Hamas and Technology: One Step Forward, Two Steps Back

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Scientific and technological advances have made various applications affordable, available, and easy to operate – including in the security realm. The article examines this development as it relates to the modus operandi of Hamas and its threat to Israel. The essay provides an overview of the events of mid 2018 to mid 2019 along the Gaza Strip border, from the beginning of the Marches of Return to the middle-to-high intensity fighting, and questions Hamas's limited use of advanced, off-the-shelf products despite their accessibility; indeed, the organization clearly prefers to use primitive means of attack. The essay posits that restraining factors inhibit Hamas's use of more advanced technologies in its struggle against Israel, including deterrent and psychological factors that discourage using advanced technologies, political restraint, the effect of classical means, and the power of inferior means over technological superiority.

Keywords: terrorism, low intensity warfare, Hamas, March of Return, technology

Over the last decade, the world has witnessed scientific and technological developments that have made various applications affordable, available, and easy to operate. In a dramatic change from the past, some have even become off-the-shelf products that are easily purchased and operated. This revolution is evident in every area of life, including security. The essay below seeks to examine the effect of technological changes on the conflict between Hamas and Israel. It begins with a description of the changes in technology and surveys changes in Hamas's use of various means of warfare

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since its inception. It then analyzes characteristics of Hamas's warfare over the past year on the Gaza Strip border. The essay seeks to examine why Hamas prefers tried-and-true types of operations and even more "primitive" attacks, despite its ability to deploy advanced technologies. The essay posits that restraining factors inhibit Hamas's use of more advanced technologies, including the deterrent and psychological aspects of using advanced technologies, political restraint, the effect of classical means, and the power of inferior measures in face of technological superiority.

Changes in Technology

The expression "the drone revolution" describes the phenomenon whereby unmanned aerial vehicles (UAVs) have become common, affordable, and extremely available. In the past, if a party wanted to use an aerial vehicle operated from a distance, it would generally have to rely on large, complex, expensive systems requiring a long period of training. Now, however, thanks to changes that have occurred in the last decade in science and technology, drones are inexpensive, easy to operate, off-the-shelf products available for purchase in stores and on the internet without any prior authorization. Although these drones do not provide advanced military UAV capabilities, their capabilities do meet the needs of some users, such as amateurs/hobbyists, civilian companies, and even certain military units.

The drone revolution is an example of a broader phenomenon: available technologies that are easy to operate and affect the economic market and user profile. At present, technologies from the civilian system are moving into the defense establishment (in contrast to the opposite direction, typical of the past) such that military forces are increasingly using off-the-shelf rather than militarily developed products. But when technology is developing exponentially, not only states and companies enjoy the change: "the major beneficiary is actually the enemy with limited technological capabilities making use of innovative commercial systems to compensate for gaps in capabilities and resources."[1]

The Technological Aspect of the Asymmetrical Conflict

Terrorist organizations have the ability to affect public opinion and, to a certain extent, shape the policy of nations much bigger and more powerful than they, in part because they stage unexpected attacks with the capacity for intimidating audiences beyond the immediate victims.[2] Moreover, some such organizations, including Hamas, operate not "only" as terrorist

organizations, but also as "terrorilla" armies that incorporate aspects of terrorism and guerrilla, embedded within civilian populations that they use to shield themselves. Such organizations are non-selective, opting to target the civil population of its opponent in clear civilian settings, as well as military forces.[3]

Technological developments have expanded terrorist organizations' current operational options, and an attack of a clear technological nature can have a broader effect simply because of its psychological impact. It is therefore reasonable to assume that terrorist organizations, especially the more prominent players among them, would take an interest in technology.[4]

Technology in the Service of Hamas and Israel's Response

Since its inception, Hamas has developed significantly in terms of its technological capabilities, on the understanding that its means of warfare have an effect not only on the tactical but also the strategic aspects of the conflict.

During the first few years of its existence and in the first intifada, Hamas terrorism reflected its status in Palestinian society. The start of its violent path included kidnappings, murder, stabbings, and the use of light weapons.[5] When the military branch of the movement gained in stature, Hamas carried out its first suicide attack – in the Jordan Rift Valley, in April 1993. The attack, involving explosives, was an advance over previous tactics, which sported light weapons, as well as Molotov cocktails and rock throwing. Over the years, Hamas made a point of staging attacks using explosives, sometimes with suicide attackers and at different levels of technological sophistication of explosives or smuggling methods.

