

Intelligence and the Challenges of High Trajectory Fire

Amir Kulick

Introduction

Every state defines its basic self interests and what in its mind constitutes existential threats. On the basis of these definitions, the state formulates the relevant responses, whether military, diplomatic, economic, or other, to events and developments. For years, the Israeli military response relied on three basic principles: deterrence, warning, and decision. The three principles implied that Israel must deter the Arab states from starting wars. Should deterrence fail, then Israel's intelligence must supply a timely warning of an impending war in order to allow the army time to prepare. Once the war has erupted, Israel must have the capability of moving the fighting onto enemy territory and wrest a quick decision in the campaign, given Israel's lack of strategic depth and limited capacity for endurance.¹

These three principles – deterrence, warning, and decision – were intended to address the threat of conventional war. However, recent decades have seen the waning of this threat. Egypt's exit from the circle of confrontations with Israel, Syria's decision once the USSR collapsed to quit the race toward "strategic balance" with Israel, and the elimination of Saddam Hussein's Iraq as a military power all contributed to this process. At the same time, two other types of threats have increased: suicide terrorism and high trajectory weapons. Both threats, formulated to avoid frontal confrontations with the Israeli army, became the weapons of the weak that exhaust the Israeli home front. The different natures of these two threats invite a reexamination and expansion of the concepts underlying Israel's military response. During the al-Aqsa intifada, for

Amir Kulick is a research associate at INSS.

example, the question of how one deters a suicide terrorist setting out on his mission fully intending to die became extremely urgent. In terms of warning, the challenge was no less complex. In the past, intelligence warning about the enemy's plans for a war was achieved by analyzing the routine activity of the enemy military and signs indicating it was preparing for battle. Because intelligence usually dealt with the context of large scale battles, the challenge of detecting warning signals lay in the interpretation of the enemy's intentions and less in finding indicators for war. In contrast to warning about an impending war, suicide bombings are carried out by small compartmentalized cells and within fairly short periods. Similarly, the question of decision became problematic in the context of coping with the threat of suicide attacks, especially since terms of time (an extended confrontation), space (the front and the civilian rear), and the enemy (sub-state organizations) were entirely different.

Nevertheless, it would seem that in recent years Israel found a relatively successful formula for coping with suicide terrorism, combining precise intelligence, preventive efforts on enemy ground, and physical barriers. By contrast, it still has a long way to go in terms of coping with the threat of high trajectory fire on the civilian front. This essay considers the formulation of a response to this threat by expanding the principle of early warning within the country's national security philosophy, and examining the intelligence aspects beyond warning in the context of countering the threat of high trajectory fire.²

Development of the Threat of High Trajectory Fire

The use of high trajectory fire against Israel's civilian front is not a new phenomenon. Already in the 1960s, artillery fire was directed from the Golan Heights towards the settlements in and surrounding the Hula Valley. In the 1970s and in the early 1980s, PLO operatives adopted this tactic of warfare and fired barrages of rockets from southern Lebanon at northern Israel. After the PLO was ejected from its Lebanese strongholds by the IDF in 1982, Hizbollah took its place. This organization too gradually adopted rocket fire as a central component in its war against Israel. During the two extensive rounds of fighting between the IDF and Hizbollah in the 1990s (Operation Accountability in 1993 and Operation Grapes of Wrath in 1996), Hizbollah made massive use of rocket fire against northern Israel. From these events, the organization concluded that the IDF does not in fact have an effective operational response to this

type of threat, and that the fire has a significant effect on the Israeli home front. Accordingly, high trajectory fire became the dominant component of Hizbollah's military doctrine.

