Dynamics of Insurgent Innovation:

How Hezbollah and Other Non-State Actors Develop New Capabilities

(Forthcoming in *Comparative Strategy*)

By

Marc R. DeVore

(University of St. Andrews)

&

Armin B. Stähli

(University of St. Gallen)

&

Ulrike Esther Franke

(European Council on Foreign Relations)

Abstract

Few issues are more important to security studies scholars than understanding how violent non-state groups innovate. To shed new light on this subject, we examine Hezbollah's innovations and the underlying processes that produced them. Based on this case, the most successful violent non-state groups are arguably those that systematically pursue incremental innovation. Although less dramatic than their discontinuous counterparts, a commitment to steadily improve an organizations' tactics and techniques can have dramatic effects. Indeed, even Hezbollah's remarkable performance during the 2006 Lebanon War is attributable to the perfection of techniques utilized since the organization's inception. While innovations were incremental in character, a bottom-up process of learning and experimentation by field commanders was critical to generating most of these innovations. If generalizable to other violent non-state actors, these findings suggest that the most formidable insurgent and terrorist groups will actually be those that relentlessly pursue incremental innovations in a bottom-up fashion.

Introduction

Few issues are more important to scholars of security studies than understanding how violent non-state groups innovate. Since the end of the Cold War intra-state wars and internationalized civil wars have outnumbered traditional inter-state conflicts by a factor of more than twenty-to-one.[1] As a consequence, the outcome of most contemporary conflicts hinges on the relative abilities of state and non-state actors to innovate. In locations as diverse as Iraq, Sri Lanka and Lebanon conventional armed forces and insurgents have engaged in deadly contests of innovation wherein each side attempted to develop new methods of inflicting harm on their opponent. However, whereas innovation by state-controlled armed forces has long been subject to academic scrutiny, violent non-state groups' innovations remain both understudied and misunderstood. To fill this lacuna, we apply analytical distinctions developed from both academic works on military innovation and the broader literature on technological innovation to assess how violent non-state actors innovate.

---

[1] Lotta Themnér & Peter Wallensteen (2011) "Armed Conflicts, 1946-2010," *Journal of Peace Research* 48(4), 525-536.

To this end, we examine in depth both the nature of one non-state actor's innovations and the underlying organizational processes that brought them about. The subject of our study--Lebanon's Hezbollah--was selected based on its reputation as an exceptionally capable organization. Unlike many comparable organizations, Hezbollah's continued effectiveness after a three decade conflict with a capable foe--Israel--suggests that the innovative dynamics at work are the product of the organization's deeply-ingrained characteristics, rather than the mere chance discovery of an effective tactic. In our inquiry we seek to answer the following questions: 1) are Hezbollah's innovations more discontinuous or incremental in nature; and 2) what are the respective roles of top-down and bottom-up dynamics in generating innovations.

To preview our conclusions, the most successful violent non-state groups are those that systematically and effectively pursue incremental innovation. Although less dramatic than their discontinuous counterparts, a commitment to steadily improve an organizations' tactics and techniques can have dramatic effects over time. Such was the case with Hezbollah, where even the organization's remarkable performance during the 2006 Lebanon War can largely be attributed to the perfection of techniques (e.g. building tunnels, employing rockets and organizing anti-tank ambushes) utilized since the organization's inception in 1982.

In addition to being incremental, much of the innovation uncovered was the product of a bottom-up process of continuous learning and experimentation by field commanders. Critical to this process was Hezbollah's leadership's decision to devolve authority to field commanders and encourage them to seek better ways of inflicting casualties. Within this context, the higher-level headquarters--Hezbollah's Jihad Council—played a critical role be ensuring that innovations developed by middle-level commanders diffused rapidly throughout the organization. However, despite the preponderance of bottom-up innovation during much of Hezbollah's existence, centralized, top-down processes have recently come to play an increasing role. This change in innovation dynamics reflects the broader transformation of

Hezbollah's struggle with Israel from one of continuous warfare, where cadres could regularly test new tactics against a 'live' adversary, to a more episodic conflict, where innovations must be developed under 'peacetime' conditions.

Innovation and Armed Non-State Actors

The study of innovation by violent non-state actors is an essential, yet under-developed area of security studies.[2] Historically, scholarly inquiry into this area was stifled by the wide-spread belief that armed non-state actors are inherently un-innovative. When compared with the ability of state-controlled armed forces to develop capabilities that stretch the limits of contemporary technologies, insurgents' repeated employment of certain basic techniques appeared distinctly unimaginative. Superficially at least, groups fighting around the world seemed to be waging war in the same way and with analogous weaponry. As a consequence, many early works on low intensity conflicts stressed the universality of the strategies insurgents pursued. Noted terrorism scholar Bruce Hoffmann even went so far as assert that one category of non-state actor--terrorists--are atavistically conservative and unwilling to exploit new technologies that offer unambiguous advantages.[3]

Because of preconceptions such as these, innovation by violent non-state actors has only recently been recognized as a field worthy of scholarly inquiry. At base, the growing interest in non-state military innovation has been driven by the events of the past two decades. Aum Shinrikyo's (1995) nerve gas attacks on the Tokyo subway, Al Qaeda's exotic suicide attacks (the 1998 embassy bombings and 2000 attack on the USS Cole) and the Improvised Explosive Device (IED) war in Iraq all focused attention on how armed non-state actors innovate.

---

[2] One major exception is: Gary Ackerman, *'More Bang for the Buck': Examining the Determinants of Terrorist Adoption of New Weapons Technologies* (Kings College London: Ph.D. Thesis, 2014).

[3] Bruce Hoffman, *Inside Terrorism* (New York: Columbia UP, 1998), 197-98.

Unfortunately, in their rush to be policy-relevant, many scholars concentrated their efforts on the narrow question of whether non-state actors could acquire and use weapons of mass destruction (WMD), rather than the broader issue of how such groups improve their operational repertoires.[4] Whereas the impact of WMD-equipped non-state actors remains largely hypothetical, the ability of armed non-state groups to engage in more prosaic forms of innovation is shaping the outcomes of numerous low intensity conflicts. When non-state actors innovate, they can perpetuate and, in certain cases, prevail in their struggles with states or other non-state actors. Contrarily, when non-state actors fail to innovate at the same rate as their opponents, they will be overtaken and defeated.

In recent years, a small number of scholars have begun to systematically examine this broader issue of how non-state armed groups innovate. Brian Jackson contributed to this field with both an article (2001) on how non-state actors acquire new technologies and a co-authored study (2005) on organizational learning in terrorist organizations.[5] Paving the way in an essentially uncharted domain, Jackson articulated a "holistic" framework for predicting when terrorist groups will employ new technologies. According to Jackson, innovation by non-state groups is a multi-stage process whose outcome is shaped by a range of variables, including: the degree to which groups are aware of outside trends; whether their leaders embrace or resist new

---

[4] Jessica Stern, *The Ultimate Terrorists* (Cambridge: Harvard UP, 1999); Bruce Hoffman, *Terrorism and Weapons of Mass Destruction: An Analysis of Trends and Motivations* (Santa Monica: RAND, 1999); Nadine Curr and Benjamin Cole, *The New Face of Terrorism: Threats from Weapons of Mass Destruction* (London: I.B.Tauris, 2000); Jonathan Tucker, ed. *Toxic Terror: Assessing Terrorist Use of Biological Weapons* (Cambridge: MIT Press, 2000); and Ian Bellamy, ed. *Terrorism and Weapons of Mass Destruction: Responding to the Challenge* (Abington: Routledge, 2007).

