actions acquired during individual life (in ontogenesis) through conscious and systematic exercise"[5], based on dynamic stereotypes formed in the cerebral cortex. These are considered automated components of voluntary motor activity. As a result of multiple repetitions, performed systematically and continuously, in stereotypical structures, the component movements of a motor action reach a high level of perfection, which allows it to be performed easily and accurately (coordinated), with minimal energy expenditure, economic), with high efficiency and without the need for direct participation of consciousness. Thus, motor skills are complex conditioned reflex chains that rely on various connections between the vestibular cortical areas, speech, view, and other analyzers, on the one hand, and the motor centers interested in coordinating this activity, on the other. These skills are systems of temporary connections, more precisely dynamic motor stereotypes, developed and strengthened through exercise.

The formation of motor skills is a requirement present in all programs/plans specific to the activity of physical education and sports in the army, being one of the main purposes of the military training process. The formation of motor skills is achieved only in a strict interdependence with the development of motor qualities, both being components of the unitary process of improving the motor activity of the military.

Within the relationship of interdependence between skills and motor qualities, it is noted that the latter are somato-functional abilities specific to each individual (born or developed/educated in the training process) in the absence of which motor skills cannot be formed and strengthened. As for motor skills, which, as we have seen, are automated components in the field of motricity, they are the forms of concrete activity in which motor qualities are manifested.

Achieving a motor action, no matter how complex, depends on the level of the component skills development, namely those movements that have previously been acquired and consolidated through a large number of repetitions, but also by

the value at which the motor qualities required by the respective action are developed. For example, rope climbing can be performed by all soldiers who have strength in their arms, but if they acquired the technique, the action would be performed more easily, naturally and accurately.

Skills and motor structures have certain peculiarities of their own, such as: uniqueness and irreversibility (motricity reject reversibility and identity of executions); chaining (combining the elements and not their simple addition, each component being dependent on the previous and the next); originality of execution (although they are automated, motor actions are not repeated identically based on the rule of associativity. For example, a soldier who repeats a military application course will not always choose the same solution).

In the process of military training we must take into account these particularities, which suggest that it is necessary to pay special attention not so much to equipping the military with standardized response techniques to stimuli, but especially to educate adaptability, which does not involve simple automated responses, but thinking, abstraction, generalization, inventiveness.

Motor abilities are motor actions acquired in human ontogenesis, which succeed motor skills, representing their next stage of evolution. They are learning outcomes that "seek to capitalize on the intellectual and motor capacity of the subject by adapting them to new motor tasks"[6]. Thus, regarding motor abilities, we can say that they are the properties of the human body, acquired as a result of participation in various training programs and which materialize through the possibility of performing motor tasks in changing conditions.

The literature in the field highlights two types of motor abilities: elementary and higher or complex. Basic motor abilities, according to some specialists in the field, precede motor skills, they are understood as the capacity of the individual to receive qualitatively and quantitatively "motor information" very quickly (there are many situations when we say about an individual that in the phase of learning a new motor element and due to its motor possibilities of adaptation, is very "skilled"). These are formed in a fairly short time by observing the motor action of other individuals through explanation by the instructor and practice.

Therefore, motor abilities represent the motor and intellectual baggage through which the motor skills of the military are expressed in new, variable, unforeseen conditions. These are non-automated components of the human motricity precisely because of this unforeseen and depend, to a large extent, on the amount of motor skills previously acquired, their quality and application to specific situations, as well as the capacity to analyze and synthesize the cerebral cortex (of its plasticity).

Generalization of certain knowledge in the form of rules, laws and notions, the motor experience (its variety and quality) give the soldier the possibility to act in different conditions as well, different from those in which the motor skills had been formed. These allow him to identify rational solutions, appropriate to the purpose of the new action and to carry it out cursively, with relative ease.

In conclusion, the development of motor capacity is ultimately the result of acting on multiple levels in the direction of improving the major functions of the body, increasing muscle strength and resistance of the body to intense demands on the background of education general coordination, on the one hand, and the formation of a vast baggage of motor skills or abilities, on the other hand. These effects cannot be obtained if we do not act in an organized, systematic and continuous way, permanently taking into account the morpho-functional and psychological possibilities of the military.

In military physical education and sports, as well as in other training categories that are components of both general military training and specialized training, the improvement of motor capacity must be a priority concern and fall into the category of first-rate objectives from the plan with the main activities of each military structure.

NOTES:

1 *** *Doctrina instruirii Armatei României*, General Staff, Bucharest, 2006, p. 19.

2 *Ibidem*, p. 16.

3 A. Dragnea şi colab., *Educaţie fizică şi sport – teorie şi didactică*, FEST Publishing House, Bucharest, 2006, p. 4.

4 *Ibidem*, p. 4.

5 Gh. Cârstea, *Teoria şi metodica educaţiei fizice şi sportului*, AN-DA Publishing House, Bucharest, 2000, p. 18.

6 A. Dragnea, *op.cit.*, p.135.

REFERENCES

*** *Doctrina instruirii Armatei României*, General Staff, Bucharest, 2006.

*** *Terminologia educației fizice și sportului*, Sport-Tourism Publishing House, Bucharest, 1978.

Cârstea Gheorghe, *Teoria și metodica educației fizice și sportului*, AN-DA Publishing House, Bucharest, 2000.

Dragnea Adrian, *Educație fizică şi sport – teorie și didactică*, FEST Publishing House, Bucharest, 2006.

http://www.maraton.info.ro/notiuni-elementare-despre-eforturile-aerobe-si-anaerobe.html

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-55

USING THE BEEP TEST AS AN ALTERNATIVE TO MEASURING THE MILITARY'S AEROBIC CAPACITY

Lt.Col.Sup.Instr. George-Florin BĂIŢAN, PhD*

Physical training in the Romanian Army generally keeps up with the main line of training of other NATO states, having the same training principles and fundamental ideas on the positive effects that the military's motor capacity can have on the development of military actions and successful fulfillment of entrusted missions. At the same time, there is an obvious need to develop (or revise the existing ones) in the Romanian Army modern tools (concepts, methods, regulations and manuals specific to military physical education) to form the basis for training and training of fighters, as there are in strong armies, recognized for their emphasis on the physical training of the military..

Keywords: Beep test; endurance running; maximum aerobic capacity; physical trening.

During the process of measuring the performance of the military, several decisions must be made regarding the choice of methods used and the interpretation of the data collected. A wide range of tools are used to assess skills in the cognitive (knowledge assimilation and intellectual capacity building), affective (attitude, belief and feeling formation) and psychomotor (motor and practical behavior training) areas. First, it is very important to properly determine the areas in which the educational objectives to be set are planned. Second, specific objectives need to be developed and appropriate tests selected that can measure and highlight in a real and valid way the objectives set. Finally, when the data are collected, the conclusions of the evaluation can become norms or reference criteria.

"Evaluation in military physical education involves checking, assessing and grading those tested. Military verification involves the application of techniques to know the changes produced by participation in training, based on predetermined objectives, and involves physical effort as a result of taking a sports test. The accuracy of the verification is determined by the quality of the instruments used, by the way in which they are applied and by the knowledge necessary for their objective application. The assessment represents the value judgment of the results, a reflection of the effort made by the military in training. It is all the more objective as the evaluation criteria are more accurate and can be measured and quantified accurately. Scoring is the activity of transforming the assessment of results into grades (in military educational institutions) and grades (admitted or rejected - for training units)"[1].

The armed forces are constantly changing, with increasingly sophisticated equipment leading to strict specialization. Different requests are the reason why, in addition to the usual (basic) tests, there should probably be different special assessment and recruitment tests. Physical performance testing should be a natural part of all training, because its results measure the improvement of physical condition, predict future performance, signal weaknesses, allow the evaluation of the quality of the training program and, above all, motivate continuous training.

Beep Test

The "Beep" endurance test, frequently used to determine the maximum aerobic capacity (VO2 max), can be found in the literature under several names, such as: "Multistage Fitness Test" (MSFT), "Leger test", "Pacer test" or "20 meters shuttle run test". Regardless of its name, this test, extremely simple and conclusive, can perform a standardized assessment of the level of physical training of the military, estimating what is the highest level of oxygen consumption reached by them, in maximum effort.

The great advantage of this test is that it gives you an objective measurement that will show you if your fitness level is what you need. On top of

* *"Ferdinand I" Military Technical Academy*
e-mail: *baitan_george_florin@yahoo.com*

that, it is also very simple, without the need for any sophisticated equipment. If you can mark a straight line on a flat surface over a distance of 20 meters and if you can download an mp3 file or use an application on a mobile phone, then in about 10-15 minutes you will even be able to self-evaluate.

The Beep test was originally designed in 1983 by Professor Luc Léger, a PhD degree holder in physical education, of the University of Montreal[2] in order to test a person's fitness level. Subsequently, in 1988, the test was republished in its current form (after small adjustments were made) in the European Journal of Applied Physiology.

One of the important components of the military's physical training is endurance (aerobic exercise capacity or cardio-respiratory endurance). When it comes to the physical endurance of the military, we must inevitably determine what is their maximum aerobic capacity (VO_2 max), well the highest level of oxygen consumption reached in maximum effort.

The main purpose of the Beep test is to measure aerobic capacity (cardio-respiratory fitness), being a good predictor of the maximum amount of oxygen that can be used by a serviceman. It has an upper limit on the transport and use of oxygen in the body, and this rate of oxygen consumption is proportional to the performance obtained in aerobic exercise capacity tests (performance improves when VO_2 max increases)[3].

To accurately measure and determine the value of VO_2 max (a cardio-metabolic test), you must be connected by specific devices to a treadmill in clinical laboratory conditions and wear a mask that can accurately monitor how much oxygen you use during the effort. Given that military units do not have such a facility, in order to estimate the aerobic capacity of the military, evaluation tests on endurance running on flat or varied terrain are used. Instead, under some conditions, a better alternative would be to use the Beep test, which makes testing the VO_2 max level a bit simpler and easier.

VO_2 max is measured in milliliters of oxygen, per kilogram of body weight, per minute (ml/kg/min), and the values recorded in women compared to men are lower, their difference being between 10 - 25%, depending on the level of training physical. Also, these values decrease with age and increase the percentage of fat, a situation in which the ability of the cardiovascular system to deliver oxygen to the tissues is no longer influenced too much by the level of training. Numerous studies[4] have shown that the value of VO_2 max increases in the case of intense and short workouts, in which to vary the intensity of the effort (such as Fartlek type workouts[5]).

Taking the Beep test as a model, over time various similar versions have been published online, so we must be careful when installing the program in order to select the original one[6]. This test is one that involves maximum effort, which requires an above average physical condition, not recommended for people who play sports as a means of recreation, who have health problems, joint / muscle injuries or a low level of fitness.

The Beep test is used by various sports organizations or federations as an entry test or as a periodic verification test. Currently, this form of testing is used by the armies of the following NATO member countries, such as the USA (when admitting all categories of personnel into the system), Canada (only for military students and special forces) and France (for the Foreign Legion), United Kingdom, Norway, Denmark, for the purpose of periodic annual testing or for admission to the system. In various forms the test is also used by other countries in the alliance (such as Germany, Poland or Greece) or outside the alliance (Sweden – only for officers, Australia, New Zealand, etc.).