Hizbollah apparently constructed the core of its high trajectory force after the Israeli withdrawal from the security zone, when it was relieved of ongoing skirmishes with the IDF and had the opportunity to turn its attention to systematic preparations for a comprehensive war. And indeed, during the years preceding the Second Lebanon War, the organization significantly expanded its arsenal of high trajectory weapons. Israeli defense sources assessed that on the eve of the war Hizbollah was in possession of some 13,000 Grad rockets with a range of about 20 km, and thousands more longer range rockets.³ For Hizbollah, the Second Lebanon War confirmed the effectiveness of this weapon and the fact that the IDF finds it difficult to respond to the high trajectory threat. Its arsenal of rockets has grown significantly since the war, and according to Defense Minister Ehud Barak now can threaten most of Israel's sovereign territory.⁴

Given the lack of an effective Israeli response to high trajectory weapons, Hamas too sought to construct similar rocket batteries. From June 2007, after its takeover of the Gaza Strip, Hamas embarked on a program of accelerated buildup and manufactured hundreds of rockets, improved their ranges, and smuggled Grad rockets with a 40 km range into the Gaza Strip. After Operation Cast Lead (December 2008 – January 2009) Hamas began attempting to acquire rockets with even longer ranges.⁵

Similar conclusions about the effectiveness of high trajectory weapons in the struggle against Israel have been drawn by Syria. For years the Syrian army has had a varied arsenal of high trajectory weapons, which includes rockets of different ranges and surface-to-surface missiles of ranges of hundreds of kilometers. Syria apparently thinks highly of the way Hizbollah deployed its rockets against Israel in the Second Lebanon War, and is looking to duplicate both the objectives of that war (massive damage to Israel's civilian front) and the way the launchers were operated at the tactical level.⁶

The Enemy's Use of High Trajectory Weapons

In order to understand the role played by intelligence against the threat of high trajectory fire, it is necessary to examine the principles underlying the use of this weaponry. In general, as one may conclude from the Second Lebanon War and Operation Cast Lead, at the heart of high trajectory weaponry is the idea of creating a significant threat of fire against Israel's home front while at the same time blocking or delaying IDF ground maneuvers. This is attained by means of several principles:

- a. Defining the civilian rear as a central target. The *raison d'être* of high trajectory weapons is to damage Israel's civilian front. This general definition has many practical ramifications, including a choice of quantity over quality, i.e., equipping the force with as many rockets as possible, despite the fact that they are a weapon that statistically lacks accuracy, instead of constructing heavier precision systems such as surface-to-surface missiles. Other ramifications relate to the choice of targets (civilian targets and urban centers) and warheads with which to equip the rockets.⁷
- b. Widespread deployment. Both Hizbollah in Lebanon and Hamas in the Gaza Strip have sought to increase the launchers' survival odds by deploying them over large areas. So, for example, during Operation Cast Lead in the Gaza Strip, rockets were fired from the northern part of the Strip, from Gaza City, and from the southern part of the Strip. During the Second Lebanon War Hizbollah deployed its rockets over much larger geographical expanses in Lebanon, primarily south of the Litani River but also north of it. Moreover, as may be seen from the attack on the Zelzal launchers by the Israeli air force, long range rockets were also deployed in the Beirut region.⁸ This wide deployment forces the IDF to spread out its means of intelligence gathering and target identification, thereby decreasing the odds of locating launchers, which in turns increases their odds of survival.
- c. Low physical signature. Another dominant principle is lowering the physical signature of the launchers. The goal is to make it difficult to discover them and is achieved by camouflaging the launchers and the launching activities by two primary methods: one, carrying out most of the activity connected to firing the launchers inside or near civilian surroundings. A prominent example of this is the use

of mosques made by Hamas to store rockets and other armaments.⁹ The second way to lower the high trajectory array's signature is by camouflaging the launch barrels inside naturally wooded areas, in small bunkers in open areas, or on the outskirts of urban areas, and in the case of mobile launchers, i.e., those mounted on vehicles, by storing them in the homes of the operatives.¹⁰ One of the main results is the short time frame of target vulnerability, i.e., the window of opportunity for attacking the launcher is brief and sometimes lasts just a few moments. This window of opportunity begins when the launcher is revealed (removing the camouflage or moving it out of hiding), continues during the time it is fired – a number of seconds during which the rocket is on fire, which allows its identification by electro-optical means, and ends with its being camouflaged again or its rapid transportation to another hiding place.¹¹