[5] Brian Jackson, "Technology Acquisition by Terrorist Groups: Threat Assessment Informed by Lessons from Private Sector Technology Adoption," *Studies in Conflict & Terrorism* 24/3 (2001), 183-213; and Brian Jackson et al., *Aptitude for Destruction, Volume 1: Organizational Learning in Terrorist Groups and Its Implications for Combating Terrorism* (Santa Monica: RAND, 2005).

ideas; how risk-accepting an organization is; the nature of the political and military environment where a group operates; a group's access to exterior sources of technological assistance; and a group's longevity.[6]

While Jackson and his colleagues identified a wide range of factors that *can* contribute to innovation by non-state actors, the sheer number of variables they specify renders it difficult to ascertain *what* factors are most determinant. Moreover, because no non-state armed group possesses *all* of the attributes that favor innovation, yet few are entirely bereft of innovation-producing characteristics, it is difficult to employ Jackson's framework to predict either organizations' relative innovativeness or the nature of the innovations that should be expected of them.[7] For example, using Jackson's framework to calculate organizations' aptitudes for innovation generates such incongruous results as the Palestine's Fatah movement being more innovative during its 1970s heyday than Lebanon's Hezbollah was in the 1990s, or the Syrian-backed As-Sa'iqa possessing a greater innovation quotient than the Provisional Irish Republican Army (PIRA).[8]

In an effort to identify the factors most critical to innovation, Adam Dolnik tested eleven variables derived from both Jackson's work and broader writings on military innovation against the empirical record provided by four armed non-state groups. Ultimately, Dolnik's case studies

---

[6] Jackson 2001, 189-202; Jackson et al. 2005, 9-26; and Maria Rasmussen & and Mohammed Hafez, *Terrorist Innovations in Weapons of Mass Effect: Preconditions, Causes, and Predictive Indicators* (Fort Belvoir: Defense Threat Reduction Agency, 2010).

[7] Jackson himself identified this shortcoming. See Jackson 2001, 203.

[8] Employing Jackson's variable's, one would expect groups founded by technically-educated leaders (Fatah's Yasser Arafat and Khalil al-Wazir were both engineers) to be more innovative than ones led by religious scholars, as in Hezbollah's case. Likewise, Fatah's leftist and modernizing self-image should have been more conducive to innovation than Hezbollah's religious worldview. Likewise, As-Sa'iqa's state sponsor and greater tolerance for risk/losses should, according to Jackson, have rendered the organization more innovative than the PIRA, which was risk averse and lacked sponsorship. The empirical record contradicts expectations generated by Jackson's framework.

led him to conclude that primary determinants of group innovativeness are: ideology, non-rational attachments to particular forms of weaponry, and a high willingness to sacrifice group members.[9] While Dolnik's systematic approach advanced the study of non-state group innovation, his selection of "innovative" cases limits the import of his conclusions. Two of Dolnik's three innovative organizations--Aum Shinrikyo and the Popular Front for the Liberation of Palestine ― General Command (PFLP-GC)--narrowly pursued technological innovation at the expense of articulating a coherent political-military strategy. Consequently, neither organization was successful in the broader sense of obtaining more resources or inflicting significant damage on opponents.

Indeed, Dolnik's innovations are arguably cases of groups myopically pursuing technological sophistication rather than developing useable, albeit less dramatic, capabilities. For example, despite investing over $30 million in chemical, biological and nuclear weapons, Aum Shinrikyo's sole attack killed only 12, yet precipitated the organization's dismantlement.[10] Indeed, as numerous commentators remarked, Aum Shinrikyo would have inflicted more damage employing explosives or firearms rather than nerve gas. Likewise, despite pioneering barometrically-triggered bombs and using motorized hang-gliders for attacks on Israel, the PFLP-GC never attained the same level of political relevance as technologically-conservative groups such as Fatah.[11] Thus, while Dolnik demonstrates why specific groups pursued exotic technologies, it does not reveal when or how *successful* organizations innovate.

---

[9] Adam Dolnik, *Understanding Terrorist Innovation: Technology, tactics and global trends* (London: Routledge, 2007), 147-79.

[10] Ian Reader, *Religious Violence in Contemporary Japan: The Case of Aum Shinrikyo* (Honolulu: Hawaii UP, 2000).

[11] Samuel Katz, *Israel versus Jibril: The Thirty Year War Against a Master Terrorist* (New York: Paragon House, 1993).

While Jackson and Dolnik sought to identify the factors endogenous to non-state actors that generate innovation, Daniel Byman and James Forest examined the role of sponsoring states and ungoverned territories in enhancing organizations' ability to develop tactics and absorb technologies.[12] Although these contributions explain why sponsorship and sanctuaries facilitate innovation, they fail to account for the varying effectiveness of organizations benefitting from such advantages. For example, although a wide range of Palestinian groups benefitted from state sponsorship and foreign sanctuaries, the innovativeness and efficiency of the groups differed substantially. Moreover, while foreign support and sanctuaries are clearly beneficial for armed non-state groups, their absence did not prevent groups such as the PIRA from innovating.[13] Therefore, although state sponsorship may contribute to the innovative capacity of groups, it is neither a necessary nor a sufficient condition for a group to innovate.

In sum, while significant efforts have been made to examine innovation by non-state armed actors within the past decade, we are as yet far from possessing a persuasive theoretical framework for understanding either the forms of innovation that non-state groups are likely to generate or the factors determining groups' relative innovativeness. To advance the current state of our understanding of non-state military innovation it is necessary to employ theoretical distinctions and categories developed in the more mature fields of military and technological innovation studies, but rarely applied to violent non-state actors.

---

[12] Daniel Byman et al. *Trends in Outside Support for Insurgent Movements* (Santa Monica: RAND, 2001); Daniel Byman, *Deadly Connections: States that Sponsor Terrorism* (Cambridge: Cambridge UP, 2005); and James Forest, "Training Camps and Other Centers of Learning," In James Forest, ed. *Teaching Terror: Strategic and Tactical Learning in the Terrorist World* (Lanham: Rowman & Littlefield, 2006), 69-109.

[13] A.R. Oppenheimer, *IRA, the Bombs and the Bullets: A History of Deadly Ingenuity* (Dublin: Irish Academic Press, 2009).

The Innovation *Problématique*

Contrary to innovation by armed non-state actors, the subject of how businesses and state-controlled armed forces innovate has long been subject to academic scrutiny. Over the course of decades of analysis, two distinctions have emerged as critical for categorizing and comprehending how innovations are generated within these fields of human endeavor. Within this context, innovations can be classified according to: 1) whether they are disruptive or incremental in nature; and 2) whether they originated through top-down or bottom-up organizational dynamics. By applying these categorizations to successful violent non-state groups, via a process tracing analysis, it should be possible to develop a better understanding of when, how and why such groups innovate.

Scholars of innovation have long differentiated between incremental and discontinuous innovations.[14] Incremental innovation is a process whereby continued improvements enhance the efficiency of a product or procedure without altering its fundamental nature. An example of incremental innovation can be found in the competitive efforts of armies during the First World War to perfect combined arms tactics.[15] By way of comparison, discontinuous innovation involves the introduction of a new product or procedure whose impact transforms

---

[14] Confusingly, scholars use nearly-synonymous terms to describe incremental and discontinuous innovations, including: continuous/discontinuous; sustaining/disruptive; incremental/transformational; single-loop/double-loop; and evolutionary/revolutionary. See: James Utterback and William Abernathy, "A Dynamic Model of Product and Process Innovation," *Omega* 3/6 (1975), 639-56; Chris Argyris and Donald Schön, *Organizational Learning: A Theory of Action Perspective* (Reading: Addington-Wesley, 1978); James Utterback, *Mastering the Dynamics of Innovation* (Boston: HBS, 1994); Clayton Christensen, *The Innovator's Dilemma* (Cambridge: HBS, 1997); and Terry Pierce, *Warfighting and Disruptive Technologies: Disguising Innovation* (Abington: Frank Cass, 2004).