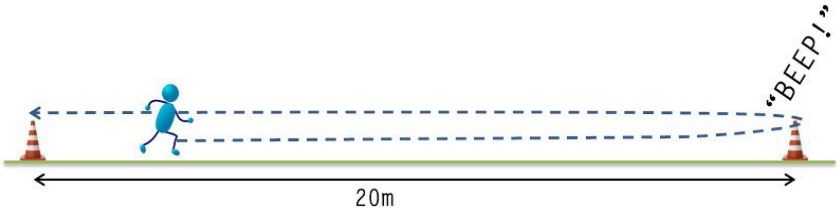


Figure 1 *Running diagram for the "Beep" endurance test*

Simply put, the Beep test involves a continuous run (back and forth) between two parallel lines, located 20 meters apart, synchronizing the pace of movement with an audio recording that emits beep-like beeps (hence the name test) at regular intervals.

Before the assessment begins, the military must stand behind one of the lines and listen to the latest audio instructions recorded or processed by the task leader regarding the conduct of the test. At the command "Attention! - Beep! - Start!" (English: "Ready! - Beep! - Start level 1-1!"),[7] the player runs to the opposite line. At first, the pace of movement is quite slow, the serviceman continuing to run between the two lines, returning only when he hears the Beep. After about a minute (the duration of a level is between 60 - 66 seconds), another type of sound (a triple Beep with different tones) indicates the transition to the next level which involves an increase in running speed (so there will be more beeps to be heard). As the test continues, the interval between the beeps decreases with each pass to a higher level, forcing the military to increase their speed. The evaluation will end when they are no longer able to keep up with the recording.

Table no. 1

BEEP TEST PARAMETERS

Level	Number of rounds	Number of cumulative rounds	Speed of running (km/h)	Travel time / round	Total time / level (sec)	Total cumulative time (min:sec)	Traveled distance / level (meters)	Traveled cumulative distance (meters)
1	7	7	8.5	9.01	63.07	1:03	140	140
2	8	15	9.0	8.00	64.00	2:07	160	300
3	8	23	9.5	7.58	60.63	3:08	160	460
4	9	32	10.0	7.20	64.80	4:12	180	640
5	9	41	10.5	6.86	61.71	5:14	180	820
6	10	51	11.0	6.55	65.45	6:20	200	1020
7	10	61	11.5	6.26	62.61	7:22	200	1220
8	11	72	12.0	6.00	66.00	8:28	220	1440
9	11	83	12.5	5.76	63.36	9:32	220	1660
10	11	94	13.0	5.54	60.92	10:32	220	1880
11	12	106	13.5	5.33	64.00	11:36	240	2120
12	12	118	14.0	5.14	61.71	12:38	240	2360
13	13	131	14.5	4.97	64.55	13:43	260	2620
14	13	144	15.0	4.80	62.40	14:45	260	2880
15	13	157	15.5	4.65	60.39	15:46	260	3140
16	14	171	16.0	4.50	63.00	16:49	280	3420
17	14	185	16.5	4.36	61.09	17:50	280	3700
18	15	200	17.0	4.24	63.53	18:53	300	4000
19	15	215	17.5	4.11	61.71	19:55	300	4300
20	16	231	18.0	4.00	64.00	20:59	320	4620
21	16	247	18.5	3.89	62.27	22:01	320	4940

The distance of 20 meters (a turn) is considered to be covered regularly if the serviceman reaches the opposite line with at least one foot (putting the sole on the line) before the Beep sound goes off. At this time, the resumption of the run must be done only after the beep is heard, the departure before it being forbidden and sanctioned with a warning. The same is true if the line is not touched before the Beep. In this situation, the examinee must continue running towards the target line, reach it and try to re-enter the required tempo. In both cases, the test is stopped if, after receiving a warning, the serviceman fails (twice in a row) to fall into the cadence of the beeps.

The score obtained by an examinee is represented by the level and number of complete laps (20 meters) completed regularly, before he can no longer keep up with the registration. Consisting of 21 levels, the Beep test starts with a speed of 8.5 km/h, and after each level (which lasts just over a minute), it increases by 0.5 km/h (according to the parameters mentioned in table 1). If you manage to reach the end of the test, it means that 22 minutes and a second have passed, you have covered the distance of 4.94 km (running in the last level with a speed of 18.5 km/h) and you should call Guinness World Records to record your performance, because no one in the world has managed this so far.

The world record for most simultaneous participants in a Beep test was set on the morning of December 14, 2017, by 941 cadets of the Military College in Harrogate (UK)[8].

The Beep endurance test has several advantages over other methods of assessing the level of aerobic capacity of the military (such as classic endurance running or running in various terrains), such as[9]:

- it is easy to manage and does not require the possession of sophisticated equipment, just a program downloaded for free from many websites and installed on your computer, tablet or Smartphone and a portable speaker with Bluetooth or some headphones. The size of the file in MP3 format is about 5 MB and it only takes a few seconds to download;
- very little space is needed, any flat ground without obstacles, marked with milestones, being very good (at least one corridor with a length of 20 meters and a width of one meter for each serviceman, meaning 20 m^2);
- it is not necessary to perform a long heating, because the test itself starts very easily, after which it gradually becomes faster and faster (we can consider that the first three levels represent a period of built-in heating). Ideally, without exaggeration, a warm-up should be performed before the start of the test, lasting about 5-10 minutes, comprising an easy run, some dynamic stretching exercises and short runs with changes of direction and rhythm;
- it can be executed individually or in groups (see the world record of 941 participants at the same time), as long as there is a flat surface with a length of 20 meters and a width of 1 meter for each serviceman;
- can have a social character by the fact that the servicemen who perform the test in a series, during the first levels, when the pace is low, can talk to each other. Then, as the intensity increases, they will become quieter and quieter, and after they stop or are eliminated, they can continue to encourage those who have not yet completed the test;
- there is the possibility of following all participants, by evaluators or spectators, throughout the test;
- regardless of the level of physical training of the military, they will always be close, without moving away from each other more than a few meters;
- it has been tested and researched very well, there are numerous studies that demonstrate the accuracy of the results obtained[10];
- it develops in the military other motor qualities in addition to aerobic endurance, such as dexterity (coordination of movements) or speed (reaction, acceleration);
- it can also be used in the activity "Sport for all" (complementary part of the training process) by a large number of sericemen, in different forms: to measure the level of fitness (especially endurance) as an alternative to assessment, traveled in the form of a competition to compare the result obtained with that of colleagues, to set a new personal record, per unit or army, or simply to attract staff from the unit to engage in physical activity in an organized manner.

As a matter of fact, in the case of the Beep test, the servicemen who are more trained will finish the last test (as opposed to running endurance on a set distance when they finished first), giving the other participants the opportunity to applaud them at the end for their performance.

Regarding the disadvantages of the Beep test, we can list the following aspects:

- in order to record a genuine result, the level of motivation of the military must be high (the performance achieved during training is not always the real one, because the level of motivation is lower than during a formal evaluation);
- in order to obtain a better score, the technique of turning and running in a straight line (on a trajectory perpendicular to the two lines drawn on the ground) must be learned, strengthened and perfected. It is enough to tread the line with one foot, it is not necessary to pass the body (total or partial) along the line. Any step performed along the line or turn that describes the shape of the

letter U, theoretically, represents unnecessary energy consumption and is added to the total distance traveled at the end. A recommendation would be to use the legs alternately to reach the two lines, which helps to distribute the pushing effort and to offer a concern to the military to keep their minds occupied. As a technique for performing turns, it is recommended that you perform a lateral turn of the body on the last two steps before the line, place the sole of the front foot (as far as possible) parallel to the line, and place the other leg straight (as far as possible), with the tip towards the next line, ready to push into the ground and move the body in this direction. The importance of making correct returns to the Beep test is the same as the significance of a return in a swimming test.

• if practiced outdoors, extrinsic factors such as atmospheric conditions (extreme temperature, wind, rain, etc.) may affect the result obtained.

In the beginning, when they first get in touch with this test, most examinees will get scores below their own aerobic possibilities due to psychological limitations. At some point, when the test starts to get difficult and your body gets tired and tells you it wants to give up, you should not give up easily. When this happens, you have to make up your mind to play the role of being relentless, being surprising how far an attitude like "I will not stop yet, I'm trying to take another turn" can take you. In order to give you extra motivation not to give up in the difficult moments during the test, it may be useful to have a colleague on your side to encourage you. At the same time, you need to focus your thoughts on something else, avoiding focusing on how difficult the test is.

When the test is performed in a group, it is tempting to focus too much on the evolutions of the other participants, ending up formulating in your mind a lot of useless questions and comparisons, such as: "should I keep up?", "Am I faster than him?", "they don't seem as tired as I feel". Do not try to run at the pace of another colleague, but keep the pace of the beep on the recording. Usually, among the first servicemen to give up earlier (stop) are those who run the fastest at first. It is advisable to save energy for higher levels, and at the beginning to use an easy run.

Implementation of the Beep Test in the periodic verification of the military

Currently, the assessment of the level of physical training for military personnel is mandatory twice a year by taking a physical test consisting of three tests (floats, abs and running distances between 1000 m - 3000 m, depending on gender, group age and type of military unit / subunit / structure)[11]. Endurance running is performed inside military units on makeshift routes or using athletics tracks in the few units that have a proper sports base. At first glance, the test seems relatively easy to administer, requiring only the measurement and marking of a route, the possession of a timer and the presence of trained staff to help coordinate and note the performance of participants. However, it is not always possible to perform this test under acceptable conditions, due to restrictions/ constraints/limitations imposed by the military environment, such as:

• establishing an inadequate route, running on a hard surface (concrete, asphalt, cubic stone, gravel, frozen ground, etc.) that can cause serious injuries over time to anatomical structures (ligaments, joints, tendons, muscles);

• lack of security and safety measures for military personnel carrying out physical activities in military bases in theaters of operations, during participation in NATO missions and operations;

• lack of space to establish a running route (on board ships, in small military units as a surface – military centers, military museums, military hospitals, etc. – or in those located in mountainous areas facing the lack of land "on as flat as possible");

• the impact of unfavorable environmental conditions for a long period of time (heat wave, frost, storm, etc.).

Given all these limitations and the fact that more and more non-NATO armies are developing their information and communication technology by creating programs for military surveillance using satellites/drones (which can monitor the movement of enemy troops, including their physical training), I believe that an alternative way to assess the resistance of the military to be used by the Romanian armed forces could be the Beep test.

Both the classic endurance running included, at this moment, in the half-yearly check of the level of physical training of the Romanian Army servicemen, and the Beep test proved to be good

predictors of the maximum oxygen absorption and, therefore, it estimates very well aerobic performance. The correlation between the performances obtained by the military in both tests was established by conducting a study respecting the principles of scientific research. Partial results were published in my own doctoral thesis[12], and I continued my research over the next three years by collecting and monitoring the performance obtained (in endurance running and the Beep test) by over 500 military students and active military personnel (included in all age groups), thus allowing the extension of the degree of analysis to a complex level, and the results being much closer to objectivity. In this regard, we have developed a summary table (Table no. 2) which shows us the minimum scales (marked with 50 points) that must be met (depending on age and gender) for the military to be declared "admitted".

At the same time, we extended the research to the situation where the assessment must be completed by awarding grades (in the case of military students, who usually fall into the age group between 18 and 25 years). For example: a male military student who scored 10/7 on the Beep test will be awarded a grade of 9 – the equivalent of 90 points. Note that:

- the score achieved in the interval 3/5 - 6/9 (distance covered between 400 - 1000 meters), for each additional lap (20 meters) 2 points are awarded;
- the score achieved in the interval 6/9 – 11/6 (distance covered between 1000 - 2000 meters), for each additional lap (of 20 meters) 1 point is awarded.