In 2001, armed organizations from the Gaza Strip, chiefly Hamas, started using high trajectory fire against Israel. At first, these were improvised Qassam rockets and mortar bombs with little precision and low payloads, but as time passed the range of firepower grew – the products of more sophisticated self-manufacturing and the smuggling of weapons into the Strip.[6] These actions are evidence of a technological and organizational change in Hamas. In 2004, the organization took a further step when it changed the military arm from a terrorist group to a body with institutional patterns of action and a military doctrine. The elimination of senior Hamas members strengthened the external leadership, leading to the forging of a close relationship with Iran. Consequently, the military wing in Gaza, directly subordinate to the external leadership, started to benefit from

handsome budgets and professional guidance by Iran's and Hezbollah's intelligence apparatus.[7] After Israel withdrew from the Gaza Strip and Hamas seized control, the terrorist organizations there, especially Hamas, equipped themselves with arms and engaged in rocket fire at a more rapid rate than before.[8] Moreover, Israel's withdrawal enhanced Hamas's efficient use of its subterranean fighting capabilities, as manifested in Operation Protective Edge in 2014.[9]

Another reflection of Hamas's arms acquisition and modus operandi is its ability to operate aerial force, as was made clear by the head of the Israeli Counter-Terrorism Bureau in September 2010 when he declared that Hamas has obtained UAVs from Iran.[10] Later, Hamas transitioned to self-manufacturing, which in 2012 led the IDF to destroy buildings in Khan Yunis used to manufacture and store high quality UAVs with a range of dozens of kilometers, which provided the organization with important strategic capabilities. In addition, in 2013, Israeli military forces apprehended a Hamas cell planning to fly an armed UAV into Israel to stage an attack, and, in 2016, the Israeli Air Force intercepted a UAV that came from the Gaza Strip that was approaching the Israeli border.[11] There were three stages to this technological development: the acquisition of knowledge and storage of materials; the use of technology received from Iran; and the assembly of UAVs and use of tools it tried to bring into the Gaza Strip and operate with the guidance of foreign parties, such as the engineer Muhammad a-Zawari. Zawari, who worked in UAV development and seems to have helped both Hamas and Hezbollah improve the UAV systems at their disposal, was shot at close range in Tunisia.[12]

Another advanced technological sphere used by Hamas is cyber warfare. The most memorable of its cyberattacks, which took place in 2014, disrupted Israel's satellite broadcasting, bringing Hamas propaganda to television screens in thousands of Israeli homes.[13] There was also an attempt to hack smartphones belonging to Israeli soldiers in order to spy on them.[14] Furthermore, during the round of fighting in May 2019, unusual activity was reported, including a Hamas attempt to penetrate a computerized system in Israel that was meant to "disrupt the fabric of life in the country"; the attempt was foiled by the IDF and the Israel Security Agency.[15]

In the face of Hamas actions and changes in its modus operandi, the IDF and Ministry of Defense are engaged in ongoing preparations and responses. It is evident that Israel develops solutions in response to virtually every means Hamas adopts for extensive use. This is due to Israel's technological

superiority, even when the problems Hamas poses are relatively simple, but action is also taken because of changes in operational patterns and military doctrines. For example, in the last decade, Israel has used technology to prevent and foil attacks;[16] Israel developed the Iron Dome interception system and put it into operational action;[17] it has developed and applied advanced technologies to identify and destroy tunnels;[18] and it is currently seeking technological solutions to the problem of incendiary kites and drones.[19]

Technology and Off-the-Shelf Products in Hamas

Given Hamas's widespread use of technology, which includes relatively advanced UAVs and cyber applications, one might expect the organization also to adopt extensive off-the-shelf technologies, especially drones, for both intelligence and attack purposes, as these have become common in terrorist organizations around the world. Here, it is worth differentiating between the use of UAVs, especially the type Hamas received from Iran or developed, and the use of drones. The use of off-the-shelf products does not require extensive infrastructures or complex development; indeed, operating them is very simple.[20] Terrorism research reports generally indicate that many organizations have adopted drones, despite their inferiority, to operate aerial forces for intelligence and attack purposes and make significant use of the aerial realm, which to date was beyond the limits of an element without an air force.[21] Furthermore, if until a decade ago one had to have millions of dollars and an acquisitions contract with a nation such as the United States before one could operate a unmanned aerial vehicle for intelligence and attack purposes, today one can carry out similar actions using unsupervised, off-the-shelf products that one can operate without any training at all (table 1).