[15] Timothy Lupfer, *The Dynamics of Doctrine: The Changes in German Tactical Doctrine During the First World War* (Fort Leavenworth: Combat Studies Institute, 1981); Paddy Griffith, *Battle Tactics of the Western Front: The British Army's Art of Attack* (New Haven: Yale UP, 1994); Bruce Gundmundsson, *Stormtroop Tactics: Innovation in the German Army, 1914–1918* (Westport, CT: Praeger 1995); and Martin Samuels, *Command, Training and Tactics in the British and German Armies, 1888-1918* (London: Frank Cass, 1995).

the competitive dynamic characterizing firms or states. Germany's development prior to the Second World War of panzer divisions and blitzkrieg tactics is an example of disruptive innovation insofar as it overthrew the existing linear principles according to which land warfare was conducted.[16] Although discontinuous innovations are commonly perceived to be more dramatic than their incremental counterparts, in actuality either form of innovation can decisively shape states' or firms' destinies.[17] As of today, no study has systematically examined which form of innovation is more characteristic of effective armed non-state actors.

Distinct, yet related to the issue of whether innovations are discontinuous or incremental is the question of whether they are produced by organizational dynamics best classified as top-down or bottom-up. Top-down innovations are those initiated and directed by the upper echelons of an organization's leadership.[18] For example, French political leaders' decision to pursue an independent nuclear capability in the face of the hostility or indifference of military leaders is exemplary of top-down innovation.[19] Bottom-up innovations are developments that arise from experience and experimentation conducted at the lower-rungs of an organization's formal hierarchy.[20] For instance, the gradual development by US Marines of tactics, procedures and rules-of-thumb for fighting "small wars" during the 1920s and 1930s was a bottom-up

---

[16] Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (Abington: Frank Cass, 1997); and Williamson Murray, "Armored Warfare: The British, French and German experiences," In Williamson Murray and Alan Millett, *Military Innovation and the Interwar Period* (Cambridge: Cambridge UP, 1996), 6-49.

[17] Mary Sanger and Martin Levin, "Using Old Stuff in New Ways: Innovation as a Case of Evolutionary Tinkering," *Journal of Policy Analysis and Management* 11/1 (Winter 1992), 88-115.

[18] Adam Grissom, "The Future of Military Innovation Studies," *Journal of Strategic Studies* 29/5 (2006), 918-20.

[19] Maurice Vaïsse, *La France et l'atome: études d'histoire nucléaire* (Brussels: Bruylant, 1998).

[20] Grissom, 920-24.

process, led by junior officers and non-commissioned officers.[21] Although military innovation scholarship traditionally focused on top-down processes, recent studies highlight the importance of bottom-up dynamics.[22]

Similarly, most studies of violent non-state innovation--including those examined in the preceding section--focus on dramatic top-down innovations. However, two studies suggest that bottom-up dynamics may be at least as important as their top-down counterparts. The first of these studies, A.R. Oppenheimer's investigation of PIRA bomb-making demonstrates that middle-ranking operatives--the bomb makers themselves--shaped the organization's tactical repertoire through incremental improvements in how they made and employed bombs.[23] More counter-intuitively, Assaf Moghadam's analysis of the September 11, 2001 plot reveals that bottom-up dynamics—particularly the roles of Khalid Sheikh Mohammed and Mohammed Atta--were critical to the attacks, which were hitherto considered a paradigmatic case of top-down innovation.[24] If groups as formidable as the PIRA and plots as unprecedented as the September 11 attacks depended on bottom-up innovation, then surely a wider range of violent non-state actors should be examined to ascertain the relative weight of top-down and bottom-up dynamics.

While the development of new technologies and tactics is one facet of innovation, equally critical are decisions about abandoning existing weapons and techniques. In his seminal

---

[21] Keith Bickel, *Mars Learning: The Marine Corps' Development of Small Wars Doctrine, 1915–1940* (Boulder: Westview 2000).

[22] Grissom, 905-34; Theo Farrell, "Improving in War: Military Adaptation and the British in Helmand Province, Afghanistan, 2006-2009," *Journal of Strategic Studies* 33/4 (2010), 567-94; James Russell, *Innovation, Transformation and War: Counterinsurgency Operations in Anbar and Ninewa 2005-2007* (Stanford: Stanford UP, 2011).

[23] Oppenheimer.

[24] Assaf Moghadam, "How Al Qaeda Innovates," *Security Studies* 22/3 (2013), 466-97.

work on economic development, Joseph Schumpeter argued that organizations can only master significant innovations if they are willing to change the technological and procedural paradigms upon which they depend. However, if innovation is a process of "creative destruction", innovative organizations can only reinvent themselves if they are first able to selectively break with their existing routines.[25] Invariably, it is extremely difficult for extant organizations to do this.[26]

To develop their existing repertoire of tactics and technologies, organizations at some point shouldered significant fixed- and set-up costs and then perfected their skills through a process of "learning-by-doing." As a consequence, the costs of an organization switching from one set of technologies or tactics to alternatives grows over time.[27] For armed non-state actors, this means that significant innovations will likely only transpire when organizations possess mechanisms for evaluating and discarding parts their existing repertoires of skills and technologies. Comprehending these mechanisms is crucial to developing a better understanding of how violent non-state actors innovate.

To sum up, long-standing traditions of academic inquiry into military and corporate innovation offer conceptual distinctions and theoretical frameworks that can be fruitfully applied to the understudied question of how violent non-state organizations innovate. Do non-state groups strive for discontinuous innovations? Or do they rather focus their organizational energies on incrementally perfecting existing tactics and technologies? Do groups pursue innovations principally through top-down or bottom-up processes? What motivates non-state

---

[25] Joseph Schumpeter, *Capitalism, Socialism and Democracy* (London: Routledge, 1992 [orig. 1943]).

[26] Michael Horowitz, indeed, argues that young organizations are more likely to adopt innovations than older ones. See Michael Horowitz, "Nonstate Actors and the Diffusion of Innovations: The Case of Suicide Terrorism," *International Organization* 1/64 (2010), 33-64.

[27] Paul Pierson, *History, Institutions, and Social Analysis* (Princeton: Princeton UP, 2004), 17-53.

armed groups to abandon certain practices in order to concentrate on others? Answering these questions will enhance our understanding of how violent non-state groups innovate.

Case Selection

The following pages will examine both the nature and processes of one violent non-state organization's innovations. Because our objective is to explicate how successful non-state actors innovate over time, we focus on an organization considered one of the most formidable of its kind--Lebanon's Hezbollah. In one of the most quoted assessments of Hezbollah, (former) Deputy Secretary of State Richard Armitage opined in September 2002 that "Hezbollah may be the 'A-Team of Terrorists' and maybe al-Qaeda is actually the 'B' team."[28] While Armitage's characterization of Hezbollah as a terrorist group is debatable, few would argue with his portrait of the organization's capabilities.[29]

In fact, Hezbollah can even plausibly claim to have bested Israel's defense forces during three distinct conflicts, fought over three decades. As a consequence, analysts have paid tribute to Hezbollah's capabilities and professionalism in a variety of ways. Journalist Nicholas Blanford refers to it as "the Middle East's most powerful armed group", scholars Stephen Biddle and Jeffrey Friedman credit Hezbollah with pioneering a new "hybrid" form of warfare, and

---

[28] Cited in Daniel Byman, "Should Hizballah be Next?" *Foreign Affairs* 82/6 (November-December 2003), 55.

[29] Determining whether Hezbollah should be termed a terrorist organization is complicated by both the absence of a universally-accepted definition of terrorism and the difficulty in clearly attributing certain actions to the organization. On defining terrorism, see Hoffman, 1-42. For a detailed treatment of Hizballah, see Byman, "Should Hizballah be Next?" 54-66; and Judith Harik, *Hizballah: The Changing Face of Terrorism* (London: I.B. Tauris, 2007), 163-75.