The optimization of the system for evaluating the level of physical training of the military in the Romanian Army can be done in a first phase by implementing simple measures, which will manage more efficiently the instructive-educational process in the field of military physical education, as follows:

- reduction of the number of age groups (from 7 to at most 5 – according to Table no. 2);
- awarding grades or a score (for all tests in the test) to prevent the military from stopping execution when they reach the minimum scale and pass it in the annual service marks;
- equalization of the running distance at the endurance test with the maintenance of different scales depending on gender and age;
- the introduction of alternative endurance running tests that also assess the aerobic endurance

Table no. 2

EVALUATION OF THE PERFORMANCE OBTAINED IN THE BEEP TEST (PROPOSAL AS AN ALTERNATIVE TO THE ENDURANCE RUNNING TEST)

Beep Test		Age (years old) / gender (M - masculine, F - feminine)									
Score obtained (level / rounds)	Traveled distance	18 - 25		25 - 35		35 – 45		45 - 55		Over 55	
		M	F	M	F	M	F	M	F	M	F
3 / 5	400 m	--	--	--	--	--	--	--	--	--	50
4 / 2	500 m	--	--	--	--	--	--	--	50	--	60
4 / 7	600 m	--	--	--	--	--	50	--	60	50	70
5 / 3	700 m	--	--	--	50	--	60	50	70	60	80
5 / 8	800 m	--	50	--	60	50	70	60	80	70	90
6 / 4	900 m	--	60	50	70	60	80	70	90	80	100
6 / 9	1000 m	50	70	60	80	70	90	80	100	90	--
7 / 9	1200 m	60	80	70	90	80	100	90	--	100	--
8 / 9	1400 m	70	90	80	100	90	--	100	--	--	--
9 / 8	1600 m	80	100	90	--	100	--	--	--	--	--
10 / 7	1800 m	90	--	100	--	--	--	--	--	--	--
11 / 6	2000 m	100	--	--	--	--	--	--	--	--	--

of the military, such as the Beep test, rowing on an ergometer, cycling on a fitness bike, running on a treadmill, swimming in a swimming pool, etc .;

• the introduction of control tests or exercises to replace the current floats and abs, and to have more applicability on the battlefield (see FORCE Evaluation in the Canadian Army or Army Combat Fitness Test in the US Army).

In 2017, Dr. Stefan Kolimechkov, a coach who worked at the Elite Gymnastics Academy in London, along with several colleagues from the National Sports Academy in Sofia developed a computer software program called Beep Shuttle, created specifically to administer the data provided following the application of the Beep test. Consisting of two applications (for children / adolescents and adults) this program displays in real time all the parameters of the test (mentioned in Table no. 1), calculates VO2 max (maximum aerobic capacity) according to the characteristics of those evaluated (age, gender, height, weight) and evaluates the results obtained by awarding grades based on international standards published by the American College of Sports Medicine[13].

If the Beep Test is going to be used in the Romanian Army as an alternative option for measuring the aerobic capacity of the military, the Beep Shuttle program can be taken over and adapted so that specialists in the field of military physical education can use it in the military evaluation process.

Conclusions

This test designed by Luc Léger is one of the most popular forms of assessing the level of physical training of individuals, their physical and mental endurance. In addition to the fact that it tests your basic physical qualities, the Beep test also highlights some character traits such as the will to fight continuously and not to give up in difficult moments from a physical point of view. For someone who is part of the military system (or wants to be part of it) it is not exactly recommended that he simply give up due to fatigue, during a challenging situation. The military must show determination and courage, not show weaknesses and be able to perform in difficult environments or in extreme conditions. The Beep test will push you to the limit of your maximum physical possibilities and beyond, what any specialist in the field wants to see in the military they evaluate.

The Beep test is a new trend in assessing the level of physical training of the NATO military, with the US Army itself implementing this verification test for candidates wishing to enter the military system. This test can provide military specialists in physical education and sport with a practical means of determining the aerobic capacity of the military when space is limited; the route is unsuitable for outdoor running or when environmental conditions are unfavorable. The suggestions made in this written submission can help military organizations wishing to assess the aerobic capacity of their personnel (on periodic or initial tests – on entry into the system) by offering an alternative, namely the Beep test.

NOTES:

1 G.C. Ciapa, *Romanian Army servicemen's physical training in modern conflict,* "Carol I" National Defence University Publishing House, Bucharest, 2018, p. 50.

2 http://www.bitworks-engineering.co.uk/linked/eurofit%20provisional%20handbook%20leger%20beep%20test% 201983.pdf, accessed on 24.03.2019.

3 https://adrenallina.ro/ce-este-vo2-max-si-cum-variaza-de-la-un-sportiv-la-altul, accessed on 24.03.2019.

4 https://www.runnersworld.com/training/a26066029/increase-vo2-max, accessed on 04.04.2020.

5 Fartlek means running at different paces.

6 https://beeptestacademy.com/beep-test-download

7 After the Beep sonar signal, the level and speed to be traveled are communicated.

8 https://www.strayfm.com/news/local-news/2454829/watch-harrogates-army-foundation-college-attempt-world-record, accessed on 05.04.2020.

9 G.F. Băiţan, *Romanian Army servicemen's physical training in the framework of NATO integration,* "Carol I" National Defence University Publishing House, Bucharest, 2019, p. 223.

10 A. D. Flouris, G.S. Metsios, Y. Koutedakis, *Enhancing the efficacy of the 20 meters multistage shuttle run test*, Br J Sports Med., no. 39, 2005, p. 40.

11 *Military Physical Education Regulations*, Publishing House of the Technical-Editorial Center of the Army, Annex no. 5, Bucharest, 2013.

12 G.F. Băiţan, *Romanian Army servicemen's physical training in the framework of NATO integration,* "Carol I" National Defence University Publishing House, Bucharest, 2019, pp. 220 - 239.

13 https://www.stk-sport.co.uk/beepshuttle-software.html, accessed on 10.04.2020.

REFERENCES

*** *Military Physical Education Regulations*, Publishing House of the Technical-Editorial Center of the Army, Annex no. 5, Bucharest, 2013.

Băiţan G.F., *Romanian Army servicemen's physical training in the framework of NATO integration*, "Carol I" National Defence University Publishing House, Bucharest, 2019.

Ciapa G.C., *Romanian Army servicemen's physical training in modern conflict*, "Carol I" National Defence University Publishing House, Bucharest, 2018.

Léger L.A., Lambert J., *A maximal multistage 20m shuttle run test to predict VO2max*, European Journal of Applied Physiology, vol. 49, 1982.

Léger L.A., Gadoury C, *Validity of the 20m shuttle run test with 1 minute stages to predict VO2max in adults,* Canadian Journal of Sport Science, no. 14:1, 1989.

Tomkinson G.R., Léger L.A., Olds T.S., Cazorla G., *Secular trends in the performance of children and adolescents (1980–2000): An analysis of 55 studies of the 20 m shuttle run in 11 countries,* Sports Medicine, no. 33, 2003.

https://adrenallina.ro/ce-este-vo2-max-si-cum-variaza-de-la-un-sportiv-la-altul

https://www.runnersworld.com/training/a26066029/increase-vo2-max

https://www.strayfm.com/news/local-news/2454829/watch-harrogates-army-foundation-college-attempt-world-record

https://www.stk-sport.co.uk/beepshuttle-software.html

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-56

THE IMPORTANCE OF PHYSICAL TRAINING IN THE MILITARY USING THE SANDBAG FOR FITNESS

Lt.Col.Sup.Instr. George-Florin BĂIȚAN, PhD*

Functional training initially applied only in rehabilitation centers for war veterans has become very popular lately in the fitness community. You need to be able to perform physically, not just look good. Training using the sandbag for fitness forces the body to become stronger and more agile in different postures, it trains you to move more efficiently and to carry out daily activities more easily and efficiently. By means of physical exercises, you are forced to overcome any situation that you encounter in the military environment and, in order to improve this capacity, you must use training programs that imitate the activities of daily living.

Keywords: sandbag, fitness; physical exercises; fitness; training; education.

When we talk about maintaining our fitness, we can all be found guilty of the fact that, from time to time, we complicate ourselves and use training exercises that later prove to be less effective for the physical training of the military. Given the variety of options available in this regard, it is difficult not to be overwhelmed by something that is not suitable for meeting the objectives of military physical education through which the model of the fighter is achieved. The sandbag is a simple fitness accessory used for performing multifunctional exercises that help you tone all your muscles. When you see the benefits of sandbag training sessions and what it can do for your body, this training process may become your new preferred method of training.

Figure 1 *Different models of sandbags*
Source: *https://www.ultimatebodypress.com; https://gymbox.de; https://www.menshealth.com*

Undoubtedly, physical training using sand-filled bags has been practiced since ancient times, but it was not until the beginning of the last century that it was recognized as a legitimate form of physical training. There is ample evidence that the sandbag was used as a sports material, which capitalized on physical exercises in well-structured training, especially by Indian wrestlers who practiced Pehlwani[1] (a form of sports competition that arose through the combination of two established ancient melee styles: Malla-yuddha[2] and Varzesh-e Bastani[3]). Pehlwani comes from South Asia and is considered a complete form of fighting in India. Fitness sandbags are still used today by athletes who practice a martial art or a contact sport, but more and more people in the field of physical education recognize that they are a very good tool for increasing fitness and performance sports, regardless of the motor activity performed.

The Fitness Sandbag

When you want to replace dumbbells and dumbbells, the sandbag for fitness (sandbag) is the

* *"Ferdinand I" Military Technical Academy*
e-mail: *baitan_george_florin@yahoo.com*

most effective alternative. Similar to a cylindrical boxing bag, it has different grip and support options that help you work in turn the muscles you want to train and can be perfectly adapted to all types of training. This way, it offers diversity to the training and allows the performance of a varied number of exercises (lifting, throwing, gripping or balancing). Made of a quality vinyl material and filled with sand, the sandbag can have different sizes and weights, depending on the manufacturer. It is easy to use and helps you increase the intensity of classic exercises, being able to gradually develop fitness in the military (as you progress in training, you can choose heavier weights).

No matter what type of sandbag you use, bought from the store (probably more durable, may have extra features such as handles, needed for some exercises that involve them) or made by you (pay attention to the type of sand used in order to produce as little dust as possible), you should not let your budget influence any positive results, as the advantages and benefits of using a sandbag remain the same:

1. The load can be changed constantly because the weight is adjustable by adding or removing so-called filling bags. Performing exercises with a constantly changing load poses a serious challenge even for servicemen with a high level of physical training. Over time, by practicing this type of physical activity systematically and repeatedly, you will certainly acquire or improve a more efficient style of lifting materials, but attention must be paid to execution, because the sandbag will always punish a poorly executed technique;

2. Exercises performed during training sessions that use the sandbag for fitness have their applicability in real life. They can be used as a representation of another person, which is perfect for anyone involved in contact sports or for those who are part of public institutions of defense, public order and national security (army, police, fire, etc.).

3. Constantly, when you lift a sandbag, you improve your grip (of the whole hand) and work your forearms, because almost every exercise you perform requires you to grab and hold the sandbag. This is especially noticeable by the military who begin such training by the appearance, in the first days, of muscle fever in the muscles of the hands and forearms.

4. Sandbag training develops mental endurance as well as physical strength in the military. There are some sandbag exercises that can exhaust an athlete as quickly as an athletics-specific training session. In fact, just putting the sandbag in position or transitioning between exercises is a challenge in itself. All these things create a serious mental resistance, an ability of the mind to withstand any pressure constructively and to find quick solutions or to elaborate brilliant ideas.

