HADMÉRNÖK

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THE WAR OF FUTURE – THE FUTURE OF WAR
Views held by the United States on 21st Century armed combat and USA's novelties in military techniques and technologies – Part 2

Absztrakt/Abstract

A szerző cikke második részében a hagyományos haderőnemeknél bekövetkezett illetve folyamatban lévő haditechnikai fejlesztéseket vizsgálja meg. Továbbá azt kutatja, hogy e szervezetek estében, miként alakul a 21. századi hadviselés, illetve hogyan vélekednek erről a különböző amerikai szakértők

In this second part of the article, the author examines the development in military techniques which occurred, or are in process to take place in branches of traditional armed forces. Furthermore, he explores the ways in which, 21st Century warfare takes shape within these organizations and what are the opinions of different American specialists about this process.

Kulcsszavak/keywords: *háború, hadviselés, jövő ~ war, warfare, future*

LAND FORCES

First of all, let's look at how do US specialists see the future's armed combats in case of land forces.

A pilotless robot plane (UAV) provides the location of the enemy base and this report is sent to the forward combat positions. The armed intervention is directed by the commander from 30 kms distance, through satellites. At this point, the human factor enters the forestage. Troops advance to viewing distance, the strike team occupies its position, based on exact GPS coordinates, then it encircles the enemy base. Robots and UAVs approach the target and the attacking infantry's armoured fighting vehicles' cannons open fire.

According to Popps, the future's combat systems is a leap forward in precision weapons, vehicles with human and automatic control, operator-provided modern artillery, unmanned aerial vehicles and such weapons, which enable combat even beyond viewing distance. (2008)

The commanders of tomorrow will have to bring the troops out to the field of combat through new means. Such is, for instance, the Stryker. In case of the Stryker, we can see that the debate about caterpillar versus wheel-based drives was settled, given that this combat vehicle possesses eight rubber-clad wheels. According to "end-users", the vehicle is extraordinarily mobile and quiet. Troops are comfortably seated in it, being the most up-to-date armoured troop carrier vehicle. It is equally quick and quiet on both paved and poor quality roads. With the help of the Sryker, solders are able to strike upon the enemy vanguards as much as 100 kms away, where these do not even expect them.

„The combat vehicle has two main varieties, which are the Stryker IPC (a transport vehicle) and the Stryker MGS (gun tower- equipped) vehicle versions. In addition, eight sub-versions exist for the Stryker IPC. These are: the Nuclear, Biological and Chemical Recon Vehicle (NBC RV), Anti Tank Guided Missile equipped vehicle (ATGM), Medical Evacuation Vehicle (MEV), Mortar Carrier Vehicle (MC), Engineer Support Vehicle (ESV), Commander's Vehicle (CV), Fire Support Vehicle (FSV), and the Reconnaissance Vehicle (RV).

The crew of Stryker ICV is made up of 11 people (commander, driver and 9 crewmen). Its armament consists in the Protector Remote Weapon System. Contents: 1 pc M2 machine gun, 1 pc MK19 40 mm grenade launcher, or 1 pc MK240 7,62 mm machine gun and 4 pc M6 smoke grenade launchers.

Fig.1. Stryker ICV
(Source: http://www.haborumuveszete.hu/rovatok/fegyverek/pancelosok/stryker_pszh/)
(28. 10. 2010)

The Stryker MGS' crew is made up of 3 people (commander, driver and gunner). Its armament consists in a 105 mm cannon with autoloader, which can fire 10 shots per minute." (Art of War, 2006)

Fig. 2. Stryker MGS
(Source: http://www.haborumuveszete.hu/rovatok/fegyverek/pancelosok/stryker_pszh/)
(28. 10. 2010)

Within the land forces arm, the Stryker is only one element in the future combat. As future combat vehicles enter deployment, commanders also have to lead and direct their units and sub-units with different methods. Own forces can be continually tracked through the army's new re-con-tracking system. Every vehicle is equipped with a GPS locator, while own forces are displayed on digital maps with blue identification symbols. By clicking with the mouse on the icon, numerous information appear about the given asset or person. The position of every single combat vehicle is known, vehicle identifiers making possible the determination of their exact position. During combat, this provides a considerable advantage and support, as up to now, connection was only maintained through radio, which was the only way to get to know the position of troops. These days, the terrain, as well as the position of own units can all be seen through a map displayed on a screen. IT provides connection between all fighting vehicles, combat systems and soldiers. However, the successful land combat needs air support, as well.

THE AIR FORCE

The F-16, the new F-22, and moreover, the newest F-35 fighter jets are able to fly at sea level, reaching twice the speed of sound, with a speed of more than 2000 kms per hour.