(former) CIA Director George Tenet categorized Hezbollah's global reach as a "notch above" Al Qaeda's.[30]

Unlike many groups, Hezbollah's longevity and reputation for effectiveness render it possible to examine not only how non-state organizations innovate, but also to ascertain what factors lead certain non-state organizations to be more innovative than others. In effect, whereas many armed non-state actors master certain technologies early in their existence, which they then apply in a consistent fashion over time, Hezbollah has engaged in three distinct periods of fighting, which were each characterized by distinct tactics and technologies. Moreover, although many observers credit Iran for Hezbollah's effectiveness, available evidence suggest that the transmission of innovations has actually been the reverse of what is frequently assumed and that it is Hezbollah that develops tactics and then transmits them to Iran's Revolutionary Guard Corps.[31]

Following the organization's emergence in 1982, Hezbollah fought other factions during Lebanon's civil war, while all-the-while employing kidnapping and suicide attacks against Israel and Western powers. Following Israel's withdrawal to its so-called 'security zone' and the Lebanese Civil War's conclusion, Hezbollah shifted tactics to conduct a hi-tech guerrilla war in Southern Lebanon between 1992 and 2000. After Israel's retreat from its security zone in 2000, Hezbollah developed a territorial defense system combining technologically-savvy special forces, part-time urban warriors, tunnels and a panoply of unguided rockets. Having

---

[30] Nicholas Blanford, *Warriors of God: How Hizballah Became the Middle East's Most Powerful Armed Group* (New York: Random House, 2011); Stephen Biddle and Jeffrey Friedman, *The 2006 Lebanon Campaign and the Future of Warfare: Implications for Army and Defense Policy* (Carlisle: Army War College, 2008); and Tenet cited in Byman, "Should Hizballah be Next?" 57.

[31] Marc DeVore & Armin Stähli, "Explaining Hezbollah's Effectiveness: Internal and External Determinants of the Rise of Violent Non-State Actors," *Terrorism and Political Violence*, 27/2 (2015), 331-357; and Marc DeVore, "Exploring the Iran-Hezbollah Relationship: A Case Study of how State Sponsorship affects Terrorist Group Decision-Making," *Perspectives On Terrorism* 6/4-5 (2012), 85-107.

innovated as both a new social movement and a mature organization, Hezbollah should be able to teach us much about how institutions sustain high levels of innovative activity over time.

Because gathering data on violent non-state actors is an inherently difficult, this study relies heavily upon primary sources and data collected during field research in Lebanon. In addition to systematically examining published primary sources, we interviewed leaders from Hezbollah, the Lebanese Army, the United Nations' Peacekeeping Mission in Southern Lebanon (UNIFIL) and the rival Shi'ia organization, Amal, in an effort to understand how Hezbollah innovates. During field research in Southern Lebanon, which has served as the epicenter for Israeli clashes with Hezbollah, we also questioned local actors, including village mukhtars (headmen), grass-roots militants, peacekeepers and combatants' family members. To help evaluate our data, we spoke with academics and journalist that possess extensive experience with both Hezbollah and its Lebanese context. Building on these sources, we have ascertained the nature of Hezbollah's innovations and pathways that enabled them to occur.

The Struggle Against Israeli Occupation (1982-85)

Beginning in 1982 a nebulous Shiite movement, later to become known as Hezbollah, started attacking the Israeli forces that had invaded Lebanon in June of that year. Unlike many inchoate armed groups, Hezbollah's actions were not characterized by amateurism or incompetence. Rather they achieved strategic results in their first years of existence, persuading a Euro-American peacekeeping force to abandon Lebanon and contributed to Israel's withdrawal to a narrow "security zone" in Southern Lebanon. These successes were achieved through the effective application of three basic tactics: irregular/guerrilla attacks, suicide car bombings and kidnapping foreigners. As will be demonstrated, Hezbollah was able to conduct these operations thanks to the skills that its founding military cadres brought to the organization from the institutions they had formerly served. Within this context, Hezbollah's main

accomplishment was creating an environment where the organization's combatants could incrementally improve their skills via a process of decentralized innovation.

To understand Hezbollah's early success and subsequent development one must examine its military cadres' backgrounds. Because Lebanon's Shiites had been historically marginalized by its Christian and Sunni communities, they were comparatively late to develop confessional political parties.[32] However, the tumultuous nature and episodic violence of Lebanese politics created incentives for Shiites to join armed groups. Beginning in the 1950s, many joined radical, secular parties opposed to Lebanon's status quo, such as the Syrian Social Nationalist Party, the Lebanese Communist Party and Lebanon's two Ba'ath Parties, all of which developed clandestine militias.[33]

Later from the late 1960s onwards, many more Shiites joined armed Palestinian groups. Having obtained de facto authority over much of southern Lebanon from the 1969 Cairo Agreement, the PLO became the dominant force over much of Lebanon's Shiite heartland. Wealthy and well-armed, the PLO recruited large numbers of Shiites into both its own ranks and those of closely-allied Lebanese militias.[34] Indeed, during interviews we conducted in southern Lebanon, we discovered that most Shiite families counted at least one male relative who had fought for the Palestinians.[35] Some Shiites attained considerable expertise and responsibility within Palestinian organizations. For example, the future head of Hezbollah's

---

[32] Richard Norton, *Amal and the Shi'a. Struggle for the Soul of Lebanon* (Austin: University of Texas Press, 1987), 16-23.

[33] Ibid, 33-38.

[34] Yonah Alexander & Joshua Sinai, *Terrorism: The PLO Connection* (New York: C. Russak, 1989), 30-37.

[35] Interviews conducted in Southern Lebanon, April 2011.

intelligence and security service, Husayn al-Khalil, was a prominent operative for Fatah.[36] Even more significantly, the future leader of Hezbollah's Jihad Council, Imad Mughniyah, was personally trained by a renowned Palestinian terrorist and former confederate of Ilich Ramirez Sanchez (aka. Carlos the Jackal) and rose to command a Shiite unit within Palestinian leader Yasser Arafat's elite Force 17.[37]

The first explicitly Shiite politico-military movement emerged in the late-1960s and early-1970s thanks to the efforts of the Iranian-born scion of one of Shiism's premier clerical families, Imam Musa as-Sadr.[38] Beginning in 1958, as-Sadr promoted social justice and combated economic inequalities afflicting Lebanon's Shiite and non-Shiite inhabitants. To this end, he co-founded the "Movement of the Deprived" with a Greek Catholic archbishop. However, the ominous tone of Lebanese politics in the mid-1970s led as-Sadr to create a militia to defend Shiite interests. Recognizing that Lebanon's Shiites were late to establish paramilitary structures, as-Sadr convinced the PLO to train his militia, which became known as Amal (short for *Afwaj al Muquwamah al-Lubnaniyah*).[39] Ultimately, the school teacher Husayn al-Musawi rose to command this militia before later defecting to Hezbollah.[40]

---

[36] Magus Ranstorp, "The Hizballah Training Camps of Lebanon," In James Forest, ed., *The Making of a Terrorist: Recruitment, Training, and Root Causes, Vol. 2* (Westport: Praeger, 2006), 251.

[37] Nicholas Blanford, *Warriors of God: Inside Hezbollah's Thirty-Year Struggle Against Israel* (New York: Random House, 2011), 27-29; and Judith Harik, *Hezbollah: The Changing Face of Terrorism* (London: I.B. Tauris, 2004), 171.

[38] Musa as-Sadr was a cousin of Iraq's preeminent Shiite cleric of this period, and his niece married Ayatollah Khomeini's son. See Rodger Shanahan, "Shi'a political development in Iraq: the case of the Islamic Da'wa Party," *Third World Quarterly* 25, no. 5 (2004): 943-54.

[39] Yezid Sayigh, *Armed Struggle and the Search for State: The Palestinian National Movement, 1949-1993* (Oxford: Oxford UP, 1997), 366-67.