5. All motor qualities will be developed with the help of exercises through which the body moves unrestrictedly (without limits) in all three plans of movement (sagittal, frontal and transverse). The sandbag allows evolution in all these plans, involves the whole body, and the demands take place both physically and mentally. This is an important aspect of sports training or the ability to perform daily tasks, but also a means of preventing injuries (or rehabilitation after certain injuries) and maintaining general structural health.

While body shape (there are three general typologies: ectomorphic, endomorphic, and mesomorphic), diet, and a number of other factors will dictate what an individual looks like, there are a number of defining elements (key competencies) that trainers present using sandbags:

1. Holding a sandbag for fitness develops amazing psychomotor skills (general grabbing and grabbing objects), especially if you use one without handles. And the tightening action is not only attributed to the muscles of the hands and forearms or wrists, but also to the shoulder joints (scapulo-humeral) and elbows which also stimulate a whole range of "tightening" muscles ("bear hug"). If the sport you practice or your daily activities involve performing strong grips (manual handling of materials – frequent physical activity in military operations[4]), then you need to train with sandbags.

The grip force is something that tends to decrease with age, and most military personnel do not attach importance to it, despite the fact that it is essential for everyday life. Physically preparing using the sandbag, you have no choice. Using the handles or sticking your fingers in the bag to catch it and get a good grip needed to handle it, will definitely increase your ability to hold and lift other objects in everyday life.

"Manual handling of materials can be defined as any situation involving the movement of objects

(vertically or horizontally) from one location to another using the body, especially the hands. This is done by lifting, transporting, supporting, lowering, pushing and pulling objects with your hands or body. Manual material handling is the most common physically demanding activity, common to most non-sedentary occupations, both military and civilian"[5];

2. Once you get into a constant rhythm of training, work hard and respect the correct execution of exercises, the inevitable result of maneuvering the sandbag for fitness is an increase in muscle mass and strength (brute force). Look at this type of strength training, in which the muscles of the whole body develop, as a possible way of working and do not seek to limit yourself only to working out in the gym. It is possible to develop an efficient style of sandbag handling, but it will never be a technique to present yourself at an official strength competition (power lifting or strongman), because the sandbag does not allow you to apply the same biomechanical principles.

3. When performing an exercise in which you use regular dumbbells, you only need a few repetitions to catch the movement, which is not possible when using a sandbag for fitness, because its center of gravity will change permanently, due to the fact that the sand moves from side to side. Thus, every movement you will try during the training will come with its own challenges, an aspect that will attract you to the physical exercises with the sandbag. Every time you try to handle the sandbag, it will behave differently, forcing your body to be vigilant and react to challenges.

Lifting a sandbag that is in constant motion requires a constant balance of the body, which develops, like few other things, your stabilizing muscles. It should be noted that the human body does not have stabilizing muscles; this name comes from the description of what these muscles do. They act to stabilize a joint so that the movement we want to perform can be performed in a similar shape. Usually, these muscles are not directly involved in a movement, but they work to keep you balanced so that the primary muscles can do their job. You just cannot underestimate the balance and control needed to lift a heavy sandbag. Regular lifting of the fitness sandbag builds a strong and stable musculoskeletal system.

Many servicemen overlook the functionality and intensity that sandbags offer to training. Only if you consider the different types and training options available to you, will you see clearly how beneficial such training can be. In this regard, we have listed just a few of the many benefits you will get using this form of training.

The basics of training, using sandbags for fitness

Just as you use most gym equipment or fitness equipment, you can use the sandbag as a weight that replaces traditional strength training options (dumbbells, discs, etc.). Using the sandbag, you can start training with the execution of standard strength programs (such as "Start Strength"[6] or "Wendler 5-3-1"[7]), because it can be used perfectly for performing classic exercises, such as: kneeling, straightening, pushing from the chest to the supine position and "Clean and Press" (dumbbell style). But if you use the sandbag for fitness only in these two strength programs, then you will not benefit from the most important advantages that this training method can offer.

The sandbag is a variable and awkward load with "built-in instability". The farther this load is from your center of gravity, the harder you will have to work to stabilize it. Therefore, exercises such as sandbag straightening do not have that inherent factor of instability. Therefore, it is much better to focus more on performing "unique exercises", which will be much more effective than using traditional means to develop strength. This means a lot of work with the sandbag over your head and the use of working positions and sockets as diverse as possible.

The basic physical exercises using the fitness sandbag to be included in any military training program are:

• *Shouldering* is a relatively simple exercise in which you have to lift (using both hands) the sandbag from the ground (it is positioned between your legs) and place it on one shoulder. But you should not be fooled by the simplicity of the exercise because, if you do not focus on the execution technique to be correct and you will try to lift the bag using any means, then you may have medical problems;

• The style of dumbbells (*Clean and Press*) is a combination of two exercises that are performed one after the other and consists of lifting the bag from the bottom to the chest (at shoulder level),

then raising it above the head by stretching the arms up (pushing from the chest). The sandbag is one of the best tools to safely learn this complex movement and is the perfect tool to prepare any serviceman who wants to progress to execution with an Olympic bar;

• The military press (*Overhead Press*) is a physical action similar to the second part of the previous exercise with the difference that, this time, the grip on the bag is made from the side, and the legs must always be stretched, and consists in lifting the bag. to the chest above the head, until the arms are in maximum extension;

• Moving *Bear Hug Load Carry* is the type of exercise for which the sandbag was designed for fitness. It consists in taking the bag in his arms, grasping it with his hands and transporting it on the determined distance/established itinerary.

to the basic motor qualities, and the handling skills of sandbags. These are:

• *Overhead Walking Lunge* with the bag over the head with the arms outstretched, and when stepping, the knee of the hind leg touches the ground. As variants, the bag can be positioned on the shoulders behind the neck or held tightly to the chest;

• *Rational Lunge* is an exercise performed from the standing position in which forward / backward (backward) bending is performed, while twisting the torso to the left / right (or alternately), holding the bag from the side with both hands;

• *Press-Out Lateral Lunge* performed simultaneously with bringing the bag from the chest forward, until the arms are stretched horizontally;

• *Windmill* consists of lifting the bag from the ground, with one hand, from the position sitting

Figure 2 *Basic exercise using the sandbag for fitness*
(a. Shouldering, b. Clean and Press, c. Overhead Press, d. Bear Hug Load Carry)

Source: *https://www.ultimatebodypress.com; https://gymbox.de; https://www.menshealth.com*

Lifting and transport, two of the tasks that involve the manual handling of materials, are among the most common physically demanding activities performed by the military.

For each of these exercises, you need to adjust your sandbag to a weight that is somewhat challenging, but at the same time allow you to perform the movements correctly from a technical point of view (it is very simple to remove/add a weight from/inside the bag). As you gain weight, you will notice that some muscles develop that you did not even know existed. These fundamental movements will provide you with a strong basis for the further development of resistance strength.

For the military with more experience in handling sandbags, I will list below some of the many exercises that can develop them, in addition

away, with the opposite arm raised vertically (and held in this position throughout the execution). The exercise can also be performed in the difficult version, in which the bag is held in the hand raised vertically above the head, and the movement is to touch with the other hand, without bending the legs, the tip of the opposite foot;

• Lifting from the ground (*Get Up*) is performed from the supine position, with the bag positioned on one shoulder and held only by hand on the same side, the movement consisting in lifting in the sitting position with the bag (all the time) on the shoulder and without touch it with the opposite hand;

• *Bear Hug Squat*. As variants, the bag can be positioned on one shoulder, above the head or on both shoulders at the nape of the neck;

• *Staggered Row* is done as follows: from a sitting position take a step forward with one foot, bend your torso at 45°, grab the bag of handles (which is on the ground in front of you) and lift until it touches the chest. When performing lifts the elbows (flexion of the forearms on the arms) lift the bag to the chin, describing a semicircular arch, without move (as far as possible) the initial position of the elbows.

"Practicing physical exercises, regularly, (repetitions), the torso and legs remain (as far as possible) motionless;

• *Front Loaded Good Morning* with the bag positioned on the chest and held with the arms wrapped around it underneath;

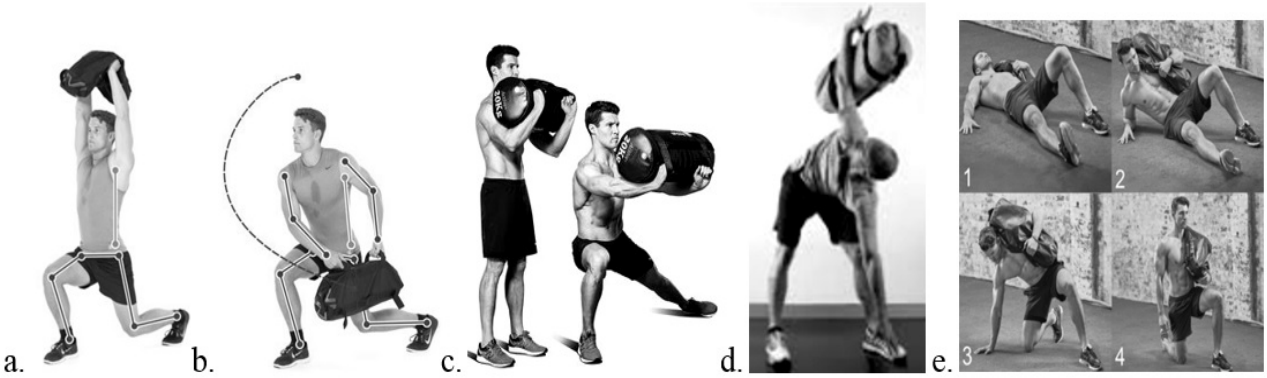


Figure 3 *Exercise using the sandbag (a. Overhead Walking Lunge, b. Rational Lunge, c. Press-Out Lateral Lunge, d. Windmill, e. Get Up)*

Source: *https://www.ultimatebodypress.com; https://gymbox.de; https://www.menshealth.com*

systematized and rational, translates into high physical performance, confidence in physical, intellectual and mental abilities, a quality level of life. Participation in physical training programs involves, on the part of practitioners, the display

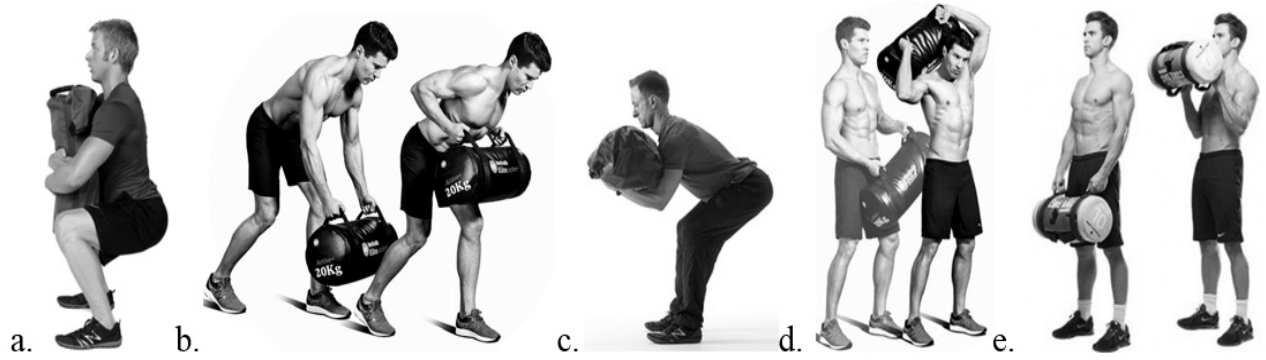


Figure 4 *Exercise using the sandbag (a. Bear Hug Squat, b. Staggered Row,* c. Front Loaded Good Morning, d. Around the World, e. Biceps Curl)

Source: *https://www.ultimatebodypress.com; https://gymbox.de; https://www.menshealth.com*

• Rotating the bag around the body *(Around the World)*, which is held with both hands. The exercise can be performed from the sitting, kneeling or sitting positions;

• Bending with the sandbag (*Biceps Curl*) is performed as follows: from the sitting position, holding a sandbag in front of the thighs, by bending of moral-volitional qualities (will, courage, etc.), consumption of material and human, physical and spiritual resources, combining the precision of actions with discipline in organizing a correct way of life and rational"[8].