- d. A large number of launchers (decreasing the value of any single launcher). As the result of a general understanding of the capabilities of the Israeli air force, both Hizbollah and Hamas concluded that in order to create high trajectory fire over time it is necessary to be equipped with a large number of launch barrels. The large number of launchers makes the specific weight of the single launcher negligible relative to the activity of the entire network. This way the destruction of a few launch barrels has no effect on the rate of fire produced. In the Second Lebanon War, for example, the Israeli air force destroyed 93 rocket launchers – 50 of them in planned sorties on the first day of the war. Thirty-three simple launchers were destroyed by airplanes hovering in the air to hunt launchers.¹² Even so, throughout the war, Hizbollah maintained an average firing rate of some 130 rockets daily, and on the last day managed to fire 253 rockets.¹³
- e. A supportive ground defense. High trajectory fire does not stand alone, but is accompanied by ground defense that complements the high trajectory weapons. In practice, ground defense is to a large extent critical, creating a significant threat of fire against the Israeli civilian front, with its objective to curb or delay IDF forces and buy time for the high trajectory fire. Indeed, both Hizbollah and Hamas built a standing ground defense alongside the high trajectory batteries based on anti-tank positions, bunkers, and booby traps

prepared in advance, with the purpose of inflicting casualties and delaying the ground maneuver.¹⁴

The Intelligence Challenges

Warning

Israel's national security doctrine assigned intelligence a central role – giving early warning that the enemy is about to embark on a war. The fact that in routine times a significant portion of Israel's military force is not mobilized or battle-ready and the fact that Israel does not have any strategic depth turn the intelligence branch and its capacity to give early warning into a first line of defense.¹⁵ Indeed, supplying early warning about an impending war has become the classical function of military intelligence. When large, institutionalized fighting frameworks such as regular armies are involved, giving early warning about an impending war is not a sudden procedure. Usually, it is constructed in stages and may begin with periodic assessments, continue by supplying initial warning about the accumulation of forces, high alerts, preparations, and other indicative signs, and end with a summarizing assessment in which military intelligence determines that a state or a group of states is about to attack in a clearly defined location, at a clearly defined time, and with a clearly defined approach.¹⁶ In other words, the war preparations by a state were an extended process producing many revealing signs throughout the process.

Early warning may be divided into two main categories: one is warning about the strategic intention to use weapons to obtain political or other objectives, and the other is warning about concrete preparations for war. With regard to the army's preparation for war, the fire array does not stand on its own. Therefore, the primary challenge for military intelligence in this context is to identify the changes in the routine activity of the high trajectory fire array and integrate this data into the general picture of the enemy's preparations for war. Among the state players using large and established high trajectory systems, the mission is fairly simple and is apparently carried out in the context of ongoing surveillance of army activity as part of efforts to identify war indicators.

Among the sub-state players such as Hamas and Hizbollah, however, the issue of indicators is problematic. At the strategic level, decisions are usually made at the level of a very small, closed group of operatives. At the

operational level, no armies are involved and therefore their intelligence signature is low. It is precisely in these instances that surveillance of the high trajectory weapons is likely to make a significant contribution to understanding the intentions of the enemy at the strategic and especially operational levels, because the number of indicators created by this system is relatively high. The logistical infrastructure and manpower required to operate the high trajectory weapons, alongside the technical preparations necessary to raise combat readiness, ensure that indicators will in fact be emitted and identified. In this sense, surveillance of the sub-state organizations' high trajectory arrays is important not just for the sake of understanding the threat but also because it is likely to contribute to understanding the comprehensive picture regarding enemy intentions.

