

THE INFLUENCE OF TECHNOLOGY ON THE DEVELOPMENT OF THE ART OF WARFARE AND CONDUCTING MILITARY ACTIONS: THE WARS OF THE FUTURE

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Abstract:

The civilizational developments has had its effect on the development of the military science that has always aimed to develop technology that would enable supremacy and easier winning. On one hand, it has evidently changed the way and tactics of conducting war, while on the other, it has erased the once clearly set boundary of the frontline. Wars are more often conducted in urban centres where the size of military power is not the factor of domination, but the availability of modern technology and superior equipment and weapons. Every revolutionary discovery in science has almost always found its use in the military sphere, which has significantly contributed to the change of warfare. Concerning the preparation, i.e. use of combat strategies and tactics, today's multidisciplinary character of warfare understands besides directly involved parties inclusion of one or more indirect participants that usually favour one of the parties in the conflict. Cyber warfare is especially characteristic and is used in preparation phase, a started or an already ended conflict. As a result, the international community, and the UN in particular, has a problem to regulate conflicts that are out of the framework of the generally acknowledged international (Geneva) conventions of warfare. The wars of the future is likely to include less people and more technology; thus this paper argues that the traditional warfare will become obsolete. Superior participants in the conflict will be the ones with technologically advanced devices and systems, as well as educated and trained personnel for their management and operation.

Key words: technology, cyber warfare, weapons, strategy, armed forces

Introduction

There is no period in the human history that is not marked by warfare. The first recorded and fragmentary described war, was going on four thousand five hundred years ago in Mesopotamia (now Iraq) between the armies of the city-states Lagash and Uma (Grant; R.G. 2015, 20). It is well

known that the war and the use of weapons have always been, still are, and will be destructive - but it is also true that the end of every war has meant progression of human civilization both culturally and technologically. Certainly, not claiming that this is an absolute causality, one could say that the war and warfare have always given a specific contribution to the development of science and humanity. Actually, until gunpowder was discovered, main factors in creating military strategy were the size, motivation, art of warfare and strengths of the troops along with the meteorological and geographical features of the land. Moreover, emergence and development of the firearms had a drastic impact which changed the approach and strategy of warfare. Hence, it redefined the nature of the hostilities. Certainly, this process has not changed the conditions on the battlefield, but as the warfare became expensive, the impact extended to areas such as politics, economy, science and medicine.

Maybe from today's prospective it doesn't seem so, but technological achievements are mostly due to the innovative solutions for better efficiency in combat actions. In fact, a significant number of technologies created and implemented within the military, have later found a more appropriate application in the civilian sector. In addition, the world as we know it is largely a product of the wars that took place all over the globe. Demographic changes, birth and the death of nations and states, civilization progress, discovering new worlds, including globalization, have a proper, direct or indirect, connection with the wars and warfare. Also, if considering the race for armaments and investing in development of new weapons, combat means and systems, one can conclude that the development of military technology directly stimulates construction of infrastructure facilities, stock exchanges, trade and the development of the monetary economy.

That is, if one can say, the good side of the war. The bad one certainly stems from the very nature of the warfare and the unaccountability of human behaviour in conditions that cannot be foreseen but are main features of warfare. The martial art is based on exercising decisions aimed at neutralizing enemy's strategy, to the extent as to prevent its tactical actions. In fact, combat actions have always had a destructive impact not as much on the nature, but more on what is called culture and civilization of the mankind. In addition, development of the technology and modernization of the military technology is also increasing the negative effects of the war. Hence, the morbid historical examples of genocide, mass murders, the Holocaust and the use of newly developed technologies for military purposes, like the bombs on Hiroshima and Nagasaki at the end of World War II. Moreover, one can say that technologies developed for strictly scientific purposes was later easily integrated into the armies of the powerful states for military objectives. Such processes were characteristic during the Cold War, when first conflicts to conquer the space began. This certainly has impact on the development of armaments, but also the development of technology for fast military transport and improvement of their communication and navigation means.

From this point of view, one can say that the strive for victory on the battlefield, has significantly prompted innovation efforts to design new types of weapons, and to a certain respect influenced the achievement of scientific and sociological benefits. From historical point of view,

and strategic military aspect in only one century it evolved from frontal fight during World War II into supremacy warfare for the space and the virtual cyberspace.