Training in which the military uses sandbags for fitness may not be the most advanced training

methodology, especially from a technological point of view, but it is certainly effective. It is these characteristics of sandbags (unstable center of gravity, changing shape, etc.) which are considered by many servicemen to be inefficient and problematic, that are the qualities that make sandbags so beneficial for training. In addition, you can exercise anywhere and anytime using the fitness sandbag (at home, in a gym, outdoors on top of the mountain or at sea, inside the container when you are on a mission, on a military ship or on a military transport plane, etc.), as long as you have it with you.

Nowadays, when time is so precious, we have to adapt our workouts where they can be done, and the sandbag is an excellent solution. It requires the entire muscles of the body, reducing the time devoted to the training session, and its small size is perfect for easy storage between workouts or transport to another location. And because you do not need special equipment or a sports instructor, it is definitely cost effective.

Unless the bag is full of sand, every time the serviceman tries to handle it, there will be an uneven weight distribution inside it that will create instability. This will cause activation of the abdominal and lumbar muscles in particular to stabilize and control the movement of the bag. Restoring balance through various muscle contractions will not only lead to a stronger body but will teach the serviceman to perfect his perception of himself (proprioception).

The most obvious benefit of training in which sandbags are used seems to be simplicity. You do not have to invest money to benefit from the services of a sports instructor or read dozens of pages of methodology or biomechanics books to understand the basics. Of course, you have to pay attention to the correctness of the execution technique and the posture of your body during the repetitions, but half of the fun of training is to figure out for yourself how to handle the bag.

When it comes to training with sandbags for fitness, there is a great diversity of motor actions designed and programmed in order to achieve the objectives of military physical education, which is why it is difficult to get bored of this type of training. Not only are there many different exercises you can try, but when they start to get boring, you can change the position of your hands when gripping the bag (grips) or you can adopt other body positions (or parts of the body) to increase difficulty. Indeed, you will be limited only by your imagination.

Conclusions

The fitness sandbag is often seen as a "poor man's choice" for strength development, which is why there is a clear-cut distinction between the military who use it and those who train with traditional sports equipment. For some reason, we rarely find people constantly working on both ends of the spectrum. In conclusion, I would like to suggest that you should not give up the classic workouts carried out in a gym and live a sports life dedicated exclusively to the sandbag. Certainly, you can use exercise with the sandbag as the main form of strength training, if this suits your lifestyle. But I think that using the sandbag during training sessions to complete your traditional strength training (in which you use dumbbells, Olympic bars, kettle bells, etc.) will increase the body's ability to make long efforts.

The sandbag can be used to mimic a series of movements that we usually perform, developing both large and small muscle groups, preventing injuries and encouraging maximum physical performance. In part, these are the reasons why the sandbag is such a dynamic training tool. With a single sandbag, you can get a great full workout for the whole body when it is used properly. So get your hands on a fitness sandbag and start making progress in increasing your fitness level. , improving strength and functional movements, as well as gradually increasing mental endurance (to get out of the comfort zone easily, to see pain as a reward for overcoming limits, to embrace challenge, to face opponents with serenity, etc.).

NOTES:

1 https://masterfighting.com/pehlwani, accessed on 21.04.2020.

2 https://healthahoy.com/ancient-sports/malla-yuddha, accessed on 21.04.2020.

3 http://www.ferdowsihotel.com/Blog/PostDetails/33/Varzesh-e-Bastani-Iranian-ancient-sport, accessed on 21.04.2020.

4 G.F. Băițan, *Romanian Army servicemen's physical training in the framework of NATO integration*, "Carol I" National Defence University Publishing House, Bucharest, 2019, p. 175.

5 [SHARP, M.A. & Co.], A database of physically demanding tasks performed by US Army soldiers, Natick,

MA: US Army Research Institute of Environmental Medicine, 1998, p. 106.

6https://startingstrength.com/get-started/programs, accessed on 23.04.2020.

7 https://www.lift.net/workout-routines/wendler-5-3-1, accessed on 23.04.2020.

8 G.C. Ciapa, *Romanian Army servicemen's physical training in modern conflic",* "Carol I" National Defence University Publishing House, Bucharest, 2018, p. 80.

REFERENCES

[SHARP, M.A. & Co.], *A database of physically demanding tasks performed by US Army soldiers*, Natick, MA: US Army Research Institute of Environmental Medicine, 1998.

Băițan G.F., *Romanian Army servicemen's physical training in the framework of NATO integration,* "Carol I" National Defence University Publishing House, Bucharest, 2019.

Ciapa G.C., *Romanian Army servicemen's physical training in modern conflict*, "Carol I" National Defence University Publishing House, Bucharest, 2018.

Henkin J., *DVRT The Ultimate Sandbag Training System: For Dynamic Power, Superior Athletic Performance and Enduring Strength*, Kindle Edition, Dragon Door Publications, Inc, 2014.

Hirshberg B., *Sandbag Training Bible: Functional Workouts to Tone, Sculpt and Strengthen Your Entire Body*, Kindle Edition, Ulysses Press, 2015.

Jones B., Strossen R.J., *The Complete Sandbag Training Course*, Paperback, Ironmind Enterprises, 2004.

Palfrey, M., *The Complete Guide To Sandbag Training*, Kindle Edition, Sandbag Fitness; 1st Edition, 2014.

Rohmer, T., *Sandbag Training: Build a Fit & Functional Body Using Workouts That Are Efficient and Effective*, Includes Over 50 Different Sandbag Workouts, Kindle Edition, 2018.

https://masterfighting.com/pehlwani

https://healthahoy.com/ancient-sports/malla-yuddha

http://www.ferdowsihotel.com/Blog/PostDetails/33/Varzesh-e-Bastani-Iranian-ancient-sport

https://startingstrength.com/get-started/program.

https://www.lift.net/workout-routines/wendler-5-3-1

https://www.ultimatebodypress.com

10.12753/2284-9378-20-57

OPTIMIZATION OF THE EVALUATION PROCESS OF STUDENTS' MILITARY PHYSICAL EDUCATION FROM THE COMMAND MASTER'S DEGREE STUDY PROGRAMS, ORGANIZED BY "CAROL I" NATIONAL DEFENCE UNIVERSITY

Col.Adv.Instr. Alin PELMUȘ, PhD*

The article analyzes the evaluation activity in military physical education within the training process, in general, and of the students from the command master's degree study programs, organized by "Carol I" National Defence University, in particular. Also, during the article, the importance of the evaluation process is noted, and some solutions are presented that can contribute to its optimization.

Keywords: evaluation; military physical training; training; optimization; effect.

Human activity is an activity eminently oriented towards goals, which means that, regardless of its nature, a certain evaluation is required at a given moment. Looking at a general framework, in the training process, evaluation is a very complex phenomenon, often loaded with subjectivism. The theory and practice of evaluation in training records a wide variety of approaches and perceptions of the significance of evaluation actions. These are nuanced in relation to the understanding of the nature of the evaluation process, with whatever represents the object of this actions, with the functions it performs and with the ways of accomplishment. From the perspective of understanding the nature of this process and the way it is carried out, there are diversified points of view in evaluation theory.

Evaluation in training is "... a complex process of comparing the results of the instructive-educational activity with the planned objectives (evaluation of quality), with the resources used (evaluation of efficiency) or with previous results (evaluation of progress)"[1] or a "... a process of measuring and assessing the value of the results of the training system or of a part of it, of the resources, conditions and strategies efficiency used by comparing the results with the proposed objectives, in order to make decisions for development and improvement"[2].

***"Carol I" National Defence University**
e-mail: *pelmusalin@yahoo.com*

Therefore, the literature in the field includes a number of common views on the evaluation of training, as follows: this is not a product but a process, namely an activity carried out in stages over time; it is not limited to assessment and grading, but targets more complex areas (structures, training programs or the training system as a whole); it involves a large number of measures, comparisons, value judgments, based on which decisions are taken to optimize the activity in the areas subject to evaluation; it is nothing more than a measure of the staff training level / structures in relation to the performances provided in the standards.

Evaluation in military training can be seen as a set of processes through the performance of profile structures, subsystems and their components are assessed, measured and compared with the established objectives, to eliminate the deficiencies found and integrate positive deviations. The purpose of this activity is understood as a need to report the level, both of those who are trained and of the instructors, and to identify the place where they are compared to what they have proposed through the designed objectives. In other words, the purpose of the evaluation is to prevent the failure of training or to minimize it, ensuring an upward evolution of all military personnel.

In any type of management and, especially, in the management of military training, the evaluation must fulfill certain functions in accordance with the established criteria, aiming at its effects both individually and socially, as follows:

• *the function of control* or finding and appreciation of the activity and results obtained. By exercising this function, the evaluation also has the role of feedback, both for instructors and trainees;

• *the function of regulating the system* or improving the activity and optimizing the results;

• *the function of prediction,* orientation and anticipation of results, as a follow-up to the expected measures;

• *the classification and selection function,* based on which the military structures/training institutions and the personnel to be trained are ranked;

• *the certification function,* materialized in the issuance of study documents;

• *the educational function*, through which one becomes aware of, motivates and stimulates the interest for permanent study, for improvement and for performance;

• *the social function*, through which the information of the local communities, of the family etc. is realized on the results obtained[3].

In general, the functions of evaluation are intertwined, their distinct approach being usually imposed only by the didactic purpose. In relation to the purpose of the evaluation, some functions may have a higher weight than others or will be pursued due to a special purpose. Therefore, they must be developed at all levels, following their manifestation in the training process. This can ensure an effective approach to the training, but also to the assessment, necessary for military personnel.

Regarding the evaluation activity in military physical education, this represents a stable component of the training process, having mainly a regulatory role both for the training of personnel and for the improvement of teaching strategies.

The central purpose of the evaluation in military physical education is represented by the outlining of the functional, morphological, motor and psychic changes produced, of great intensity, volume and complexity. To summarize, the general objectives of the process of evaluating the military physical education activity are: highlighting the efficiency of the training process; reporting the results to the previously established objectives; verification and assessing the level of development of motor qualities, physical, mental and integral training; testing the functional capacities of different systems, organs or functional mechanisms (aerobic, anaerobic); knowing the reaction of the military body to the efforts and particularities of the fatigue and recovery processes; verification the effort indicators (volume, intensity, breaks) specific to the different streamlined and standardized drive systems used in training[4].