Alongside the classical dimension of early warning for war, the high trajectory threat presents a new dimension for intelligence: providing warning during the fighting. Here, warning focuses on pointing to the enemy's intentions to start using types of weapons it has not yet used, e.g., an intention to fire rockets equipped with chemical warheads or an intention to target areas in Israel that have so far not come under fire. This type of warning relies on the assumption that the enemy will make graduated use of its firepower; therefore, the intelligence gathering must supply warning in time in order to allow the Home Front Command and the civilians themselves to prepare for the anticipated threat. The ramifications for constructing the intelligence force are many; central to these is the need to sharpen the degree to which intelligence reaches the decision making echelon on the political level and in the relevant organizations and ensure that this information flows continuously, even during the war. This presumes, of course, that critical decisions about the use of high trajectory weapons will be made at these echelons rather than by unsupervised field level operatives.

Decision

In everything having to do with warning, intelligence about high trajectory weapons does not stand on its own but is rather a part of a broader matrix. At the end of the day, intelligence in this regard is supposed to produce warning. By contrast, when it comes to decision and the high trajectory threat, the work of intelligence plays a more significant, central role.

Decision, a complex issue that goes beyond the narrow topic of dealing with an enemy that uses high trajectory fire, lies outside the scope of this essay and is worthy of a separate discussion. Nonetheless, one may say that in Israel's defense doctrine, decision is generally a synonym for "causing the Arabs stinging defeats," as defined by Israel Tal.¹⁷ According to Tal, the ways to achieve such "stinging defeats" include destroying the enemy's military force as a cohesive fighting force and to a lesser extent, conquering its territory and occupying its areas of deployment and maneuver, damaging the enemy's allies, destroying its economic infrastructure, and threatening its capital city.¹⁸ These principles were formulated in the 1950s and were meant to provide a response to the confrontation with state enemies holding territorial assets and defending them with regular armies.

The implementation of these principles in order to achieve decision against sub-state organizations such as Hizbollah and Hamas needs greater clarification than the present discussion.¹⁹ Nonetheless, it is clear that in any future confrontation with sub-state organizations using high trajectory fire as their principal combat strategy against Israel, the issue of coping with fire at the civilian front is critical. Accordingly, attaining a decision against the enemy will to a large extent be measured by three basic parameters: one, a halt to or reduction of the fire at the home front; two, damage to the enemy's strategic assets; and three, the stamina of Israel's civilian front. The resilience of the Israeli public depends on a number of factors where intelligence seemingly plays an important role, though secondary to other components. Here the task of intelligence lies primarily in identifying the set of possible threats before a war (in order to build the Home Front Command force and reduce public uncertainty), identifying developing threats during a war (such as the enemy's intention of using non-conventional weapons), and participating in situation assessments about the civilian routine. Intelligence plays a more central role with regard to the first two parameters – stopping or reducing the fire and damaging the enemy's strategic assets.

Stopping/Reducing High Trajectory Fire at the Home Front

The ability to significantly reduce the fire directed at Israel's civilian front depends on understanding the principles guiding Hamas, Hizbollah, and Syria in the operation of these arrays. Finding solutions to operational

problems posed by each of these principles can in the end lead to a successful tackling of the high trajectory threat. These solutions lie fully or partly within intelligence's purview.

The problem: dispersed deployment and low physical signature.

The response: prioritizing regions and focusing the intelligence gathering.

Two of the important principles guiding Hamas, Hizbollah, and apparently Syria in their use of high trajectory systems are the deployment of launchers over large geographical areas and the reduction of their physical signature, which make it more difficult to locate them and increases their odds of survival. In this, intelligence plays an important role; central to it is defining the priorities for response and, in conjunction with the operational side, determining the type of operational response for each of the areas. Widespread deployment, especially when extensive regions are involved such as those in Lebanon and Syria, does not allow one to allocate the same operational and intelligence gathering resources to each site (either an open or populated area) where a rocket launcher may be found. Still, the rocket launcher's low signature requires a quick response coming immediately on the heels of its identification.