[40] Ranstorp, "The Hizballah Training Camps of Lebanon," 248-49.

Once Lebanon's Civil War began in 1975, Shiites acquired practical military experience in a conflict that killed 100,000 Lebanese even before Israel's 1982 invasion. For example, while Palestinian-affiliated Shiites launched rocket attacks on Israel and opposed Israel's 1978 and 1982 invasions, Amal's Shiites first fought alongside the Palestinians against Christian militias and then fought the Palestinians for control of southern Lebanon. Although often on opposing sides in the Civil War, events between 1978 and 1982 brought veteran Shiite fighters from Amal and Palestinian groups together to serve a new movement that adhered to the Islamist political vision promoted by the Iranian Revolution. The disappearance of Amal's founder, as-Sadr, during a 1978 voyage to Libya led to the organization falling under the sway of an ambitious lawyer, Nabih Berri. This development alienated Amal's more religious members, who increasingly saw the Islamic regime imposed by Iran's Ayatollah Ruhollah Khomeini as their political model.[41]

While Sadr's disappearance and Khomeini's rise undermined Amal's status as Lebanon's Shiite party par excellence, Israel's 1982 invasion laid the groundwork for the emergence of a more militant organization. By defeating and driving into exile the Palestinian groups that controlled southern Lebanon, the Israelis left the Shites who had fought alongside these groups unemployed and footloose. Meanwhile, Amal, too, came apart when its leader, Berri, joined the 'Committee of National Salvation,' formed by Lebanese President Elias Sarkis to negotiate with the Israelis. This decision to bargain with, rather than fight against, the invading Israelis prompted 500 Amal members, under the leadership of Hussein al-Musawi, to defect to form Islamic Amal, which became one of Hezbollah's building blocks.[42]

---

[41] Dominique Avon & Anaïs-Trissa Khatchadourian, *Le Hezbollah: De la doctrine à l'action: une histoire du « parti de Dieu »*. (Paris: Seuil, 2010), 36.

[42] Carl Wege, "Hizballah's Bekka Organization," *Perspectives on Terrorism* 4/3 (2010), 30.

Exploiting these events, pro-Iranian Lebanese clerics sought Iran's assistance to create an anti-Israeli Shiite movement uniting Amal dissidents, veterans of Palestinian groups and activists from several small Islamist movements.[43] Iran responded positively to these entreaties, negotiating an accord with Syria that permitted it to send 5,000 (quickly reduced to 1,500 and then 300) members of its Islamic Revolutionary Guard Corps (IRGC) to Lebanon's Beka'a Valley in July 1982. Initially unarmed, the IRGC personnel spread propaganda and worked to federate Shiites opposed to Israel.[44] These efforts galvanized nine representatives of Shiite organizations, including three from Islamic Amal, to agree on a common platform calling for jihad against Israel and adherence to the Iranian doctrine of *wilayat al-faqih* (rule of the supreme jurist). Following the adoption of this document—often referred to as Hezbollah's founding act—the nine established a permanent committee (Shura) to oversee their anti-Israeli struggle.[45]

Soon thereafter, Iranian money flowed into the Beka'a through the IRGC's hands. These financial resources, in turn, proved catalytic to Hezbollah's growth. Hezbollah's ability to pay salaries of $150-200 per month attracted fighters formerly employed by Amal and Palestinian groups, enabling Hezbollah to expand to 7,000 combatants within several years.[46] Amongst these recruits was Mughniyah, who brought with him Shiite veterans from Arafat's Force 17, and al-Khalil, who founded Hezbollah's internal security service.[47]

---

[43] Richard Norton, *Hezbollah: A Short History* (Princeton: Princeton UP, 2007), 30-34; and Blanford, 47.

[44] Blanford, 43-45.

[45] Na'im Qâssem, *Hezbollah: La voie, l'expérience, l'avenir* (Beirut: Albouraq, 2008), 32-34.

[46] Judith Harik, *Papers on Lebanon 14: The Public and Social Services of the Lebanese Militias* (Oxford: Centre for Lebanese Studies, 1994), 25; and Harik *Hezbollah: The Changing Face of Terrorism*, 40.

[47] Ranstorp "The Hizballah Training Camps of Lebanon," 251.

Staffed with combat veterans, Hezbollah began launching attacks on Israel and Western targets. Unlike other violent non-state organizations, Hezbollah's early actions soon bore strategic fruit, convincing Israel to withdraw from much of Lebanon in 1985 and curtailing American and Western European influence in that country. Although some analysts credit IRGC advice for these results, an analysis of Hezbollah's three principal tactics—irregular/guerrilla warfare, suicide car bombings and hostage taking—reveals that Hezbollah's success depended on its cadres' ability to build upon skills they already possessed in an incremental and decentralized fashion.

Irregular/guerrilla warfare tactics such as ambushes and 'hit and run' attacks were vital to Hezbollah's development and accounted for two-thirds of the Israeli soldiers it killed between 1983 and 1985.[48] However, Hezbollah's early efforts to conduct such attacks were handicapped by the IRGC's advisors, who initially sought to impose their 'human wave' tactics. With little formal military training, yet able to raise thousands of volunteers each year, the IRGC's signature tactic during the Iran-Iraq War (1980-1988) was launching mass infantry assaults on fortified positions.[49] Although inappropriate for use against Israel's well-trained conventional army, the IRGC trained Hezbollah's first two intakes of 150 recruits to conduct human wave attacks.[50] As a result, Hezbollah launched several such attacks on isolated Israeli positions, which invariably failed to accomplish their objectives. As one seasoned UN official

---

[48] Between 1983 and 1985, Israel suffered 164 combat deaths in Lebanon, of which Hezbollah accounted for 90 percent. See Daniel Helmer, *The Long War Occasional Paper 21: Flipside of the COIN: Israel's Lebanese Incursion Between 1982-2000* (Fort Leavenworth: CSI, 2007), 52. Suicide attacks produced 57 of these deaths. See Stephan Rosiny, "'Märtyrer' der Hizb Allah – eine Chronologie und Typologie ihrer Ersheinungsformen," In Dirk Ansorge, ed., *Der Nahostkonflikt – politische, religiöse und theologische Dimensionen* (Hamburg: Institut für Theologie und Frieden, 2007).

[49] Steven Ward, *Immortal: A Military History of Iran and its Armed Forces*. (Washington D.C.: Georgetown UP, 2009), 223-31.

[50] Blanford, 54-66.

observed, "They [Hezbollah] were very amateur, foolhardy in many ways, but very brave. They just walked into the line of fire and were cut down very badly. It was just like watching the Iranian assaults against Iraq."[51]

The heavy casualties and negligible results generated by human wave attacks provoked Hezbollah's military cadres to embark on a tactical 'revolution from below'. In a decentralized fashion, individual Hezbollah commanders discarded IRGC tactics and reverted to the tactical formulae they knew from the Lebanese Civil War, which featured small semi-autonomous combat groups and such irregular/guerrilla warfare tactics as ambushes and 'hit and run' attacks. In southern Lebanon it was the veteran militant Sheikh Ragheb Harb who led the way organizing fighters into self-contained groups of 5-6 combatants and instructing them to fight as guerrillas. Elsewhere, veterans of Amal or Palestinian groups spearheaded the transformation from mass attacks to small combat groups.[52]

This return to Civil War's tactics improved Hezbollah's performance almost immediately. By December 1983 Israeli soldiers began to fall victim to complex ambushes, wherein Hezbollah combat teams attacked their patrols with grenades and automatic weapons.[53] Hezbollah also employed small units to assassinate Lebanese discovered collaborating with Israeli intelligence, thereby preventing the Israelis from establishing an adequate human intelligence network.[54] Because of its own growing effectiveness and of Israel's inability to anticipate its actions, Hezbollah constantly increased the pace of its operations such that, by

---

[51] Timur Göksel cited in Jaber, Hala (1997). *Hezbollah: Born with a Vengeance*. New York: Columbia UP, 28.