The evaluation in military physical education of the students / trainees from "Carol I" National Defence University is carried out having as benchmarks the norms for ensuring the quality of educational services and the provisions of the *Code of Ethics and University Deontology*. This includes:

• *verification* – the action by which the individual/group is subjected to a test. The test has rules or scales, which express the value scale it is performed at. Physical fitness tests consist of verifying the most important physical qualities: cardio-respiratory endurance and muscle strength;

• *assessment* – the stage that follows verification, necessary for decisional optimization. It resides in the reflection of reality in the conscience of the specialist and, as such, some value judgments are made through this manner of estimation. Given that, in our case, in the test subject to verification, the results are measurable, the assessment is real and it does not require a special effort on the part of the evaluator, especially because in that test there is a table with rules;

• *grading* – it represents the result of the dialectical unity between verification and assessment. This is materialized by giving grades, as an act of displaying a label as a result of learning. Also, the grade is the index that corresponds to the achievement of performance and can fulfill several roles: information; training process regulation; therapeutic; pathogenic. The fairness and validation of grading consists in expressing in a just manner the object it measures. A test is valid, conclusive or accurate when once repeated it leads to identical assessments and marks by the same evaluator, at different times, or by different evaluators simultaneously.

Verification is performed during the teaching activity, tests for the development of motor qualities, acquisition of basic and utility applicative motor skills and those from the *Military Physical Training Regulation*, according to the educational

planning and management documents drawn by the *Military Physical Education Department*. The assessment and grading is performed by the teaching staff who directly conduct the military physical education activity, according to the norms and scales provided by the *Methodology regarding the evaluation of military physical education of students and trainees from the National Defence University "Carol I"*[5].

According to the *Military Physical Education* discipline sheet and the above-mentioned methodology, the learning outcomes of the students participating in the command master's degree study programs are determined by the following forms of evaluation:

• *initial evaluation* – performed at the beginning of the discipline within the study program, with the role of providing the teacher with information about the level of skills and attitudes that the student possesses, and which are necessary for further development. The initial evaluation is not graded and has no implication on (does not influence in any way) the final grade;

• *progress evaluation (formative)* – carried out throughout the educational activity, it aims to diagnose, guide and support students in developing and improving the level of physical training. Also, the progress evaluation gives the teacher feedback on the quality of the educational activities they carry out (continuity; capacity and interest in independent practice of physical exercises; attitude towards discipline; participation in sports and application-military competitions). According to the discipline sheet, the progress evaluation is graded and has a certain weight in the final grade of the discipline equal to 50%;

• *summative evaluation (balance)* – performed to determine the level to which the objectives of the discipline have been achieved (level of individual physical training, motor performance) and includes the tests of the *Assessment Test of the level of physical training of military personnel / Regulation of physical education military* (push-ups, abdominal exercises, endurance running). This form of evaluation also aims at ranking and selection. The summative evaluation represents 50% of the final grade of the discipline.

In accordance with the specific regulations, in the curricula of the command master's degree programs, *Military Physical Education* is provided as a compulsory subject in all four semesters and is completed with a grade at the end of each semester. Participants in command master's degree programs are assigned to units at the end of their studies, depending on the graduation average according to the provisions of the *D.M.R.U. 11 / SMG 48/2015, Norms regarding the distribution and appointment of graduates of the initial professional training programs of the active military personnel, of the master studies and of the residency*. In this context, it results, unequivocally, that the evaluation of this educational discipline is of major importance in the equation of the distribution of graduates.

Given that the distribution of functions is an activity of particular importance, especially for graduates of command master's degree programs, but also that evaluation is a fundamental element, a stable component of the level of physical training of any individual, I believe that the following measures, which are available to any teacher, can optimize the evaluation process for military physical education, as follows:

• regarding the *initial evaluation* – the implementation of this type of evaluation is the option of each teacher, but I consider that it should become mandatory because for the evaluation in 1st and 3rd semesters, it is possible that due to severe weather conditions (blizzard and snow / heavy rain, ice-covered running surface, etc.), the endurance running test cannot be performed and the performance of the initial assessment must be taken into account in the calculation of the final grade;

• regarding the progress evaluation (formative) – given that progress is more difficult to interpret and respect and that it is "always higher in those with a lower initial level and lower in those with a higher initial level", I consider it opportune for each teacher to draw up an observation sheet and record of the following aspects: the student's attitude in different hypostases of their activity, the results recorded at sports competitions, the results recorded after determining body composition (BMI-body mass index or BFI-body fat index), the level of independent practice of physical exercise, quantity and quality of acquired elements, the subject capacity of generalization (application in practice), restructuring, assembly of acquired elements, performing organizational tasks; establishing an intermediate assessment leading to an increase

in the level of training required at the date of the summative evaluation and which may be in full or in part, namely a sequential assessment of each component (strength test – push-ups and abdomen tests, endurance – running test);

• in terms of *summative evaluation* – the competition for obtaining the best possible position in the assignment can be among members of the same study group or among members of different study groups but, usually, from the same military branches. In this regard, it is necessary to set up an evaluation committee, consisted of at least two members of the specialized department, to eliminate any suspicions about the assessment of evaluators and because this may be a solution to improve the evaluation, for the benefit of those to be trained and, certainly, of that system.

Also, the development of military physical education assessment of students in command master's degree programs by a joint commission is of major importance from another perspective as well. Thus, an extremely important aspect that argues, in a positive sense, this form of evaluation, makes reference to the errors that may occur in the specific activity of evaluation in physical education, namely the effects that can distort the value of results. The main effects that may produce substantial changes in recognizing the evaluation objectivity of the activity performed permanently only by the teacher, designated to conduct the teaching activity to the respective study group, are:

• *the "halo" effect* – according to this, the assessment of results is achieved as a result of the extension of other positive assessments from other disciplines in the curriculum; in the evaluation of behavior, two variants of the "halo" effect can be found: the "gentle" effect (the evaluator shows a higher degree of understanding for those he knows better, than those he knows less) and *the effect of generosity* (in this case there are different reasons to present the situation in a much better way than the real one);

• *Pygmalion effect* – the assessment of the results is made as a result of a fixed opinion made by the evaluator about a person;

• *the personal equation of the evaluator* – each specialist makes his own evaluation standard, some being better than "others", whereas others being "worse";

• *contrast effect* – it is encountered in the situation where after a very good evaluation, another less good one follows for the same result (the reversed variant is also valid);

• *the order effect* – certain evaluators are more permissive in assessing the results at certain times of the day, week, year (in other words they are not consistent in assessing the results from the perspective of the time component);

• *the logical effect* – it is represented by the replacing the main objectives with the secondary ones, in the evaluation of the results[6].

In conclusion, we can say that evaluation in training is a problem originating in the past, but with modern connotations, it is a controversial topic, due to its moral load, because through this activity classifications and selections are made, verdicts are assigned, so fate is decided some people (in our case the military structure is decided where the graduates will carry out their activity for a period of at least one year). In this context, the optimization of the evaluation process in military physical education and, especially, the active participation of students in all forms of evaluation included in the system, have a positive influence in the equation to units' assignment of officers graduating command master's degree programs. Moreover, due to teacher abilities, assessment should not become a chore for students, but to develop and support their interest in the work carried out, to guide them in order to maintain or increase the level of physical training.

NOTES:

1 I. Jinga, *Managementul învăţământului*, Academy for Economic Studies Publishing House, Bucharest, 2003, p. 79.

2 I. Ţoca, *Management educaţional*, Didactic and Pedagogical Publishing House, Bucharest, 2002, p. 56.

3 https://www.academia.edu, accessed on 02.07.2020.

4 I. Andrei, M. Braboveanu, G. Penciulescu, *Influenţa funcţiei de evaluare a managementului în optimizarea activităţii de educaţie fizică militară*, *Bulletin of "Carol I" National Defence University*, nr. 4/2005, p. 302.

5 https://www.unap.ro/index.php/ro/prezentare/documente-institutionale, acceset on 02.07.2020.

6 A. Dragnea and colab., *Educaţie fizică şi sport – teorie şi didactică*, FEST Publishing House, Bucharest, 2006, p. 211.

REFERENCES

Andrei Ion, Braboveanu Marian, Penciulescu Gabriela, „Influența funcției de evaluare a

managementului în optimizarea activității de educație fizică militară", *Bulletin of "Carol I" National Defence University*, no. 4/2005.

Dragnea Adrian și colab., *Educaţie fizică şi sport – teorie şi didactică*, FEST Publishing House, Bucharest, 2006.

Jinga Ioan, *Managementul învăţământului*, Academy for Economic Studies Publishing House, Bucharest, 2003.

Loghin Mihaela, *Evaluarea pregătirii fizice militare*, DARECO Publishing House, Bucharest, 2002.

Țoca Ioan, *Management educaţional*, Didactic and Pedagogical Publishing House, Bucharest, 2002.

http:// www.academia.edu

https://dmru.mapn.ro

https://www.unap.ro

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-58

STRENGTH –A DRIVING QUALITY WITH AN ESSENTIAL IMPACT IN THE MILITARY ACTIVITY

Lt.Col.Sup.Instr. Marius Constantin ISTRATE, PhD Candidate*

The article analyzes synthetically the decisive contribution that the development/training of the main driving quality – strength – has within the military activity, especially through its influence on the increase of the military's capacity, obligatory condition for their adaptation and response to the physical and mental demands generated by the current operational environment, as well as for the level of combat capability of military structures.

Throughout the article, the factors that determine the value of the force, the forms of its manifestation in the military activity, as well as the development methods frequently used in the physical training activity of the military personnel are addressed.

Keywords: force; effort capacity; military activity; intensity of effort; duration of effort; physical and mental stress; training.

In order to constantly adapt to the demands of the external environment, the human being must perform motor acts and actions, in other words, using the current language, to move. All these acts, actions and activities performed by man involve physical effort and a lower or higher energy and mental consumption.

A. Dragnea (1996) defines effort as "a conative behavior of mobilization, concentration and acceleration of physical and mental forces within a system of self-regulation, both conscious and unconscious, in order to overcome an obstacle, to overcome the resistance of the environment and even the resistance of one's own body".

The capacity of effort is the body's ability to perform and sustain for as long as possible, a physical or mental activity. The capacity of effort is one of the key factors in carrying out these activities in general, and implicitly, and in activities specific to the military environment, an environment to which we will rather refer to in the following pages. Thus, this parameter directly conditions the achievement of increased performance in the training of military personnel, both individually and collectively, within the training of troops process.

"The capacity of effort is acquired, in particular, within the training process specific to the military physical education activity, which aims to develop/educate basic motor qualities – strength, speed, endurance, thus ensuring the biological and functional substrate of the effort required by the military activity"[1].

Military conflicts generate a very high consumption of energy and human resources. The efficiency of the energy and mental consumption of the military can be achieved through the means of military physical education, by educating basic motor qualities (strength, endurance, speed, skill), by adapting physical training to potential situations, using all individual equipment from endowment and alternating working conditions[2].

The theaters of operations, the modern battlefield, as well as the current missions that the military personnel carry out during the training process, require very good physical training, an increased capacity for effort, with a special emphasis on endurance and physical strength. Thus, during the execution of specific activities, the military, in addition to being equipped and endowed with their own equipment, also performs a series of difficult operations such as: mounting and dismounting from fighting vehicles, handling specific equipment and techniques, transporting crates and boxes of ammunition and even, at certain moments, bearing on one's back or carrying the wounded comrades.

In support of the above, military specialists studying the war say that survival on the battlefield is largely conditioned by the strength and muscular endurance possessed by the combat forces[3].

Strength is the fundamental and complex motor quality specific to the human body, all areas of activity carried out by humans involving its use.

***"Carol I" National Defence University**
e-mail: *mariusconstantinistrate@yahoo.com*

It is also a fact proven by specialists in the field that improper evolution or insufficient development can have negative effects in the formation and consolidation of motor skills and abilities.

Given the complexity and multiple valences attributed to this quality of the body, researchers in the field have had different approaches to defining strength. Without having a single and unanimously accepted definition, we will further present some of these approaches.

A. Demeter (1977) defines strength as "the ability of the neuromuscular system to overcome resistance through movement based on muscle contraction".

