



The Limits on Technological Superiority

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BESA Center Perspectives Paper No. 2,234 November 20, 2023

EXECUTIVE SUMMARY: After Israel's disengagement from the Gaza Strip and the entrenchment of the Hamas terrorist organization there, a war of attrition commenced between Hamas and Israel that has lasted for almost two decades. As Israel's defense doctrine leans heavily on technological superiority, it has depended primarily on its numerous technological assets to manage this conflict. By contrast, Hamas, which is significantly disadvantaged in terms of technology, has pursued a strategy designed to neutralize Israel's technological superiority through the use of terror tactics against civilian populations and the employment of low-tech and readily available means of warfare. The success of the surprise attack initiated by Hamas on October 7, 2023, demonstrated that Israel's overreliance on technology in a conflict like this one was a flawed and even perilous concept.

Throughout the nearly two decades since the disengagement from Gaza, Israel has found itself embroiled in a protracted violent struggle against Hamas (which is supported by another terrorist organization based in the Gaza Strip, Islamic Jihad). Hamas has consistently focused its efforts on terrorizing Israeli civilians. For those living near the Gaza Strip in the area known as the "Gaza Envelope", life has been unbearable for many years. Israel always responded to Hamas's terror attacks on those communities with limited force, without ever achieving a decisive resolution.

Over the years, there have been 16 military operations or rounds of conflict in Gaza, averaging about one per year. In each case, the technological capabilities employed by the IDF became more advanced and sophisticated. Iron Dome, an advanced short-range missile defense system developed in Israel, was put into operation in 2011 and has been highly successful at intercepting Hamas's rockets. In 2021, the construction of a sophisticated technological barrier was completed that stretched approximately 65 kilometers along the entire length of the Gaza Strip. Israel invested three years and 3.5 billion shekels in this barrier, which was one of the most complex and advanced engineering projects ever conducted in the country. It involved a complex underground barrier with advanced sensing systems, an above-ground technological barrier with surveillance technologies, remote-controlled weapons systems integrated into an advanced detection system, maximum coverage cameras for the area, and command-and-control war rooms.

Yet on the morning of October 7, 2023, Hamas launched a massive, highly successful murderous attack on the southern IDF army bases and settlements bordering the Gaza Strip. Using basic means of communication, such as handwritten messages and person-to-person oral contact, Hamas leadership managed to handle the entire operation's communication channels and avoid early detection by Israel. By using simple measures, they successfully disrupted the advanced technological systems responsible for on-site detection and prevention, followed by partial interference with the IDF's communication systems. These successes led to a mass infiltration by a large number of terrorists into the settlements and military bases, resulting in an unprecedented number of dead, injured, and hostages taken including both civilians and IDF personnel.

The perception that technology alone can lead to military dominance reached its peak in the early 1990s with the emergence of the "Revolution in Military Affairs" (RMA) concept. This idea posits that military superiority relies on advanced technological solutions to address a wide range of threats and scenarios. It took root in American defense circles and influenced the strategies of several Western armies, including Israel's.

From its inception, Israel has emphasized the acquisition of technological superiority as a means of countering numerical inferiority. Over the years, this

strategy has become a cornerstone of Israel's identity as a technologically advanced nation, earning it the nickname "Start-Up Nation". It significantly affected Israel's national security perception and its military. This perception is well reflected in the country's innovative defense industry and the high number of Israeli technology start-ups in the defense sector.

One of the ultimate goals of advanced technological defense systems is to provide a real-time, comprehensive operational picture of the battlefield at any given moment. Efforts to achieve this goal involve the development of means that can "see" through walls or underground, advanced sensing systems capable of providing continuous battlefield coverage around the clock, improved data compression techniques, and more efficient transmission methods for large volumes of data. Additionally, it includes the utilization of artificial intelligence to assist in rapid decision-making, based on the large volume of data collected.

However, no matter how advanced technology becomes, it is highly unlikely to completely eliminate the "fog of war". Moreover, the increasing reliance of advanced armies on technological systems creates a certain vulnerability. Alongside the advancement of information technology in recent decades, more significant points of weakness have become apparent. The most advanced tracking systems can be countered by simple measures, such as drones and explosive devices. Highly advanced sensors have limited capability to provide information about what is happening in underground bunkers and tunnels. Urban areas pose particular challenges as they contain large numbers of people and structures that all represent potential targets for tracking. In addition, there is the significant problem of the difficulty in distinguishing between non-combatants and adversaries.

A successful attack on Israel's military information and communication networks can blind and silence its forces for significant periods, as indeed happened on October 7. The events of that day were the result of those limitations and serve as proof that even a modern military, armed with state-of-the-art equipment and technology, can be caught completely off-guard.

The conclusion of World War II heralded a change in the landscape of violent conflict worldwide. This change is reflected in the ascendance of asymmetrical

conflict involving non-state actors, such as terrorist organizations, much like the conflict between Israel and Hamas. Asymmetrical conflicts are characterized by a growing involvement of the civilian population and a blurring of distinctions between the frontlines and the home front. These conflicts are often limited in scope, and traditional notions of victory in war or total defeat of the enemy are no longer valid.

One of the major components of asymmetric conflict is access to military technology. The more economically developed a country, the more advanced its military technology. This reality is clearly seen in the balance of military power between Israel and Hamas. By directing attacks against non-combatant civilians, the side in the conflict that holds the technological disadvantage – Hamas – aims to cancel out the asymmetry. As Israel holds such a clear technological advantage, Hamas cannot compete in a technological arms race, and it does not try. Instead, it resorts to simple and less advanced means that make it much more challenging for Israel to use its technological advantage.

An excellent example is Hamas's use of incendiary balloons and kites, which it started launching towards Israel in April 2018 and which caused severe fires in the communities near the Gaza Strip. These simple means of warfare frightened residents and stirred public anger towards the IDF, which struggled to cope with them. As part of this trend, Hamas also began using cheap, readily available civilian drones with a wide range of applications, including military purposes such as intelligence-gathering and the carrying of explosive charges. Hamas has used drones like the DJI Matrice 600, which is capable of carrying a payload up to six kilograms and which can reach a maximum speed of about 65 km/h.

The primary battlefield on which the State of Israel combats terrorist organizations such as Hamas is an extremely dense and populated urban area, rife with enemy units that constantly try to hide from the IDF's advanced sensor networks. They seek to inflict damage and quickly disappear into shelters or underground bunkers and tunnels. Although technological supremacy is, and will probably remain, an important element of the IDF's modus operandi, recent years' experience teaches that the key to winning the war against terrorist organizations that employ the tactics discussed above will likely require full control of the territory. Though some degree of control can be achieved by means of technology, full control

demands a substantial, sometimes massive, presence of "boots on the ground", as the United States learned in its campaigns in Afghanistan and Iraq. Even a technologically advanced military force will always remain vulnerable when facing such warfare, and it is unlikely that a miraculous technology will emerge to change that fundamental reality. Overreliance on technology in conflicts of this nature can, in certain circumstances, act as a dangerous hindrance to achieving the desired outcome, as seen in the events of October 7, 2023.

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