[52] Interview with Nicholas Blanford, Journalist Specialized in Lebanese Affairs, April 7, 2011.

[53] Helmer, 51.

[54] Blanford, 60-61.

mid-1984, it was conducting 100 attacks per month.[55]   In Hezbollah's own quasi-official history, Vice-Secretary General Na'im Qassem emphasized the collective impact of "ordinary operations conducted daily with explosive charges, ambushes, sniping and many other means."[56] Thus, Hezbollah built in a decentralized fashion on the irregular/guerrilla techniques its founders brought to it to engage Israel in a protracted war.

Although Hezbollah's embrace of small combat groups and irregular/guerrilla warfare tactics was initially led by individual field commanders, their measures diffused throughout the organization via the informal ties uniting local commanders. Once Hezbollah's higher-level leadership was convinced of the superiority of the organization's autochthonous tactics, based on Civil War experience, over those imposed by the IRGC, they also insisted that Hezbollah cadres gradually replace Iranian instructors in the management of Hezbollah's training camps.[57] Indeed, within time, Hezbollah's fighters were not only conducting all training within Lebanon, but also overseeing specialized courses held in Iran. Reflecting on this inversion of the original relationship between Hezbollah and the IRGC, one analyst observed that, "Hizballah trains Iran, not the other way around."[58]

While irregular/guerrilla tactics were critical to Hezbollah's success, the tactic that won it the greatest publicity and disconcerted its opponents most was the use of suicide car bombs. In many respects, Hezbollah's precocious development of suicide attacks was an incremental improvement on traditional Lebanese car bomb attacks. First introduced into Lebanon in 1972,

---

[55] Helmer, 52.

[56] Qâssem, 137.

[57] Blanford, 54-46, 120.

[58] Andrew Exum, *Hizballah at War: A Military Assessment* (Washington D.C.: Washington Institute for Near East Policy, 2006), 7.

car bombs became a notable feature of the Lebanese Civil War in the late-1970s.[59]   Because of their mobility, ubiquity and carrying capacity, automobiles proved an efficient means of surreptitiously delivering explosives to high-value targets. As a consequence, all of Lebanon's militias adopted them as a means to destroy their rivals' headquarters, kill their leaders and terrorize their neighborhoods.[60] In total, Lebanon's warring factions detonated over 245 car bombs during the 15-year war.[61]

Lebanon's Shiites innovated on Lebanon's traditional car bombs by inserting drivers desiring martyrdom into the explosives-laden vehicles, thereby enhancing their ability to deliver heavy explosives against both secure and mobile targets. Within this context, a small Lebanese Shiite organization, the ad-Da'wa group, conducted the world's first suicide car bomb attack in December 1981.[62] Although ad-Da'wa merged into Hezbollah in 1982, its militants did not play a direct role in Hezbollah's first suicide attack.[63] Rather it was the Fatah-veteran Mughniyah who orchestrated the attack on his own initiative, which destroyed Israel's military headquarters in Tyre in November 1982 and killed 75 Israelis.[64] Tellingly, both Mughniya and ad-Da'wa built their suicide car bombs using a distinct characteristic of Lebanese car bombs— using gas-cylinders to accelerate their detonation.[65]

---

[59] Mike Davis, *Buda's Wagon: A Brief History of the Car Bomb* (London: Verso, 2007), 67-68.

[60] Lee O'Brien, "Campaign of Terror: Car Bombings in Lebanon," *MERIP Reports* No. 118 (1983), 23-26.

[61] Walid Raad, *My Neck Is Thinner Than A Hair: A History of the Car Bomb in the Lebanese Wars of 1975 to 1991* (Cologne: Walther König, 2005), passim.

[62] Norton, *Hezbollah: A Short History*, 71.

[63] Interview with Harik, April 6, 2011.

[64] Blanford, 53-54.

[65] Interview with (ret.) Brigadier Elias Hanna, Lebanese Army, April 5, 2011.

The pace of Hezbollah's suicide attacks increased as knowledge about them diffused informally amongst the organization's cadres. Whereas 1981 and 1982 featured one suicide car bomb attack apiece, 1983 witnessed four, the bulk of which were masterminded by a combination of former Amal cadres (Husayn al-Musawi) and former ad-Da'wa personnel (Abbas al-Musawi).[66] Beginning in 1984, the geographical distribution of suicide attacks also expanded beyond Beirut and Tyre to embrace all of Israeli-occupied Lebanon. Henceforth, Israeli soldiers were equally at risk of falling victim to suicide bombers in outposts near the Israeli border as teeming Lebanese metropolises further north. Figure 1, below, illustrates Hezbollah's evolving suicide car bomb campaign.

---

[66] *Deborah D. Peterson versus the Islamic Republic of Iran* US District Court of the District of Columbia, Civil Action 01-2094 (RCL) at: www.ca9.uscourts.gov/datastore/opinions/2010/12/03/08-17756.pdf

Table 1: Hezbollah Suicide Attacks

Date	Target	Event
11.11.1982	Israeli Military Headquarters, Tyre	75 Israeli soldiers and 15 Lebanese and Palestinian prisoners killed; 28 Israelis wounded.[67]
23.10.1983	U.S. Marine Barracks, Beirut	241 American military personnel killed
23.10.1983	French Paratroop Barracks, Beirut	58 French paratroopers killed
04.11.1983	Israeli Military Intelligence Post, Tyre	28 Israeli soldiers and 35 Lebanese and Palestinians killed.[68]
10.03.1985	Military Command Post, Khiam	12 Israeli soldiers killed; 14 Israelis wounded.[69]
19.08.1988	Military Motorcade, Tall an-Nahas	3 Israeli soldiers wounded.[70]
19.10.1988	Convoy, Kfar Kila	7 Israeli soldiers killed; 8 Israelis and 2 Lebanese wounded.[71]
09.08.1989	Motorcade, al-Qalia	5 Israeli soldiers wounded.[72]
25.04.1995	Infantry patrol, al-Jarmaq, Bint Jubayyil	12 Lebanese, 9 Israeli soldiers and 1 SLA militiaman wounded.[73]
20.03.1996	Israeli convoy, Taibeh	1 Israeli soldier killed; 7 Israeli soldiers wounded.[74]
30.12.1999	Car Bomb near an Israeli Army Patrol	1 Israeli soldier and 13 Lebanese wounded.[75]

Hezbollah's suicide attacks disconcerted its opponents. Stunned by the loss of 299 American Marines and French paratroopers in two 1983 suicide car bomb attacks, American

[67] Associated Press, December 11, 1982.

[68] Associated Press, November 4, 1983.

[69] Associated Press, March 10, 1985.

[70] Associated Press, August 19, 1988; United Press International, August 19, 1988.

[71] Associated Press, October 22, 1988.

[72] Associated Press, August 14, 1989; United Press International, August 9, 1989.

[73] Associated Press, April 25, 1995.

[74] Associated Press, March 20, 1996; Agence France Press, March 21, 1996.

[75] Associated Press, December 30, 1999; Agence France Press, December 30, 1999.

and Western European governments withdrew the 5,000 soldiers of the Multinational Force that had deployed to Lebanon the previous year. Unwilling to withdraw so quickly, Israel responded to suicide car bomb attacks with improved security at its headquarters. However, Hezbollah innovatively responded to these countermeasures by developing techniques for conducting suicide attacks against Israeli patrols and logistics motorcades. Compared with earlier attacks, these attacks—conducted from 1988 onwards—depended on up-to-date intelligence about Israeli movements and Hezbollah's training suicide bombers capable of maneuvering their car bombs close to moving, hostile targets. Nevertheless, further Israeli countermeasures, including the increased convoy security and the use of helicopters for logistical purposes, meant that Hezbollah's suicide attacks yielded diminishing returns (illustrated in Figure 1) despite their increasing complexity.