E.L. Fox, D.K. Mathews (1984) defines strength as "the tension that a muscle can oppose to an external resistance, in a maximum effort", and V. M. Zațiorski (1995) as "the ability of man to overcome some external resistance or to act against it by muscular effort"[4].

I. Sabău (1997) defines strength as "the ability of the human body or a part (segment) of it to overcome an external resistance or to act against it through physical and mental effort. It is the trait of the human organism or of a part of it, which is shown by physical and mental tension, through which it opposes or overcomes some external resistance"[5].

From the definitions presented above, we notice that the common and fundamental element in the manifestation of strength actions is muscle contraction.

Factors that determine the value of strength

In order to choose the best means and methods in the training process for strength development, it is imperative to know the main factors that determine the value of this quality of the human body, the most important being: the number of muscle fibers engaged in contraction and muscle thickness. There are also other factors that play a role in determining the value of force, such as:

- The level of development of the other driving qualities;
- The mental condition of the individual: will, motivation, emotional states, power of concentration, attention, etc.);
- Nervous factors;
- Diet;
- Age and sex;
- Frequency of training lessons and continuity of the preparation process.

The number of muscle fibers engaged in contraction is a crucial factor in the value of the strength that a muscle can develop. The higher the number of muscle fibers, the closer the force of execution of that movement is to its maximum value.

Depending on the difficulty of the effort, at that time a certain number (smaller or larger) of muscles and muscle fibers are contracted. These muscles involved in that force movement fall into two categories:

- agonists (who act directly to achieve that effort);
- antagonists (acting in the opposite direction).

The condition for achieving muscle contractions with maximum efficiency is that, in the respective motor action, only the agonist muscles should be engaged, and the antagonist ones should enter a state of relaxation. This efficiency can be obtained only after an intense preparation process, a process oriented concretely towards the development of the strength of the respective segment or segments, in which the movement is repeated methodically, and the result is a very precise coordination of the nerve impulses and responses transmitted to different muscle groups. The value of the force largely depends on this neuro-muscular response, the nerve centers responsible for coordinating the motor action transmitting strong nerve impulses, exciting the agonist muscles and, at the same time, exerting an inhibitory action of the antagonists. In this regard, we must emphasize that a simultaneous contraction of all muscle groups in the body and all the fibers of a muscle is not possible.

Thus, in the specialized literature in the field, we find some extremely conclusive data in this direction[6]:

- in a resting state, depending on the position of the body, between 3-10% of the total number of muscle fibers in action at that moment are involved in the contraction;
- during a small strain, the number of fibers in a muscle participating in the action is increased by 10-30%;
- in a cyclic motor action (walking, easy running) the fibers of the agonist muscles are divided as follows: about 1/3 participate in the action, while the remaining 2/3 are in a state of relaxation;

• in intense physical exertion the percentage of muscle fibers involved can gradually increase up to 75%, which corresponds to an effort of maximum intensity, but in this case fatigue sets in fairly quickly.

Muscle thickness is another key factor in the development of muscle strength. The strength of a muscle depends on its thickness, being proportional to its cross section. Achieving high performance in strength efforts is performed with the help of functional muscle hypertrophy which, in turn, is increased by using high and very high intensity efforts in training. As a result of a systematic and continuous action, the muscle mass increases, implicitly determining the increase of strength.

Forms of manifestation of strength in military activity

General strength refers to the efforts in which all muscle groups are involved. In military activity this form is required by the daily activity of the military itself, by specific missions and actions (e.g. those carried out in heavy, swampy, sandy terrain, in those executed in mountainous areas and very difficult to access, walking, skiing, trekking, mountaineering and climbing, etc.).

Specific strength takes into account the force produced by motor acts typical of a certain type of activity and which involve a small number of muscle groups. In the military activity we find it in the actions carried out on the armament systems and in the combat equipment technique, gymnastic exercises, athletic tests, in sports games, etc.

Maximum or absolute strength. As the name suggests it, this form refers to the greatest force that the neuromuscular system can generate in the body through maximum voluntary contraction. In the military activity we find this form of manifestation of force in all actions that involve lifting and transporting different weights, as well as overcoming obstacles or overcoming them such as: specific exercises for weapons, crossing the runway with CISM obstacles, military-application routes, application paddling and swimming with the equipment and armament provided, etc.

Relative strength. It is a type that considers the ratio between maximum/absolute strength and body weight. Thus, the higher the body weight, the lower the relative strength. In the military activity we meet it especially in gymnastics, contact disciplines such as hand-to-hand combat with/ without the equipped equipment, taekwondo, judo and jiu-jitsu, karate and boxing, in the applied courses, in the pentathlon test and athletic tests, such as and in some sports games, etc.

Speed force. This form of force represents, according to D. M. Ioseliani's definition, "the ability to manifest high values of force in the smallest unit of time"[7]. In military activities we find it in the military pentathlon test, in the obstacle course for soldiers of all branches, application routes, throwing hand grenades, fire duel, actions performed at objectives such as taking crew positions on weapons systems and equipment, as well as mounting and dismounting them, combat sports (judo, taekwondo, hand-to-hand combat, boxing, etc.), athletics and short distance swimming (50, 100, 200 m), applied rowing, as well as in some sports games.

Methods of developing the strength used in the activity of physical training of the military

Strength is a motor quality that can be developed both in gyms, equipped with sophisticated equipment, but, in the absence of such capabilities or in addition to them, can be educated with their own body weight and improvised devices. The specialized literature presents a series of methods for strength[8] development, and in the following we will briefly present some of them, used successfully in the activity of physical training of military personnel.

The method involving "weights" or weightlifting – which has 4 variants:

• *Continuous increase of the load* – the military achieves this increase depending on the number of repetitions he wants to perform (more repetitions - less increase, fewer repetitions, higher increase);

• *Continuous increase and decrease of the load* - during the training session the soldier continuously increases and decreases the load he works with, the rate of increase and decrease of the load being always the same;

• *The "step-by-step" method* – the soldier performs at least two repetitions with the same weight, then climbs to the next step (e. g. 60% - 60%, 70% - 70%, 80% - 80%, etc.);

• *The "wave" method* – the military alternates the increase and decrease of the load from one

repetition to the next repetition, respecting the principle that establishes that the growth rate must be higher than the decrease rate (50% -60% -55% -65% -60% -70% etc.).

The method of the isometry procedure – it involves the military performing 4 to a maximum of 6 muscle contractions / military physical training class, on immovable objects that cannot be moved or pushed and maintaining these contractions for up to 10-12 seconds. Between contractions, he should take an active break of 100-120 seconds.

The method of fast and intense efforts – it is the main method used to increase the explosive strength and involves the military performing muscle contractions through very fast executions and with maximum amplitude.

The method of repetitions performed until break-point– it involves the execution by the military of repetitions with loads of about 50-60%. When he has reached the limit of his possibilities, he performs two or three more repetitions with the help of another soldier.

The method of the "circuit" procedure – it is one of the methods of developing muscle strength used very often in the teaching process of physical training of the military and does not require special conditions. Depending on the number of stations/exercises, the circuits are divided into short circuits (4 - 6 stations/exercises), medium (7 - 9 stations/exercises) and long circuits (10 - 12 stations/exercises). In order to be more effective, it is necessary to know the level of training of the military at that time, and the circuit should address only the development of the military strength and thus, not to contain exercises that train the other motor qualities. Also, the exercises used in the circuit must be as simple as possible and the stations arranged so that the muscles of the same segment/ part of the body do not work consecutively. Other important methodological indications aim at using these circuits only at the end of the military physical training lesson, and the working time is less or at most equal to the breaks.

In conclusion, we can say that force is a motor quality with a decisive impact on military activity, being involved in absolutely all the actions that the military performs. The level of development of this quality, together with the resistance in particular, directly conditions their capacity for effort, an essential factor in the successful fulfillment of the entrusted missions and, at certain moments, in the very survival of the combatant soldier or his comrades. In other words, given the direct link between the development of strength and the expression of other qualities and motor skills at a high level, the fact that strength increases through systematic training and decreases if it is longer neglected, it is very important that constant attention be paid to activities specific to the field of military physical education and sports.

NOTES:

1 A. Pelmuș, „Dezvoltarea calității motrice: rezistența, factor esențial în activitatea militară", *Bulletin of "Carol I" National Defence University*, nr. 3, Bucharest, 2018, p. 67.

2 G. Ciapa, *Pregătirea fizică a militarilor din Armata României în conflictele moderne*, disertation thesis, "Carol I" National Defence Publishing House, Bucharest, 2017, p. 37.

3 I. Andrei, *Importanța pregătirii fizice în procesul de instruire militară*, "Carol I" National Defence Publishing House, Bucharest, 2015, p. 30.

4 https://www.scritub.com/timp-liber/sport/Forta32221.php, accessed on 07.04.2020.

5 I. Sabău, *Aspecte noi și contribuții privind dezvoltarea forței în probele de aruncări la atleții de performanță și înaltă performanță*, disertation thesis, Bucharest, 1997 apud M. Loghin, *Pregătireafizică - condiție și premisă de creștere a capacității de luptă a armatei*, Printech Publishing House, Bucharest, 2001, p. 7.

6 D.C. Torje, *Teoria şi metodica pregătirii în domeniul educaţiei fizice a personalului M.A.I.*, Ministry for Internal Affairs Publishing House, Bucharest, 2005, p. 24.

7 V. Tudor, *Capacităţi condiţionale, intermediare şi coordinative componente ale capacităţii motrice*, Coresi Publishing House, Bucharest, 1999, p. 41.

8 Gh. Cârstea *Teoria și metodica educației fizice și sportului*, AN-DA Publishing House, Bucharest, 2000, pp. 62-64.

REFERENCES

Andrei I., *Importanța pregătirii fizice în procesul de instruire militară*, "Carol I" National Defence Publishing House, Bucharest, 2015.

Andrei I., Ceascai V., *Efortul fizic pe înțelesul tuturor*, "Carol I" National Defence Publishing House, Bucharest, 2017.

Cârstea Gh., *Teoria și metodica educației fizice și sportului*, Editura AN-DA, Bucharest, 2000.

Ciapa G., *Pregătirea fizică a militarilor din armata României în conflictele moderne,* teză de doctorat, "Carol I" National Defence Publishing House, Bucharest, 2017.

Ciapa G., *Orientări și oportunități pentru pregătirea fizică a militarilor*, "Carol I" National Defence Publishing House, Bucharest, 2019.

Dragnea A. și colaboratorii, *Educație fizică și sport – Teorie și metodică*, FEST Publishing House, Bucharest, 2006.

Loghin M., *Pregătirea fizică – condiție și premisă de creștere a capacității de luptă a armatei*, Printech Publishing House, Bucharest, 2001.

Matveev P.L, Novikov A.D, *Teoria şi metodica educaţiei fizice*, Sport-Tourism Publishing House, Bucharest, 1980.

Pelmuș A., „Dezvoltarea calității motrice: rezistența, factor esențial în activitatea militară", *Bulletin of "Carol I" National Defence University*, nr. 3, Bucharest, 2018.

Sabău I., *Aspecte noi și contribuții privind dezvoltarea forței în probele de aruncări la atleții de performanță și înaltă performanță*, disertation thesis, Bucharest, 1997.

Torje D.C., *Teoria şi metodica pregătirii în domeniul educaţiei fizice a personalului MAI*, Ministry for Internal Affairs Publishing House, Bucharest, 2005.