Fig. 3. F-35 fighter jets
(28. 10. 2010)

Nevertheless, a new technology exists, which may make these planes obsolete. This is the Scramjet[1]. The Scramjet is a supersonic combustion ramjet engine[2], operating with traditional fuel, at speeds of 4-7 Mach. By using hydrogen as fuel, its top speed may be increased to up to 14 Mach. At a speed of 5 Mach, meaning above 6000 km/h, the supersonic flights become hypersonic. The key factor to achieve this top speed is the Scramjet engine's airflow intake and blow-out. Compressed air arriving into the burn-chamber is not slowed down to subsonic speed, as the process created this way provides a larger thrust power and much higher speed. The Scramjet can not only operate on fighter jets. Hypersonic airplanes ensure higher speed and efficiency. Having a greater speed, one can strike deeper and more efficiently into enemy territory. The essence of this system is that the attacking aircraft can cover 1200 kms in 10 minutes, meaning that, a robot airplane can make it from Chicago to Washington DC in this short time. Let's see an example from a present day fighting scene: in Afghanistan, this technology allows to attack a marked target without the need to fly with our fighter jets into a hostile nation's airspace.

The hypersonic jets fly with Mach 10; however, one of the most important technological breakthroughs consists in the development of the slow, unmanned aerial vehicles, the UAVs. Their shape is strange, they are slow and do not have their own weapons yet, but it is highly likely, that these airplanes will serve as the core of tomorrow's aerial arsenal. Coalition forces in Afghanistan use UAVs to recon the enemy positions, and launch attacks from them, mainly with Hellfire missiles. The great advantage of UAVs is that these can fly anywhere and can stay in the given airspace for a prolonged time, while no pilot is endangered. The "electronic eyes" (cameras) monitor the landscape, track the target and warn the navy ships and coastal forces about the potentially hostile activity. UAVs are also capable to escort the fleet, watch for terrorist actions, or perchance, the enemy's landing. According to Leahy, it was the development of IT that brought along the huge advancements. Onboard sensors and other equipment made possible the first informatics revolution, which brought to life the Predator and the Global Hawk, as bases from which, even better such contrivances can take off. (2005).

The pilotless combat airplane (UCAV) will be among the new generation of UAVs also and it will even fly in formation. It doesn't look like any of its pilot flown buddies; it will be smaller and it will be able to put up with stresses which are beyond human endurance.

[1] HTKA: The hypersonic aircraft and their hearths – the Scramjet (http://htka.hu/2009/11/06/a-hiperszonikus-repulogepek-es-szivuk-%E2%80%93-a-scramjet/)

[2] http://hu.wikipedia.org/wiki/Torl%C3%B3sug%C3%A1r-hajt%C3%B3m%C5%B1

Fig. 4. The X-47A UACV
(Source: http://www.jp-petit.org/Disclosure/disclosure_a_doubt.htm)
(28. 10. 2010)

The flight systems and weapons of today's UAVs are still commanded remotely, by an operator, but in the future, these will run automatically, according to a programmed flight plan. In the future, different UAVs will cooperate with each other, based on shared intelligence (reckoning) and decision making, in order to strike a target, while the observing person does not even have to intervene at all. We can state, according to Leahy's opinion, again, that within ten years, one-third of all combat airplanes will be unmanned. Given the integration of arms, the role of traditional airplanes will be to transport the troops to and from the combat zone. The future combat system is expected to ensure fast deployment (dispersion) of the troops. (2007)

These days, a ship-based unit can board a smaller transport plane, which will take it to the marked area, then return to the base. "But we already have such sensors, which will signal us that, at precisely this or that place, there is an almost 600 metre-long open place, which is proper for landing, the ground is solid and there are no enemies nearby. Once the defence is organized, the plane can enter the area and land under any meteorological conditions. What can we do without sensors? The airplane picks up the first platoon, flies over the target area and then, it returns for another load, which it might drop at a much further location. Today, we can't talk about fast and precise aerial troop transports". (Leahy, 2009)

The new technologies revolutionize the land-based and aerial combat of the future, but there are changes in the making at the navy, as well.

THE NAVY

These days, the navy fleet is radically changing. The new navy ships have to execute novel assignments. Furthermore, these vehicles move and fight in ways differing from their predecessors. In the past, navy ships were tasked to fight in open sea combat and to cover with artillery fire the

enemy coast from afar. Nowadays however, there is a need for faster and more expandable ships. Some of these do not even look like ships as we knew them. The FSF1 SeaFighter[3] is a vehicle which was developed by the Naval Research Office.