Against this background, and based on the fact that Hamas smuggling operations and intelligence assessments were thwarted, the expectation was that the organization would make extensive use of drones. In fact, the Israeli State Comptroller's report dealing with the flaws in properly assessing the drone threat warned that Hamas, like other terrorist organizations, would use them for gathering intelligence and staging attacks against Israel.[22] Similarly, statements and tenders (in the field of systems to foil drone activity) issued by the Ministry of Defense[23] are also evidence that extensive use of such off-the-shelf products is seen as a possible or even real threat to Israel.

Table 1: Military vs. Shelf Technology in Unmanned Aerial Vehicles[24]

MQ1 Predator UAV	DJI Phantom4
	
US UAV made by General Atomics	Chinese drone made by DJI
Purpose: ISR and attack	Purpose: aerial photography and amateur/hobby flying (it is possible to make pirate adjustments so that it can be used to broadcast intelligence in real time and to attack)
Sold with very strict US export restrictions only to states	Sold on the internet without restrictions to anyone with a credit card
Requires a flyer and systems operator	Requires only an operator
Requires extensive training for operation	Can be operated based on the instructions included in the kit; instructions can be easily and quickly learned also by watching internet videos
Requires extensive technical support and complex maintenance for operation	Does not require support or maintenance; one can keep several units for the sake of redundancy in case of malfunction or loss

Israel is not the only nation that views such use as a real threat. Other nations around the world relate to the issue the same way. For example, they are concerned drones might be used to scatter hazardous materials into the air, as demonstrated in a simulation at the 2016 Nuclear Security Summit,[25] and are concerned about hostile attacks or irresponsible use of drones liable to pose a risk to human life, something that occasionally leads to an airport closure around the world, when drones flying in the vicinity are identified.[26]

Au Contraire: Why Hamas Does Not Make Extensive Use of Drones

The March of Return campaign, which began in the Gaza Strip on March 30, 2018, included weekly demonstrations near and at the border. Under civilian cover, terrorist activities used a range of means – both "primitive"

ones, such as kite bombs and balloon bombs, and familiar actions of bomb throwing and sniper fire, as well as more modern technology-based activities.[27] Moreover, during the year, the conflict escalated to the point of medium and high intensity warfare, which included sniper fire, the launch of hundreds of rockets, and the firing of anti-tank missiles at both military and civilian targets.

This stage of the Hamas-Israel conflict can serve as a limited case study for the era of available shelf technologies. Given the availability of these, it was expected that under the cover of civilian demonstrations and rounds of fighting, such technologies would be employed, all the more so given the fact that the organization has already showed its ability to do so. For example, in May 2018, Hamas deployed a booby-trapped drone under the cover of the rioting near the fence.[28] A year later, in May 2019, a pair of armed drones was used during a round of high intensity fighting.[29]

However, a numerical analysis of Hamas actions indicates that although it has proven it can use advanced shelf technologies, it prefers to employ older, familiar patterns of action and means of warfare; in fact, it seems to be making a point of harnessing even more primitive methods to its cause. Table 2 charts modus operandi and means of warfare used from the start of the Marches of Return to the end of the eighth round of fighting against the background of the weekly demonstration.

The data indicate a total of 1,923 attacks. A review of the media reports from the relevant time frame shows that 1,490 balloon and kite bombs were sent and that on two occasion live birds were used to start fires. By contrast, drone and model airplane bombs were used a total of six times. Figure 1 offers a breakdown by percentage.