Tudor Virgil, *Capacităţile condiţionale, coordinative şi intermediare – componente ale capacităţii motrice*, Coresi Publishing House, Bucharest, 1999.

https://ro.scribd.com/doc/252061058/1-Capacitatea-de-Efort-Fizic

https://www.scritub.com/timp-liber/sport/Forta32221.php

http://www.urbanwarriorgym.ro/ce-este-forta-cum-o-imbunatatim/

Bulletin of "Carol I" National Defence University
10.12753/2284-9378-20-59

RECOVERY OF THE FIGHTER'S BODY AFTER EFFORT

Col.Prof. Ion ANDREI, PhD*

In order to be able to accomplish a mission, the fighter must have impeccable physical training that allows him to act in different conditions from those of daily life. For this, the fighter must constantly raise the level of physical effort capacity, through training sessions carried out systematically, continuously, consciously and scientifically. After the physical effort made in training process and missions, the fighter needs a period of recovery of the body to prepare for future physical efforts at optimal parameters and create the conditions for increasing the capacity for effort. So, it can be said without mistake that recovery is a part of the training process, with a role in creating the conditions for accumulation. Recovery must be natural, but there are often cases where physical effort leads to depletion of the energy substrate used and there is no time available to restore it naturally; then there is guided recovery that does nothing but complete the natural recovery. It is important that the fighter's lifestyle be adequate for the activity and effort.

Keywords: physical effort; fighter; rehabilitation; guided recovery; natural recovery.

Participation in an armed conflict on the battlefield or in a mission on the theaters of operations are typical of military activity. This determines the content of training process of the military, of the fighter. In the activity of training, especially for solving conflicts or missions, the military needs strength and energy, skills to maintain vigor and physical and mental freshness, great ability to recovery the body after great and prolonged efforts in difficult conditions, tenacity and strength to overcome difficulties and endure deprivation to meet the multiple requirements of the battlefield.

The recovery of the fighter's body is one of the most important biological processes and should be treated as a component of training process. The efforts made in the training process and in fulfilling a mission require an immediate recovery of physical and mental capacities, of psychophysical endurance, so that the fighters might be able in a short time to act again at full capacity. Recovering the body after the effort made in the training process is a sine qua non condition to progress, to make great efforts in terms of duration and intensity, which determine the increase of effort capacity. Thus, the body works to maintain its biochemical functions and processes in a state of dynamic equilibrium, translated into a continuous constancy of physiological functions – homeostasis[1] –, recovery being a response to previous effort, becoming a means of sustaining the effort that to be filed.

Recovery differs from rehabilitation: recovery is addressed to a healthy organism that has made a significant physical effort (fatigue arising from physical effort), while rehabilitation is located in the area of sports pathology and is addressed to a sick organism (injuries occurred following a physical effort). On the other hand, recovery is of two types, natural and guided (when natural recovery is no longer possible).

Recent studies suggest that local metabolic fatigue is due to the following factors[2]:

- muscle phosphocreatine depletion – in effort up to 2';
- accumulation of lactic acid in the muscles – in efforts between 35" and 4'30";
- decrease in muscle glycogen and accumulation of ammonia – in the efforts made for 10 to 90';
- depletion of muscle glycogen and accumulation of lipid peroxides – in the effort between 70 and 360';
- decrease in circulating glucose;
- depletion of essential amino acids in the blood and penetration of tryptophan into the brain;
- neuropsychiatric discomfort factors.

The recovery of the body is an integral part of the daily training process. This requires adequate equipment and time allocated in the training process or after completing a mission because after the body has been required physical effort, energy reserves

*"Carol I" National Defence University
e-mail: *ionandreiunap@yahoo.com*

decrease dramatically. This condition is called *anabolic rest* and is actually a state of physiological fatigue, called by some authors *pessimum* which triggers the body's natural recovery processes. If the functional possibilities of the body are exceeded, we can no longer talk about a functional synergy, so we will face a pathological fatigue or a functional pathology[3]. The immediate effects are:

• at the level of the central nervous system – the appearance of cortical inhibition, following a physical effort (in which hyperexcitability predominates), which irradiates the entire cerebral cortex favoring anabolic processes, with a role in reconstruction;

• at the level of the vegetative nervous system and metabolism – the decrease of heart rate and respiratory rate, the increase of the alkalinity of the internal environment, the predominance of vagal and cholinergic effects favor the creation of conditions for the installation of anabolic processes to the detriment of catabolic ones;

• at the level of the muscular system – restoring the glycogen and myoglobin reserves, as well as increasing the protein synthesis by intensifying the enzymatic processes.

The central nervous system is responsible for the natural recovery of the body, this being the main form of recovery after an effort, whether it refers to a single training session, a micro-cycle (training stage), a macrocycle (complete training program), or when performing a mission.

Natural recovery is defined by a certain stereotype[4]:

• the vegetative parameters (cardiovascular and respiratory system) return to normal in a few minutes;

• metabolic parameters (biochemical indices) return to normal in a few hours;

Table no. 1

THE TIME REQUIRED TO RECOVER THE ENERGY SUBSTANCES USED IN THE EFFORT[5]

The recovery process	Recovery time	
	Minimum	Maximum
Phosphagen recovery - ATP and CP	2 minutes	5 minutes
Repayment of alactacic oxygen debt	3 minutes	5 minutes
Muscle glycogen resynthesis	10 hours (after continuous effort) 5 hours (after effort at intervals)	46 hours 24 hours
Resynthesis of hepatic glycogen stores	Unknown	12-24 hours
Elimination of lactic acid from the blood and muscles	30 minutes (active recovery) 1 hour (passive recovery)	2 hours 1 hour
Repayment of lactic acid debt	30 minutes	1 hour
Restoration of oxygen reserves	10-15 seconds	1 minute

• endocrine, hormonal, enzymatic parameters return to normal in a few days.

However, there are certain features of the body's recovery as a result of physical effort (in training process or in the mission):

• energy sources used – carbohydrates from muscle glycogen stores, fat from body fat deposits and even proteins, when physical effort causes severe energy depletion:

• type of muscle fiber used – type I, slow-twitch, tonic, oxidative, red and type II, fast-twitch, phasic, glycolytic, white;

• the psyche – a positive, optimistic thinking can influence the recovery, in the sense of reducing the time in which it can be achieved;

• age – the older the age, the more difficult it is to recover and the longer period it requires;

• experience - a more experienced fighter has a faster recovery;

• weather – physical effort performed in extreme temperature conditions requires a longer recovery period.

Guided recovery (a complex process – methodical, pedagogical, medical, biological) completes the natural recovery, if the energy substrate that needs to be restored cannot be achieved until the next effort should be made (long and/or intense efforts performed at short intervals). The means used in guided recovery can address the biological, functional substrate that was required in the effort (cardiovascularandrespiratory,muscular,endocrine, hormonal, enzymatic, nervous) or belonging to a certain field (balneophysiokinetotherapy, nutrition, pharmacology, psychotherapy, rest).

In the following table I tried to include a large part of the means of recovery of the body after performing a physical effort depending on their addressability, as well as the correlation of the means of recovery with the nature of the physical effort:

In conclusion, the most important role in the recovery of the body after effort is the natural recovery, but when it cannot ensure the recovery in a short time so that the fighter might carry out a new mission entrusted to him, the means of guided recovery can also be used.

The application of means of recovery of the body after the effort (natural and/or guided) must take into account the specificities of the effort made, the type of mission performed, the individual characteristics of the fighter, the environment in which combat actions take place, but it must not be forgotten that their effectiveness is determined primarily by the accessibility of these means.

Table no. 2

MEANS OF RECOVERY OF THE BODY AFTER PERFORMING A PHYSICAL EFFORT

The biological substrate required in the effort	Neuropsychiatric	Neuromuscular	Endocrinometabolic	Cardiovascular and respiratory
Belonging to the field of recovery	Balneophysiokinetotherapy, nutrition, pharmacology, psychotherapy, rest			
Specific actions	Psychotherapy (demonstration, desensitization, relaxation, activation, conversations, relaxation techniques, concentration, self-suggestion, suggestion, psychosomatic training), acupuncture, acupressure, massage, medication			
	Active and passive rest, warm hydrotherapy		-	Active and passive rest, warm hydrotherapy
	Oxygenation	-	Oxygenation	
	-	Hydroelectrolytic rebalancing		
	Negative aerionization	-	Negative aerionization	-
	-	Sauna, diet	-	Sauna, diet
	-		Neuromuscular relaxation	-
Types of effort	Anaerobic effort			-
	-	Aerobic effort (without endocrine recovery)		
	Mixed effort (without endocrine recovery)			

In other words, the fighter cannot benefit from all the means of recovery of the body because it is not possible for them to be applied in units (acupuncture, acupressure, oxygenation, negative aeration, sauna, etc.), but this does not mean that it cannot achieve an optimal recovery. The important role belongs to the fighter, because the recovery is largely conditioned by each fighter's observance of specific norms as he/she must adopt an optimal lifestyle, which is close to that of a performance athlete – rest, diet, elimination of risk factors (alcohol, tobacco, etc.). In order to support the fighter in achieving these goals, there must be a concentrated effort of all those responsible, at the level of each structure – specialist in military physical training, doctor, psychologist.

NOTES:

1 Ion Andrei, Viorel Ceascai, *Efortul fizic pe înțelesul tuturor*, "Carol I" National Defence University Publishing House, Bucharest, 2007, p. 7.

2 Alexe Nicu, *Teoria şi metodica antrenamentului sportiv modern,* România de Mâine Foundation Publishing House, Bucureşti, 2002, p. 207.

3 Alexe Nicu, *Antrenamentul sportiv modern,* Editis Publishing House, Bucharest, 1993, p. 473.

4 Adrian Dragnea, *Antrenament sportiv – Teorie și metodologie –,* vol. 1, National Academy of Physical Education and Sports Publishing House, Bucharest, 1993, p. 213.

5 Cornelia Bota, *Ergofiziologie,* Editura Globus, Bucharest, 2000, p. 262.

REFERENCES

*** *Teoria şi metodica antrenamentului sportiv modern*, România de Mâine Foundation Publishing House, Bucharest, 2002.

Andrei Ion, Ceascai Viorel, *Efortul fizic pe înţelesul tuturor,* "Carol I" National Defence University Publishing House, Bucharest, 2017.

Bota Cornelia, *Ergofiziologie,* Globus Publishing House, Bucharest, 2000.

Dragnea Adrian, *Antrenament sportiv – Teorie şi metodologie*, vol. 1, National Academy of Physical Education and Sports Publishing House, Bucharest, 1993.

Ionescu A., Anton B., *Dirijarea medicală a efortului,* National Center for Training and Professional Development for Coaches, National School for Coaches, Bucharest, 2004.

Nicu Alexe, *Antrenamentul sportiv modern,* Editis Publishing House, Bucharest, 1993.

Nicu Alexe, *Teoria şi metodica antrenamentului sportiv modern*, România de Mâine Foundation Publishing House, Bucharest, 2002.

Editor-in-Chief
Laura MÎNDRICAN
Editor
Irina TUDORACHE
Proof-Reader
Mariana ROŞCA

Sub-editor
Gabriela CHIRCORIAN
Cover
Andreea GÎRTONEA

ISSN (on line) 2284-9378

ISSN (print) 2284-936X
L 2284-936X

The publication consists of 198 pages.

"CAROL I" NATIONAL DEFENCE UNIVERSITY PUBLISHING HOUSE
Bucharest, no. 68-72 Panduri Street, sector 5
e-mail: *buletinul@unap.ro*
Phone: 319.48.80/0215; 0453

1391/2020 C. 261/2020