At the same time, by their nature launching barrels cannot be distributed equally throughout the entire campaign arena, and the fire produced by each geographical area is not identical in amount or in its type of target. An analysis by Uzi Rubin shows that in the Second Lebanon War Hizbollah fired rockets from a number of primary regions. For example, fire was directed at population centers in western Israel – the northern coastal strip and particularly Haifa – from the outskirts of Tyre, whereas fire was directed at the Golan Heights from the southern part of the Beqaa Valley.²⁰ Similarly, in Operation Cast Lead rockets were fired at Ashdod primarily from the northern part of the Gaza Strip. It is necessary to take advantage of this situation in order to determine geographical priorities for response and prepare specialized intelligence and operational solutions for every area. In the first stage, intelligence must identify the geographical spheres most likely to produce most of the fire aimed at Israel's civilian front or, alternately, produce fire (even if sporadic) aimed at the major population centers, such as the greater Tel Aviv region, and at strategic infrastructures. Such prioritization may occur by weighing a number of factors, such as terrain, population,

enemy deployment, and type of rocket deployed in the region, as well as the ability of intelligence to identify targets in the same sphere. In the second stage, it is necessary to prepare an intelligence and operational response tailored to each geographical area. As such, a broad operational program is constructed out of sub-programs – a kind of intelligence-operational mosaic providing the optimal response to the specific threat in every geographical region. This would replace any large scale program seeking to impose a uniform response for the entire sphere of fighting.

Adopting this method in previous confrontations would have resulted in channeling intelligence gathering resources and larger aerial or ground forces to the region of Tyre or the northern part of the Gaza Strip at the very beginning of the respective campaigns, eliminating the need to wait for the accumulation of data on the fire (after a few days or a week of sustained fire). Alternately, in the absence of intelligence and the ability to identify targets in these spheres, the operational plan could have formulated an appropriate ground response to these disparate ground cells before the outbreak of the fighting, and have allowed for the channeling of intelligence gathering efforts to other regions in which the ability to identify targets was higher. In this respect, intelligence and analysis of rocket launcher deployment is likely to assist in synchronizing the aerial efforts and intelligence gathering with ground moves, and prevent the concentration of intelligence gathering efforts in locations where the ability to identify targets is low, or alternately, direct ground forces to these areas ahead of time, already at the planning stage. This becomes even more critical if we take into consideration Hizbollah and Syria's arms buildup and the possibility that in coming wars massive fire of long range rockets will be produced from deep within Syria and Lebanon.

From an intelligence and operational perspective, regional prioritization must not stop with the outbreak of the war, but must be dynamic and base itself on an analysis of the data concerning the incoming fire, the condition of IDF troops, and perhaps even the state of the civilian population in specific areas in Israel. So, for example, it is possible that repeated and severe damage to a certain urban center will force the IDF, as part of its effort to assist in bolstering civilian resilience, to formulate a quick, ad hoc operational response against the region that

was the source of the fire, even if this region did not previously figure among the army's top priorities.

The problem: a large number of launchers. The response: operational planning with a strong damage capability

The third principle discussed in operating high trajectory weapons batteries is the large number of launchers dispersed in order to reduce the specific weight of each launcher and avoid a situation in which damage to a few launchers affects the potential rate of fire at Israel. In tackling the quantity challenge, intelligence work plays a double role, one at the planning stage and the other at the execution stage. In light of the understanding that the large number of launching barrels does not allow the physical destruction of every one of them, intelligence must, when the operational program is formulated, point to the enemy's weaknesses that if damaged, would neutralize the largest possible number of fire sources. For example, assuming that operating a large number of launchers in an organized fashion over time requires some kind of central command and control apparatus – local headquarters, communications infrastructures, and so on – intelligence must at the planning stage identify these components (both from analysis standpoints and from target standpoints).