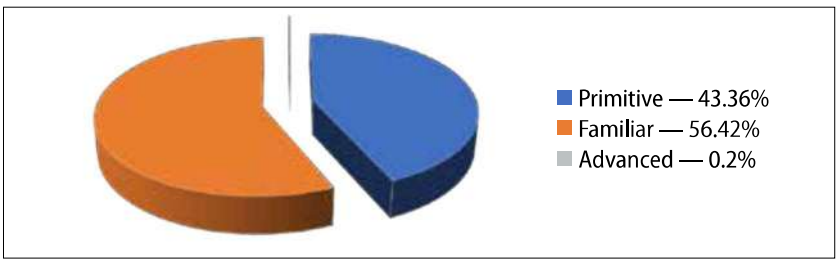

Figure 1: Assessment of Hamas's Technical Means

Table 2: Hamas Terrorist Acts, March 30, 2018-May 5, 2019[30]

Type of Action	Method/Means	Number of Uses
Primitive	Winged creatures for arson	2
	Kite and balloon bombs	1, 490
Familiar	Arson of structures (with gasoline)	13
	Molotov cocktails	739
	Rock throwing	No data collected
	Stabbings	0
	Firearm fire	43
	Sniper fire	8
	Kinetic fire	11
	Grenades	75
	Improvised grenades	18
	Improvised roadside bombs	159
	Pipe bombs	73
	Mortar bomb fire	23
	Anti-tank/anti-aircraft fire	4
	Rocket volleys	775
Technological	Armed drones and model airplanes	6
	Cyberattacks	1

A breakdown of the data shows that despite expectations, and despite the availability of technologically advanced off-the-shelf products and its proven ability to use them, Hamas has overwhelmingly transitioned to primitive patterns of action at a number that is almost identical to their use in recent decades. Hence the question: Given that off-the-shelf products and advanced technologies are within Hamas's reach, why does the organization continue to rely on familiar, even primitive terrorist patterns of action?

There are five principal factors restraining Hamas's use of advanced technologies in the conflict:

a. *Deterrence*: Deterrence has a great impact on the adoption of new technologies by Hamas, from when they are adopted, through the

elimination of knowledge bases, to the fatal outcome of a technologically advanced attack, which could generate a massive reaction given Israel's internal public support and even international legitimacy for a response.[31]

b. *Psychology*: The psychological factor, a cornerstone of the terrorilla strategy, stems from a reading of the sensitivity of world and Israeli public opinion.[32] Using advanced technologies could harm the organization's image as the weak side or the victim in this asymmetrical conflict, and could therefore turn the tables on Hamas.
c. *Political restraint*: Despite the common belief that a terrorist organization will always strive to harm its enemies, unique political circumstances can serve as a factor restraining the use of advanced technologies. For example, as Hamas now depends on Egypt's help and Israel's willingness to compromise its attitude to the organization in exchange for a period of calm, the use of advanced technologies might upset the balance and change the rules of the game between the sides as these rules have emerged in the years since Operation Protective Edge.
d. *The impact of classical means*: Roadside bombs and bullets will remain terrorists' preferred options because physical attacks are more deadly, arouse fear, and force the enemy to concede to terrorists demands. Bruce Hoffman, in his research on terrorism, has spoken of the paradox in the context of terrorist organizations' chemical and biological capabilities, claiming that these have far caused fewer deaths "compared to the gun and the IED."[33]
e. *The impact of inferior means in the face of technological superiority*: The State of Israel reacts to a significant number of security challenges it faces by relying on its technological superiority. Since their introduction, the more primitive means have proved that they cause damage that Israel finds hard to foil or address with technological means. This itself is further incentive for Hamas to use these means rather than technologies that might be foiled by electronic or other advanced means of warfare.

Conclusion

Changes in technology over the last decade in every area of life, including security, allow both armies and sub-state organizations – including terrorist organizations – to use off-the-shelf technologies to achieve their goals. Hamas has proved that it is an adaptive movement, changing its modus operandi and adopting diverse technologies to serve its needs, and that it is also capable of using advanced off-the-shelf products, such as drones, as

well as even more advanced means. Nonetheless, there are several factors that deter extensive use of advance technologies, representing only part of the explanation for their surprisingly sparse use compared to Hamas's overwhelming preference for primitive means, such as kites and balloons.

However, this is not to say that Israel can afford not to prepare, foil, or defend against terrorist organizations' use of drones in particular and other off-the-shelf products in general. On the contrary, these organizations' ability to use diverse technologies will only grow in tandem with technological developments. Therefore, nations facing such threats, including Israel, must on the one hand take preventive measures in the field of regulation and foiling activity – namely, in government intervention in the acquisition and development of drones and model airplanes, whether by supervision or restriction. On the other hand, they must understand the essence of the restraining factors and examine how to harness them to better confront a terrorism threat encompassing a vast range of methods and means.

Notes

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