

# The Future Land Battlefield and Armor

by Dr. Azar Gat

Since the outbreak of war in Ukraine, we have heard a lot about the new technologies that have revolutionized warfare: drones of all types and sizes – armed, loitering and self-destructing; artificial intelligence and big data; cyber; automation and robotics.

All this is familiar enough. And still, it is unclear whether the full meaning of the revolution in shaping the armed forces and weapon systems in land warfare has been grasped. The term “revolution in military affairs,” already coined by 1980, says nothing about the causes and nature of this revolution. This article proposes a broad historical-conceptual framework within which all the above developments can be understood, and outlines what their practical consequences are likely to be.

Humanity is going through the third industrial-technological revolution – after the steam and iron revolution of the 19<sup>th</sup> Century and the revolution generated mainly by the internal-combustion engine during the first half of

the 20<sup>th</sup> Century – both of which also deeply affected warfare. Some call the changes we are living through today a fourth industrial revolution, but all the preceding changes are products of the same fundamental technology that has been advancing since the middle of the 20<sup>th</sup> Century: the exponential growth in electronic computational power.

## Transformation

Note how this technological revolution has transformed naval and air warfare. At sea, the heavily armored, big-gun capital ships have vacated the scene, and warfare is carried out offensively by electronic guided missiles and defensively by electronic disruption and interception systems. Similarly, air warfare, once based on the kinetic capabilities of planes and their armament, now relies primarily on electronically guided weapons and electronic defensive systems. Both at sea and in the air, victory now depends on which nation is a step ahead of its rivals in these crucial techno-tactical spheres.

The medium in which land warfare takes place is far more complex than those of the sea and air, because of both the numbers involved and land’s complex topographical features. But at least since the early 1980s the direction has been clear to those who grasp the broader context. The revolution that land warfare is undergoing is no less profound and far-reaching than that generated by the mechanization revolution and the introduction of the tank and other armored fighting vehicles.

It was J.F.C. Fuller, the leading, pioneering theorist of mechanized warfare, who firmly placed the mechanization revolution in war within the context of the second industrial revolution and thereby helped people understand its full significance and scope. Incredibly, as early as 1928, he had already looked farther ahead, predicting that the third revolutionary wave of the future – which would shape war, as all other fields of life – would be “electric and robotic” (the word “electronic” did not yet exist).



## Land warfare's backbone

Let us focus on the tank, a product of the second mechanization revolution and the backbone of land warfare for about 100 years. Ever since World War II, tanks have primarily been optimized to fight other tanks and, secondly, to withstand hollow charges. Their main armament is a high-velocity gun firing kinetic projectiles. Half their 60- to 70-ton weight in most armies consists of heavy armor, which in turn requires a 1,500-horsepower engine.

However, tanks will no longer be able to reach kinetic gun range from each other. They will be discovered and attacked at much longer ranges. This is no different than with the mighty battleships of World War II's Pacific Theatre, which never came within firing range of each other. New gun munitions adapted to the new forms of warfare, as well as the adjustment of the tank's gun to launch guided missiles, are merely intermediate solutions that bypass the question of what the current utility of the heavy kinetic gun itself is.

The tank's heavy armor has similarly reached the limits of its ability to withstand precision, tandem hollow-charge, fire-and-forget munitions, which target the tank's top. The wholesale destruction of the hapless Armenian army in the 2020 war against Azerbaijan – like the stranded and harassed Russian convoy enroute to Kyiv, Ukraine, and the image of the Russian armored battalion massacred during its attempted river crossing in the Donbas, Ukraine, with the shattered bridge in the middle – starkly expresses current reality.

This does not mean that the tank and other fighting vehicles are history. But the answer is not to be found in

further reinforcing heavy armor or in improved tactical practices, clumsy as Russian tactics proved to be. Rather, the answer lies in a full-scale adjustment of land fighting vehicles to the ongoing electronic revolution – above all in adopting active defense systems, such as the Israeli Trophy and Iron Fist, now purchased and installed by the United States, German and British armies.

Active defense means electronic detection, disruption and interception of incoming projectiles – the same revolution that sea and air warfare have already undergone. As these systems become standard everywhere – and this is only a matter of time – battlefield success will depend on the question of which side possesses the last word in terms of offensive and defensive electronic systems and counter-systems. As in air and sea warfare during the electronic age, it can be expected that when one side holds a decisive advantage in these systems, we shall see crushing, almost one-sided victories in regular conventional land warfare.

Such systems are currently installed on heavily armored fighting vehicles as something extra, whereas they are in fact destined to replace heavy armor, whose effectiveness has in any case been nosediving. Current fighting vehicles are thus intermediate breeds which combine two eras – the old and the new. This is true for the latest models of the Abrams, Leopard and Israeli Merkava alike. The heavy armor is no more necessary for land fighting vehicles than the 350-400mm steel armor of the past is necessary for warships today. It is a disadvantage.

## Less can be more

Indeed, relying on electronic detection

and interception systems enables a drastic reduction in the armor of fighting vehicles for what is necessary against small arms, shrapnel and blast. Hence an expected reduction in their weight to about 10 to 25 tons; a parallel reduction in engine size and weight; and design re-orientation to electronically guided defensive and offensive systems. This, I submit, is the direction land warfare and land weapon systems are heading in the electronic-computerized age.

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