In the Second Lebanon War, Hizbollah lowered and raised the rate of fire at Israel's home front at will.²¹ This requires some kind of organized structure of command and control. Moreover, as Ben-Israel explains, Hizbollah is on the one hand an organization with guerilla elements (in particular in terms of clandestine operation, compartmentalization, and survivability), but on the other hand is also "a classical military organization with command and control strongholds, advanced communications systems, weapons warehouses...a fixed infrastructure, and regional units of well-trained fighters."²² Biddle and Friedman, who analyzed Hizbollah's fighting in the summer of 2006, also came to a similar conclusion, and demonstrated that during the confrontation with the IDF, the organization conducted itself more as an organized military force than a decentralized guerilla organization.²³ This principle is certainly applicable also to Syria, where firepower would likely occur according to a coherent hierarchical command system, stemming from the very fact that these rocket batteries are part of the regular army. In light of processes of

establishment that Hamas' military force is undergoing, presumably in the future the fire batteries of this organization will also acquire coherent command and control at some level or another. Accordingly, the task of intelligence must amount to more than indicating the nature of the threat and the enemy's intent and deployment. Already at the planning stage intelligence personnel must point to the organizational components whose damage would help neutralize the largest possible number of high trajectory batteries.

An additional dimension concerning response to the large number of launching barrels is connected to the capability of intelligence to produce targets for attack. In modern armies, where firepower is a dominant element, the job of the intelligence branch to identify targets plays a leading role. In essence, without intelligence about high quality targets, no effective operation of fire is possible. From this aspect, intelligence transmits detailed information about the location of targets in real time, and no less importantly assists in determining the priorities for destroying them, according to the measure of risk represented by each target and the availability of the means of attack.²⁴ This task of intelligence becomes critical in a confrontation with high trajectory weapon batteries based on a large number of launchers. The high number of targets requires intelligence not just to undertake better early preparation and construction of objectives for attack before the campaign, but also – and especially – to develop the ability to provide information about targets in real time. Fulfilling this task successfully is presumably dependent on developing a response based on a combination of intelligence data (the type of armaments in enemy hands and the enemy's manner of operating them at the tactical and techno-tactical levels) and advanced technological capabilities (location and attack). Focusing on one side of the equation alone, be it intelligence data or technological capabilities, will supply only a partial operational solution.

Damaging the Enemy's Strategic Assets: The Deterrence-Decision Connection

Beyond damaging the enemy's military force – in our case, the destruction of a large number of launchers and other organizational components affecting the production of fire – decision or handing the enemy a “stinging defeat” can be achieved also through damaging its strategic

assets. When discussing a state enemy, the term “strategic asset” is fairly clear and includes essential areas (from a security perspective), governing institutions, essential national infrastructures, central economic installations, and so on.

What is a strategic asset for sub-state organizations such as Hamas and Hizbollah? These organizations are not states, and therefore do not have national infrastructures or governing institutions. Seemingly, the discussion is about organizations for which territory does not play a central role. Nonetheless, a closer look at Hamas and Hizbollah reveals that they too have assets that may be defined as strategic. Territorially speaking, the center of gravity of these organizations may be found in the areas that are home to their ardent supporters and out of which the organizations operate. In the case of Hamas, one may assume that it would be possible to define certain neighborhoods and refugee camps in the Gaza Strip as its territorial strongholds. In the case of Hizbollah, southern Lebanon, the central and northern parts of the Beqaa Valley (the region from Baalbeck to al-Hermel), and the southern neighborhoods of Beirut have traditionally served as its natural territorial strongholds. Damage to and conquest of these areas, either fully or in part, would probably be deemed by the organizations as strategic damage.