The Impact of Technology over the Art of Warfare and Combat Actions

Since the very beginning, warring parties have always aspired to create weapons in order to defeat the opponent. Such a trend is still present. So, in parallel with the development of the world, new weapons are being developed whose use implied change of strategies for use of armies. As an example, one can mention the emergence of artillery, risen from the need to overcome the walls of the well-established cities that was not possible to be conquered just by pushing the infantry. Emergence of long range cannons has reduced the need for bulky horsemen and infantry combat troops, enabling losses among the enemy from a safe distance. The best example is the siege of Constantinople by Sultan Mehmed II, where the use of long range cannons destroyed until then unconquerable walls. After that, the city was conquered. By efficiency improvement and first of all due to the strategy of Napoleon Bonaparte who discerned the role of the artillery in an attack and stressed the need for its mobility and change of tactical operations. So, instead of the previously imposed strategy, artillery to be in support and protection of the infantry they started introducing engagement of infantry units in protection to the artillery batteries (McLynn 2009, 283). Finally, by recognizing the artillery power on the battlefield during World War II, military strategists have initiated the need for mobilizing large cannons, for their own deployment from one position to another. That, combined with the development of the automobile industry resulted in the development of tanks and self-propelled howitzers, which contributed to the significant dynamics of the combat actions on a wider front.

Despite the size and equipment of the army, the navy has always played a key role in developing military strategies during a military conquest. The siege of Tire in 332 BC by Alexander III of Macedonia is just one example. Had not been able to conquer the city because of the size and equipment of the fleet of Tire, Alexander built a causeway so that the phalanx could conquer the city by land. However, considering that even after a seven-month siege, conquering the city was impossible until Thirsk ships rule the sea, he engages eighty Phoenician, 120 Cyprus and numerous ships of the Macedonian fleet, after which, over a month, suffering unexpected losses he manages to conquer the city (Komesarović 2016, 5-8).

Substantial conquests and contacts between civilizations until early XX century took place by sea. Then, military naval troops had a key role. From that period until the travels of Marco Polo, the discovery of the American continent by Christopher Columbus in 1492, the sinking of the Spanish Armada by the English Royal fleet in XVI century, the decisive role of the Navy in the Civil War in the United States, the emergence of submarines and their importance in World war II, nuclear tensions in the Bay of pigs in Cuba and today's strategic deployments in the world's waters, the Navy has an essential role in the progress and implementation of combat plans and actions. Today's global situation imposes the need for global navies (of course, this is all about

military predominant superpowers like the US and Russia, but also countries such Australia, UK and Japan, whose defence largely depends on the strength and ability of the Navy), ready to meet the need, as the rapid deployment of combat potential to all destinations related to the world's oceans, but also for enabling free trade traffic, as it was the involvement of part of the Navy and some of the EU Member States, to provide security to the Gulf of Aden.

The construction of the first aircraft by which in 1903, the Wright brothers managed to fly, announced the revolution of innovation that followed. Military strategists immediately saw the advantage not only to act against the enemy and its installations, but also to monitor and gather information on the movements and formations from a safe distance. During World War I the process of the massive use of aircraft began. The success of armies increasingly becomes dependent not only on the rule on the ground, but by the rule of the airspace. Hence, again there was a change in the strategic planning of military operations and their tactical implementation, because the combat power of the warring parties and the battles fought in the geographical territory, mostly depended on the ability to control the sky above. Since the beginning of World War II onwards, and especially after the attack on Pearl Harbour by Japanese Air Force in 1941, the air force totally changed the approach to the warfare. Moreover, it is due to the fact that the aviation and navy are increasingly acting as a common component. At the same time, the need for rapid deployment of troops for their deployment from one place to another, imposed the need to find solutions for simple and secure solution in that respect, which resulted in modelling aircrafts able to take off and land on aircraft carriers, and the significantly shorter runs than usual. Thus, combat strategy of the commanders of the armies of the great powers, was a complex operation that involved planning and preparation of operations for the action of all three types of army. Nowadays, however, there is a massive use of combat aircrafts of various types that are not only for military purposes but also in addition to the civilian structures during natural or other disasters of large scale (mainly for rescue and evacuation of people and material goods).