Figure 1: Israeli Military Victims of Hezbollah Suicide Attacks
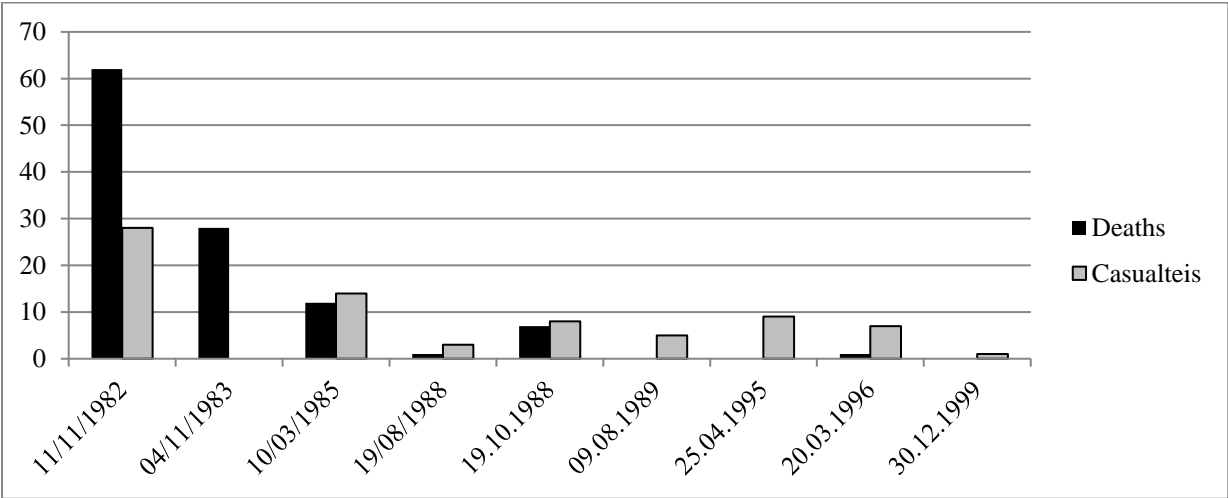
Aware that continual improvements to Hezbollah's suicide bombing procedures could not reverse the tactic's declining effectiveness, Hezbollah's military leadership gradually abandoned suicide bombings. Secretary General Hassan Nasrallah justified this decision

publicly in 1996, arguing that high-value military targets were rarely vulnerable to suicide attacks and that lower-value targets could not justify the sacrifice of trained fighters.[76]

Even as Hezbollah cadres developed suicide attacks as an incremental improvement on Lebanese car bombs, they were also creatively adapting traditional Lebanese kidnapping procedures to the new organization's requirements. Kidnappings were common during Lebanon's Civil War and at least 13,968 Lebanese were abducted during the conflict.[77] Although the vast majority of kidnapping victims were Lebanese, nine foreigners had been abducted prior to Hezbollah's creation.[78] Both economic and strategic incentives motivated kidnappers, who extracted monetary ransoms and political concessions in exchange for hostages' liberation. The kidnappers, for their part, relied on family networks to preserve their security and operated in a decentralized fashion.[79] As a consequence, the country's major militias plausibly denied responsibility for kidnappings that served their interests and abductees' allies faced difficulties mounting rescue operations.

According to informed observers, members of preexisting Shiite kidnapping networks were amongst Hezbollah's early recruits and certain Hezbollah cadres therefore considered kidnapping a viable tactic from the organization's beginnings. Within this context, the contours of Hezbollah's foreign hostage-taking campaign gradually emerged as cadres identified objectives that kidnappings might fulfill. Hezbollah's sponsor, Iran, played a major role in this process, viewing foreign hostages as bargaining chips for first obtaining the liberation of Iranian diplomats that had 'disappeared' in northern Lebanon in 1982 and, later, as a means of

---

[76] Hassan Nasrallah, 1996, rpt. and trans. in Nicholas Noe, ed. *Voice of Hezbollah: The Statements of Sayyed Hassan Nasrallah* (London: Verso, 2007), 157.

[77] Labaki & Rejeily, 38.

[78] Ibid, 42.

[79] Blanford, 73.

extracting concessions from Western governments.[80] As an organization, Hezbollah also had

an interest in hostage-taking because of the ransoms that could be obtained and their expectation

that kidnappings would curtail Western diplomats' and intelligence agents' activities by driving

foreign expatriates from Lebanon.[81] Finally, individual Hezbollah cadres had personal reasons

for taking hostages, with Mughniya and Husayn al-Musawi intent on freeing relatives from

Kuwaiti jails, and Mughniya also committed to freeing his Palestinian terrorist mentor from a

French jail.[82]

Motivated by this complex nexus of objectives, Hezbollah-affiliated kidnapping

networks systematically abducted expatriates from countries Iran and Hezbollah wanted to

influence. Overall, Hezbollah's networks kidnapped 87 American and European expatriates,

with the hostage-taking climaxing in 1984-86. To conceal Hezbollah's role, the organization

relied on the same decentralized structures, based on family networks, characteristic of Civil

War-era kidnappings. Rather than advertising their affiliation with Hezbollah, these networks

employed 17 different aliases.[83] As a result, Western governments were never entirely sure

whether a kidnapping was Hezbollah's work or a 'rogue' operation conducted by unaffiliated

Shiites.[84] However, despite their denying any responsibility for the kidnappings, the Shiite and

Islamist character of the hostage-taking networks left Hezbollah and Iran the only actors that

could plausibly obtain hostages' release.

---

[80] Robert Baer, *See No Evil: A True Story of a Ground Soldier in the CIA's War on Terror* (New York: Three Rivers, 2002), 73-104.

[81] Interview with Harik, April 6, 2011.

[82] Blanford, 76.

[83] Jaber, 113.

[84] Ibid, 121.

As a result, Hezbollah and Iran reaped the political and economic advantages of hostage-taking, without suffering significant negative consequences. For example, Hezbollah obtained large ransom payments and drove many Western states to prohibit their citizens from travelling to Lebanon.[85] Meanwhile, Iran coerced the United States into selling it weaponry and compelled France to expel opposition politicians.[86] However, the very decentralization of Hezbollah's kidnapping campaign rendered it difficult for the organization to terminate the so-called hostage crisis when it wanted to do so. Individual kidnapping networks refused to release their hostages until their individual demands were met in addition to Hezbollah's overall demands, and negotiations over hostages were slowed by the competing agendas of Iran, Hezbollah's leadership and the individual kidnapping networks.[87] Consequently, it was not until 1991, several years after Hezbollah had wanted to resolve the hostage crisis, that the last foreign hostages were released.

In sum, Hezbollah's founding cadres' ability to build on Lebanese Civil War tactics in an incremental and decentralized fashion had far-reaching political ramifications by the mid-1980s. Harassment by Hezbollah's irregular/guerrilla warfare and the psychological shock of its suicide car bombs contributed to Israeli leaders' decision to withdraw from most of the Lebanese territory they occupied in 1985.[88] Meanwhile, Hezbollah also coerced the United States and Western Europe to modify their policies towards Lebanon and Iran through hostage-taking and suicide attacks. Although Iran provided Hezbollah with large subsidies and political guidance, its advisors played a negligible role in the development of the tactics that achieved

---

[85] Norton, *Hezbollah: A Short History*, 74.

[86] Interview with (ret.) General Abdel Kader, Lebanese Army, April 6, 2011

[87] Giandomenico Picco, *Man without a gun* (New York: Random House, 2000), *passim*.

[88] Martin van Crevald, *The Sword and the Olive: A Critical History of the Israeli Defense Force* (New York: PublicAffairs, 1998), 288-99.

such impressive results. Rather, the organization's principal tactics had antecedents during the Lebanese Civil War and were developed by veterans of that conflict.