The organizational-institutional dimension joins the territorial aspect. Both Hamas and Hizbollah are organizations that emerge from within the population and maintain close mutual links through a network of institutions providing state-like services (*daw'a*). In this, Hizbollah surpassed the other movements by establishing a quasi-government (the Executive Council), which is responsible for providing various services such as education, health care, construction, social support, culture, religion, and more to the Shiite community. This system relies both on a human infrastructure in the form of a bureaucracy, and on a physical infrastructure such as offices, warehouses, and buildings. These infrastructures are an example of the organization’s strategic assets. To the same extent, a strategic asset may be a certain activist who is defined as a potential future leader, or a string of economic assets providing a living for the organization’s senior members. While damage to this type of asset would not directly affect the fire directed at Israel during the war itself, it would likely contribute to the sense of a stinging defeat within these organizations and their leaderships.

In terms of Israel's defense doctrine, obtaining a decision or stinging defeat is meant to build up Israel's deterrence over time. Therefore, a war against an organization using high trajectory weapons cannot end by merely tackling the enemy's firepower; it must look ahead and view the confrontation as a part of an ongoing process, at whose end Hamas, Hizbollah, and every other party will understand that firing at Israel's civilian front can only result in a Pyrrhic victory. In these respects, intelligence has a decisive role to play, primarily to identify the assets whose damage would contribute to the process, to create a critical mass of these assets, to gather data about them, and to prepare them as targets for attack.

Conclusion

The high trajectory threat presents Israel's security concept with many challenges and should prompt those in charge to engage in a new type of thinking about the principles forming the underlying principles of deterrence, warning, and decision. Similar to the fundamental level of the security concept, adjustments – or even more far reaching changes – are also necessary in the field of intelligence in order to tackle the challenges presented by high trajectory weapons to Israel's home front. In contrast to the function assigned to intelligence by the national defense doctrine – providing early warning about an impending war – the intelligence branch never restricted itself to dealing with this field alone. Intelligence personnel were always involved not only in intelligence gathering and assessment but also in providing intelligence for a wide range of military needs, including force buildup, planning, special operations, and achievement assessments. At the same time, it seems that the complexity of the challenge presented by high trajectory fire in a future war must prompt the intelligence community to show greater involvement in the operational planning stage that precedes a battle, in providing vast and higher quality target intelligence, and in conducting the campaign in general. Nevertheless, tackling the high trajectory threat successfully depends not only on the intelligence branch and its people but also on the understanding of other military branches that it is necessary to integrate intelligence and its research and assessment deeply and extensively into planning and execution. This sort of understanding is likely to ensure

that in the next confrontation with the high trajectory threat, the result will be much better than it has been in the past.