Finally, the successful management and command to enable coordinated and synchronized actions of military units at the front, would not be possible without quick and timely transmission of commanding strategic thinking. Invention of the telegraph in the middle of XIX century, not only completely transformed the overall relations in the world, but, like many other technological breakthroughs before, it was immediately accepted, applied and developed in the military sphere. Unsteadiness, but above all, delays and uncertainties of the signal and courier relationship was often one of the main reasons for failure in strategic manoeuvres. Therefore, telegraph and telephone lines were immediately accepted and incorporated in the managerial-command system. With the advancement of technology, improvement has also been achieved in the means for operational and technical communications in combat actions, to such extent that without these means fighting a wider front cannot generally be imagined. The best example for this has been the capturing and decoding of the communications system of the Wehrmacht called "Enigma". It helped in decoding the intercepted messages, thus in creating the strategy of the Allied forces to counter the enemy. Today, the modern systems for satellite communication and positioning are the basis for successful warfare and conducting operations. This is confirmed

by the fact that in the modern warfare, initiated by the application of NATO's military campaign in the FRY, aims to destroy or disable the static satellite-antenna systems and the stationary communication facilities by which the enemy to a great extent is disabled to coordinate the combat actions.

Briefly, neither command can be successful without quality nor timely means for communication, nor communications can be successful without effective command. In fact, it is the area of communications that is the battleground of today, to which the military and political authorities devote extreme attention.

Media Technology at a Battlefield

Communication as the process of sending and receiving messages between people, is an exchange of information. Information, when accurate and timely, is the foundation of success on the battlefield. As defined by the American sociologist Harold D. Lasswell, the act of communication is responding to the five questions: who says, what tells, in which channel, to whom and with what effect. But, the questions should in sequence agree with the following five aspects: communicator, message, medium, receiver and accomplished effects. Simply, communication is the most important single factor that has a strong impact on the people and their relationship with the environment. In this case communication is reviewed in terms of its importance in the warfare, because communication is actually the weapons of today.

Every spoken word of the political leaders may start or stops hostilities because modern wars are transmitted in live through the media. Even worse, depending on the strategy, the media share the truth that strictly targets specific audience. Then it is extremely difficult to determine the difference between the real information and manipulation that is often used as a strategy in this kind of warfare. The simple method of communication between a small numbers of subjects is a history. The development of technology and the Internet, as well as opportunities imposed by the globalization opened up space in the process for simultaneous participation of extremely large number of subjects. It transferred primacy of the verbal and written communication to video and digital form.

In times of war, especially at the front line, the information transferred/transmitted by the media, may be a key strategy for the success of combat actions, especially in terms of motivating the public to support any of the parties involved in the war. Example for this is the start of the 2003 military campaign in Iraq, and the latest 59 strategic missiles launched on Syria, in April 2017, by the US armed forces. Certainly, it is incomparable to the military engagement of the US military action in Syria. But in both cases, media reports on the production of nuclear weapons or use of chemical weapon used as trigger to carry out military operations. With no claims of favouritism or refutation of justification for attacks based on media transmitted information, it is important to know that this is not the first time to use or abuse the undeniable power of media to transform the events in a form suitable for justifying the warring parties.

At the same time, media serves as a weapon to intimidate and deter the enemy. Most recent example of the human history of wars is the combat activity of the irregular units of the so called Islamic state. They extensively used the media to show brutal scenes of executions, killings and demolition, with the sole purpose to intimidate and demoralize potential opponents. This approach falls into the area of special war which, with today's level of technology, ensures absolute availability to every individual on the planet. However, it is difficult to make the necessary difference in what is information and what is misinformation in times of war.

These examples clearly show how communication can cause but also affect the combat actions. What is particularly characteristic is the fact that despite their basic function, media have the potential to cause negative safety impact not only on the military but also the civilian sector, the difference being that the civil sector has significantly less ability for protection. Military sector has sufficient historical experience for implementation of a successful strategy for protection of this type of war because regardless of the method of communication, army has always had extensive intelligence activities and wide-scale-use of electronics from its very appearance to date. On the other hand, traditional army with encryption, disrupting radar and electronic surveillance, are not synonymous for today's way of using the means of global communication. A major reason for that is the cyberspace, which can not be penetrated with the listed assets. It requires use of brand new technologies and combined intensive surveillance of the military along with the civilian structures. The main difference is in the context and the objective since the global electronic connectivity exposes to threat security of overall civilian infrastructure (Tafoya 2011), which is the subject of protection of the army.

Technology as a Main Weapon to Conquer Cyberspace

In today's digital era, the issue of cyber security is not an issue which concerns only computer scientists. Cyber security has become an essential issue that touches both fields such as business, politics and the army, and every citizen individually. Current level of information and communications technology opens up a whole new space whose conquest commenced the battle that becomes a real war without disturbing territorial integrity and physical security and defence potential of the country. Actually, it is cyberspace and the war being waged for dominance and is developed with the same dynamic with the technology. In this war it is possible to carry out activities which threaten national security, where such activities will be fully independent of territory and extensiveness of physical security resources of the state.