Fig. 5. The FSF1 SeaFighter
(Source: http://www.ifish.net/gallery/data/500/medium/Sea_Fighter_FSF1.jpg)
(28. 10. 2010)

The aluminium-bodied catamaran was designed for fast actions in shallow coastal waters. It is capable to manoeuvre in as much as 3.5 metres of water depth. It is basically a multipurpose vehicle. Numerous, so called deployment modules were designed into the ship's body, so that it is capable for mine-sweeping, anti-submarine combat, amphibious operations or humanitarian help support. On its right side, or at the back, it can receive or deploy inflatable rafts and remotely controlled boats. The flight deck was constructed for helicopters and vertical landing and takeoff UAVs. Regarding its stealth properties, the inner areas within the hull were coated with such materials, which decrease escaping vibrations and noise by 70%. It is indeed faster and more mobile then racing boats, as its top speed can reach up to 90 kms/hr. Its excellent manoeuvrability is ensured by the two Rolls Royce water jet engines, which can also be operated individually from each other.

In case of traditional combat ships and other fighting vehicles, the propulsion is separated from the weapon system, meaning that the propulsion force is not appropriate for enemy detection, or in the combat against it. However, this principle is to be modified, as well. The new, electric navy ships and fighting vehicles are already on the designers' board.
With the large amounts of generated electric power they can even operate sensors or weapons. The designing process of vehicles is undergoing a change, as more efficient integrated vehicles are in the making, with higher survivability capacity. The generator-produced electricity feeds the propulsion, as well as the radar, sonar, missile launching system, or provides energy for the electronic weapons. The DDG-1000 integrated supply destroyer, which was already presented in the first part of the article, is equipped with the newest traditional weaponry, planned to be updated with even more state-of-the-art weapons during an upcoming stage. The directed energy weapons operate with microwaves, electric impulses and laser beams. Their energy paralyzes or destroys

[3] Strategy Page: Sea Fighter (http://www.strategypage.com/military_photos/military_photos_20052816.aspx)

the enemy's ships and shots down its missiles or aircraft. The new weapon featured on the new ships is the electric cannon, being under development over the last 75 years.[4]

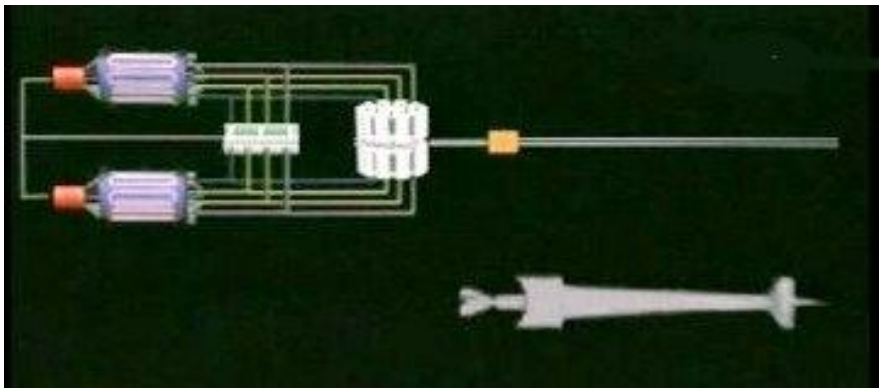

Fig. 6. The electric cannon
(www.wikipedia.org)
(28. 10. 2010)

They send electric current through two parallel sliding rails, which induces an electromagnetic field. The projectile, which is made of a conducting material, is placed between the two rails, closing the circuit. The propulsion energy starts up the process, based on the Lorenz-effect, shoots the projectile out towards the target. The operation principle of the electric weapon is as follows: an electromagnetic field is generated and using the electromagnetic field's reciprocal effect, the projectile moves along the two rails at a speed of 6-7 kms/second. This is 5-6 times faster then the customary speed of traditionally charged weapons. The grenade moves so fast, with such a kinetic energy, that there is no need for a warhead. During testing, the Wolfram bar used as a projectile penetrated through the armour plate of a tank.

Its other considerable advantage is the firing range. The Navy plans to deploy into combat electromagnetic cannon with a firing range of 400 km.

The projectile covers 80% of its 500 km trajectory in outer space. During its return, the atmospheric drag slows it down a bit, but even this way, it is much faster then the grenade of any of today's weapons.

CONCLUSION

As a conclusion, we can assess that, in all three combat arms of the USA, such techniques and technological developments are under way, which, according to my own judgement, are far exceeding the framework of anti-terrorism combat and are maximally appropriate for deployment in conventional armed combat, if the nation's interests dictate it so.

[4] „During the 1920's, the Norwegian Birkeland already developed an electric cannon, based on his patent registered in 1902. During the 2nd World War, the Germans also did experiment with such a weapon, but the technology of that time was not yet appropriate. The USA started experimenting 20 years ago, at smaller scales and they arrived here through a process full of hurdles" (Twentieth Century: The Electric Cannon http://www.huszadikszazad.hu/index.php?apps=cikk&cikk=5055)

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