Notes

- 1 Israel Tal, *National Security: The Few vs. the Many* (Tel Aviv: Dvir, 1996), pp. 61-63, 80-81, 85-86.
- 2 For a discussion of the general ramifications of the threat of high trajectory fire for Israel's national security concept, see Gabriel Siboni, "High Trajectory Weapons and Guerilla Warfare: Adjusting Fundamental Security Concepts," *Strategic Assessment* 10, no. 4 (2008): 12-18.
- 3 Amos Harel and Aluf Benn, "Head of Military Intelligence: Hizbollah Has Rockets Capable of Reaching the Sharon Region," *Haaretz*, July 27, 2004.
- 4 Barak's statement at the end of a tour of the south, August 7, 2008, <http://euro.walla.co.il/?w=/21/1326281>. For more on Hizbollah's network of rockets after the Second Lebanon War, see Amir Kulick, "The Next War with Hizbollah," *Strategic Assessment* 10, no. 3 (2007): 41-50.
- 5 Amos Harel, "Gaza After Operation Cast Lead: Hamas Arming with Long Range Rockets and Anti-Aircraft Missiles," *Haaretz*, April 22, 2009. For more on the process of Hamas' force buildup and the attempt to duplicate Hizbollah's doctrine of warfare, see Amir Kulick, "'Lebanon Lite': Lessons from the Operation in Gaza and the Next Battle with Hizbollah," *Military and Strategic Affairs* 1, no. 1 (2009).
- 6 Yiftah Shapir, "The Syrian Army Buildup," *Strategic Assessment* 10, no. 2 (2007): 16-22.
- 7 For a discussion on the warheads attached to the rockets, see Uzi Rubin, *The Rocket Campaign against Israel during the 2006 Lebanon War*, Begin-Sadat Center for Strategic Studies, Middle East Security and Policy Studies No. 71, June 2007, p. 10. For a discussion of the targets, see p. 12.
- 8 For a discussion of rocket deployment regions, see Isaac Ben-Israel, *The First Missile War: Israel vs. Hizbollah (Summer 2006)*, Program for Security Studies: A Position Paper, Tel Aviv: Tel Aviv University, 2007, p. 9.
- 9 The Intelligence and Terrorism Information Center, "The Use of Mosques for Military and Political Purposes by Hamas and Other Terrorist Organization," March 1, 2009, http://www.terrorism-info.org.il/malam_multimedia/Hebrew/heb_n/html/hamas_065.htm.
- 10 Rubin, *The Rocket Campaign against Israel during the 2006 Lebanon War*, pp. 8-9.
- 11 Rubin, *The Rocket Campaign against Israel during the 2006 Lebanon War*, p. 20; Ben-Israel, *The First Missile War*, p. 45; Amos Harel and Avi Issacharoff, "The Qassam Is Promoted to the Next Grade (Hope That It's Not in Your School)," *Haaretz*, September 2, 2007; Amos Harel, "Hamas Improved Rockets and Use of Timers," *Haaretz*, January 18, 2008.

- 12 The data is taken from a speech given by former air force commander Eitan Ben Eliyahu, as cited by Yossi Melman, "This Is What the Next War Will Look Like," *Haaretz*, July 6, 2008; different data is cited by Ben-Israel *The First Missile War*, p. 46, whereby the air force destroyed 126 launchers by hunting them.
- 13 Alon Ben David and Yoav Limor, "Saddam and the Qassam," *Ynet*, April 17, 2008; Rubin, *The Rocket Campaign against Israel during the 2006 Lebanon War*, pp. 13, 38.
- 14 Amos Harel and Avi Issacharoff, "How Hamas' Army Is Preparing for War With Israel," *Haaretz*, December 26, 2008; The General Security Services, "Hamas and the Construction of Force," November 30, 2008, <http://www.shabak.gov.il/publications/study/Pages/gaza-hamas-terror-report.aspx>.
- 15 Tal, *National Security*, pp. 86-87.
- 16 Aviezer Yaari, "Intelligence Assessment in the Unique Circumstance of the State of Israel," in Zvi Offer and Avi Kober (eds.), *Intelligence and National Security* (Tel Aviv: Ministry of Defense, 1987, Hebrew), p. 216.
- 17 Tal, *National Security*, p. 56.
- 18 Tal, *National Security*, pp. 56-60.
- 19 For a discussion of this issue, see Gabriel Siboni, "Disproportionate Force: Israel's Concept of Response in Light of the Second Lebanon War," INSS Insight No. 74, October 2008.
- 20 Rubin, *The Rocket Campaign against Israel during the 2006 Lebanon War*, pp. 11-12.
- 21 Rubin, *The Rocket Campaign against Israel during the 2006 Lebanon War*, pp. 13-14.
- 22 Ben-Israel, *The First Missile War*, p. 10.
- 23 Stephen Biddle and Jeffrey A. Friedman, *The 2006 Campaign and the Future of Warfare: Implications for Army and Defense Policy*, Strategic Studies Institute, US Army War College, September 2008, pp. 35-73.
- 24 Yaakov Amidror, *Intelligence: From Theory to Practice* (Tel Aviv: Ministry of Defense, 2006), p. 76.