But first things first. Disclosure of "Wikileaks" affair revealed in late 2006 is often considered as the beginning of the cyber war. Since then, Internet had been a field of operations in which war for supremacy in cyberspace erupted later. Opening salvo in the broad front of the cyber war was "fired" by "STIKSET" – the worm virus that acted with a crippling attack in the cyberspace. This level of development of actions was early anticipated by the military and political authorities in developed countries. Seeing the threats of the virtual that can easily move into the real world, substantial resources to defending national cyberspace were invested. Consequently, military

commands of developed countries formed units and command centres for cyber and information space (such military structures, alongside the United States and Russia are also introduced by other countries among which prominent members of NATO, such as for example the German Bundeswehr) In fact, fuelled by escalating cyber-attacks and understanding the real threat of virtual front the NATO command indicated that it changes the focus of the traditional defence warfare to warfare in cyberspace even in 2010. Earlier, the Alliance in 2006 proposed and in 2008 established a joint defence center against cyber threats (NATO Cooperative Cyber Defence Centre of Excellence-NCCDCE) which became fully operational in 2010. Seriousness of the approach to military actions of the Alliance is shown by the fact that the mentioned centre, not only has established cooperation with the military cyber units of the Member States but also with all partner armies and institutions. Moreover, they have incorporated this new military segment (as in the the Defense Institute of Sweden).

It is worth mentioning that these military structures, because of their nature and goals, are introduced as separate kind of branches, such as the army, navy or air force. To clarify the engagements of these forces one must point out that their main task is defence of the military software systems from cyber-attacks, but also monitoring of threats and assessment of opportunities of potential attacks against total national capacities.

Among other things, the new army trend indicates that from the real front in the theatre, armed forces are regrouping and deploying to one relatively unknown and undiscovered virtual space where it is really hard to predict enemy's strategy, based on which to create offensive and defensive tactical actions. It confirms the statement of US General Michael Hayden, former director of the Central Intelligence Agency (CIA) of the United States, who said that it is not entirely clear what strategy to choose, for reasons that, in the long term, there is not a clear picture about the legal and political implications of the decisions to fight in cyberspace (Singer and Friedman 2014, 4). This conclusion is due to the fact that cyber-attacks are unpredictable and it is difficult to define real target of the attack. Such targets can be important civilian institutions and facilities, like airports or national treasury of one country but also capacities closely related to defense such as plants for the production of ammunition, weapons and military equipment. An additional problem is the thin line between the cyber war and cybercrime. Finally, one of the key disadvantages of the new, viral front is that the number of enemy does not play any role, but it is the technological equipment and the ability to control the conduct of the conflict. Also, the problem is the virtual space with still uncertain boundaries for action. In fact, the potential of cybercrime is transformed into potential cyber warfare. The established methods of virtual crime are basis for new strategies for warfare in the cyberspace. Good side of this war is that it takes place without apparent casualties and destruction, because the ultimate goal is to block, impair or destroy the enemy information systems through controlled missile, navigation and communication systems of the enemy.

Finally, before the start of any war, cyber warfare intelligence (spy) activities are also taking place. Later, after the war has already begun, they intensify which depends on the developments on the battlefield. Hence, the advantage for the timely collection of high-quality and reliable

information about the enemy, goes to the party that invests in the development of new technology and trains personnel who will operate it. Ultimate goal like in the warfare in the real space and time, is achieving supremacy in terms of the enemy or the potential enemy.

Given that cyber warfare is already a reality followed by rapid technological development, objectively, the question related to what will be the next level of confrontation, or even more, whether it would be possible to determine the limits of the combat zone comes to the fore. Certainly, that the response cannot give an accurate projection of the development and size of future actions. However, it is an assumed fact that at this front, the armies will attack the opposing installations from its territory in an attempt to influence the policy, the important political and economic results and certainly, the military power of the opponent, which will be their target.

This possibility, combined with media and their great power to create public opinion, are the advantages of cyber warfare because without specific engagement of the armed forces, by spending a relatively low financial resources, and in particular, for at this point, theoretical opportunities for victims and destruction, desired goals that preceded the war can be better achieved. Preparations for the supremacy of cyber Front have already started. It is confirmed by the international cyber defense exercise organized by the NATO Center of Defense Against Cyber Attacks (NCCDCE) which in the month of April 2017 was held in Tallinn, Estonia, where the headquarters of centre are located. The importance of investing in new technology and personnel for successful cyber warfare, confirms the engagements of the 25 states and their active participation in the above mentioned exercise, but also the countries that finance and sponsor this project, including the US, Belgium, the Netherlands, Greece Czech Republic, Slovakia, Turkey, United Kingdom and other as well as Sweden, which is not a resident member of the NATO alliance.

Finally, research in the field of nano-technology, which has already been successfully implemented by the Israeli armed forces leads to the conclusion that war and its practice may take a completely new dimension that will extend the so far acquired and applied military knowledge and skills. This technology allows producing devices with micro size, extremely difficult to detect. If considering that the fundamentals of the military doctrine have available information about the enemy, in order to discern and discover enemy's intentions, it becomes clear that introducing nano technology, combined with the total computerization and digitization, fundamentally changes the military strategy as we know it today.

What Can be Expected?

So far the progress in technology development clearly indicates the impact of technology on the development of new military skills and the manner of conducting combat actions. In addition, it is more than clear that there is a need for reform of the armed forces and their equipping and training for the period ahead. Of course, it should be clear that the army was, is and will remain the basic political entity for the implementation of a policy, i.e. as emphasized by von Clausewitz, the war is continuation of politics by other means or by other means. For enforcement of this policy, there should be specially formatted institutional entity such as the military. As such, "military

should be well organized, politically and socially conscious ethnicity that along with other social groups is a social actor in the political arena. It is trained for a possible use of force when the need arises to protect the nation from external aggression or internal violence (Vankovska 1995, 49-50). In fact, advances in technology will certainly not lead to a situation of war to be led from offices and with the use of keyboards, but as years ago, it will require use of brutal force for the specific realization of political intentions. After all, evidence in itself is the conquest of the Crimea by Russia, military campaigns of the US and NATO in Iraq, Afghanistan, Libya and elsewhere, which are still current military situation in Syria.

Hence, the launch of the so called hybrid wars, which requires planning and setting a new strategic approach to warfare, positions the army and its command structures as one of the primary entity in demonstrating the power of the state. This in turn implies greater involvement of civilian structures in the implementation of strategic-tactical operations. And that is so, because hostilities are increasingly taking place through indirect contact, such as retrieving information, using satellites and unmanned aerial vehicles (drones – for the time being are not considered military targets or attacking assets) for collecting data classified as IMINT, greater use of intelligent military equipment (using guided missiles from a safe distance to targets located by using satellite) instead of sending ground troops, performing foray into political and diplomatic communication or blocking it and so on. This kind of warfare was rated as successful during the so-called Arab spring and later in Ukraine.

Although there is still no exact definition of the modern way of warfare, there is a general assessment of the modern warfare as a multidimensional phenomenon which includes a wide range of activities and actions, directly or indirectly targeted against the enemy. Stated range of activities and actions includes conducting political-economic and media warfare, use of legal but much greater use of illegal methods to gather information on the overall situation on the enemy side and finally performing classic military operation in accordance with the strategic goal, which depending on its successful implementation, can pass without sending ground troops to the enemy territory.

It will not be exaggerated if we say that the development of military means and weapons have influenced the development of human civilization despite all the inhuman load of the wars. Certainly, this is not a justification for war and devastation it brings with it, but it is a fact that research and innovation to reach weapons and equipment to gain advantage at the front, are making a significant contribution not only to change the physiognomy of the war, but also to change the overall human development, nature and the environment in which it exists. In fact, since the invention of gunpowder and its use for military purposes, the mode of warfare has constantly been changing. Changing the mode of warfare is taking place in all spheres. Introduction of guns, tanks and use of missile systems that have significantly changed military strategy employed on the grounds have got a new shape after the appearance of aerial drones and submarines. Encompassing all perspectives, military strategy finally improved with the new dimension imposed by the motives of the great powers to conquer the cosmos, and the opening of the virtual space.

Hence, it is much certain that the laboratories for innovation technology and weapons that will be used in the future, will further strengthen its influence on the development of military skills and warfare as a final political act. Given the infinity the science seeks, the frames of the future fronts will be easier to be set with more precision. However, real running hostilities in years to come will not accurately be perceived, even less the development of the art of warfare in the increasingly expanding space. Finally, with the development of robotics, programming and creating artificial intelligence, conduct of future wars without direct participation of the people in the battles becomes a realistic possibility.

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