The Battle for the Security Zone (1985-2000)

While Israel's 1985 withdrawal from much of Lebanon constituted an incontrovertible success for Hezbollah, it paradoxically challenged the organization's future viability. Before 1985, many of Hezbollah's military successes had been achieved either in urban environments, where force protection was particularly challenging for the Israelis or against the supply convoys that supported their overextended forces. The 'security zone' that the Israelis occupied after 1985 mitigated the vulnerabilities that Hezbollah hitherto exploited, yet still sought to occupy enough Lebanese territory to protect northern Israel from guerrilla raids. As will be shown, Hezbollah responded to this challenge with administrative reforms that improved its ability to foster incremental, decentralized innovations. Facilitated by these reforms, Hezbollah cadres continuously developed two tactics with antecedents in Lebanon's Civil War—small unit 'storming' raids and roadside ambushes using improvised explosive devices (IEDs)—to inflict a steady stream of casualties on Israeli forces and their Lebanese allies, leading some analysts to refer to southern Lebanon as Israel's Vietnam.[89]

Designed by Israeli strategists to stymy Hezbollah's military campaign, the security zone comprised 850 km² or 10 percent of Lebanon's territory.[90] Bereft of large urban centers, the zone was rural, mountainous and marked by scattered villages. Living within this zone was a large Christian community, whose militia, the South Lebanon Army (SLA), the Israelis built into a sizeable anti-guerrilla force that one veteran analyst described as "a well-knit little army"

---

[89] Brendan O'Shea, "Israel's Vietnam?" *Studies in Conflict & Terrorism* 21/3 (1998), 307-319.

[90] David Hirst, "South Lebanon: The War That Never Ends?" *Journal of Palestine Studies*, 28/3 (1999), 6-10.

in the mid-1980s.[91] With 2,500-3,000 members of the SLA and 1,000 Israeli troops to control a region populated by only 100,000 inhabitants, Israel possessed a much better force-to-population ration than hitherto the case. In the eyes of Israeli planners, regular patrols within the zone, a string of hilltop fortresses at the zone's edge and targeted assassinations outside the zone would stymie Hezbollah.

Israeli commanders' calculations appeared vindicated for several years. Indeed, Hezbollah only intermittently attacked the zone during the five years following Israel's 1985 retreat. Instead, Hezbollah spent these years embroiled in a low-intensity "gangster style of war" with the Lebanese Communist Party (1985-86), clashes with Syrian forces in Beirut (1987), and a fratricidal war with its Shiite rival, Amal (1988-90).[92] Consequently, Hezbollah was unable to concentrate on attacking the security zone until it had terminated its internecine conflicts with Lebanese actors and reached a modus vivendi with Syria.

When Hezbollah began attacking the zone in 1990, its cadres' existing tactics rapidly proved unsuitable to the new campaign. Hezbollah's most dramatic tactic from the 1980s—suicide bombing—proved of limited utility because checkpoints rendered it difficult to sneak suicide car bombs into the zone and the only available targets—hilltop forts and convoys—yielded few casualties. Consequently, Hezbollah only launched three such attacks in the 1990s, which proved comparatively disappointing. Likewise, Hezbollah's leaders discovered that most of their fighters, who were accustomed to launching hit-and-run attacks from the apartment blocks, alleyways and basements of large cities, were unprepared for the security zone, where fortified hilltop outposts barred their way into wooded hills.

---

[91] Al Venter, *Barrel of a Gun: A War Correspondent's Misspent Moments in Combat* (Philadelphia: Casemate, 2010), 294.

[92] Interview with Judith Harik, Professor at the American University of Beirut, April 6, 2011.

At first, Hezbollah fighters cast tactical subtlety aside, charging the hilltop forts frontally and in broad daylight with groups of up to 200 fighters.[93] Not surprisingly, attacks launched uphill, across minefields and into machinegun fire sacrificed combatants to little end. As one Israeli intelligence officer observed "they [Hezbollah] failed every time."[94] To make matters worse, the fact that many Hezbollah fighters resided in Beirut and the Beka'a Valley meant that every offensive was preceded by combatants driving to the front in cars, motorcycles and scooters. Israeli intelligence invariably detected these movements and forewarned outposts that an attack was coming.[95] Employing crude tactics and bereft of surprise, Hezbollah lost five of its own fighters for every enemy killed in 1990.[96]

Hezbollah's governing body, its Shura (Council), quickly grasped that its tactics generated an exchange rate that the organization could not sustain. However, rather than dictate new tactics from above, the Shura empowered field commanders to improve their tactics in a decentralized fashion. As part of this reform, Hezbollah's military wing was segregated from the rest of the organization and henceforth answered only to the organization's secretary general. In principle, the Secretary General, who is a cleric by training, issues only broad directives and leaves operational and tactical decisions to military commanders themselves.

To provide expert direction for Hezbollah's military campaign, the Shura established a Jihad Council, composed of seasoned field commanders. The Fatah-veteran Mughniyah was

---

[93] Blanford, 83-92.

[94] Barak Ben Zur in Daniel Byman, *A High Price: The Triumphs & Failures of Israeli Counterterrorism* (Oxford: Oxford UP, 2010), 225.

[95] Interview with Brigadier Hanna, April 5, 2011.

[96] Michael Eisenstadt, "Hizballah Operations: Past Patterns, Future Prospects", *The Washington Institute for Near East Policy* (May 1996) at: https://www.washingtoninstitute.org/policy-analysis/view/hizballah-operations-past-patterns-future-prospects (accessed December 2018).

appointed to chair this body in 1993 and remained in this position until his 2008 assassination.[97] However, while the Jihad Council provided strategic guidance, field commanders were accorded considerable autonomy to plan and conduct operations on their own initiative. Initially, southern Lebanon was divided into three sectors, each with its own commander. Later, a fourth independent command was created for Hezbollah's Katyusha rocket forces.[98] Thus, the operational and tactical direction of Hezbollah's military campaign was delegated to field commanders, with the Jihad Council playing a coordinating function by distilling and diffusing lessons within the organization.

Hezbollah's military reorganization was initiated by Secretary General Abbas al-Musawi in 1991 and was pursued after his 1992 assassination by his successor, Nasrallah. Explaining the rationale for Hezbollah's new command structure, Nasrallah stated that,

> The real credit in the development of the resistance is for its military cadres, and these people had their experiences under constant development. When I became secretary general… these cadres had become more experienced and their knowledge was greater [than their political superiors]. My job was to strengthen the ties between these brothers…. It was quite natural for the improvement of the resistance.[99]

Thus, by enhancing military commanders' autonomy vis-à-vis their political superiors, and improving communications links between individual military cadres, Hezbollah's Shura improved the organization's potential for decentralized military innovation.

The reorganization Hezbollah's military wing quickly generated results. Indeed, Israeli commanders soon recognized that Hezbollah tactics were incrementally, yet continuously evolving. One Israeli general stated with alarm that Hezbollah "was learning the modus

---

[97] Blanford, 124.

[98] Interview with Brigadier Hanna, April 5, 2011.

[99] Blanford, 124-25.

operandi of the IDF and were improving from incident to incident."[100] Another general

observed after the campaign that, "Hezbollah is a learning organization. They would debrief

[and draw lessons] after every operation."[101] As a result of Hezbollah's focus on continuous

incremental improvement, its exchange ratio steadily improved. As illustrated by Figure 2,

whereas Hezbollah lost five combatants for every Israeli/SLA soldier killed in 1990, it only lost

two in 1991 and 1.7 in 1992.[102] Thereafter, the exchange ratio continued to evolve in

Hezbollah's favor, until it was inflicting more losses than it suffered.[103]

Figure 2:

Ratio of Hezbollah Fighters Lost for Each IDF/SLA Soldier Killed
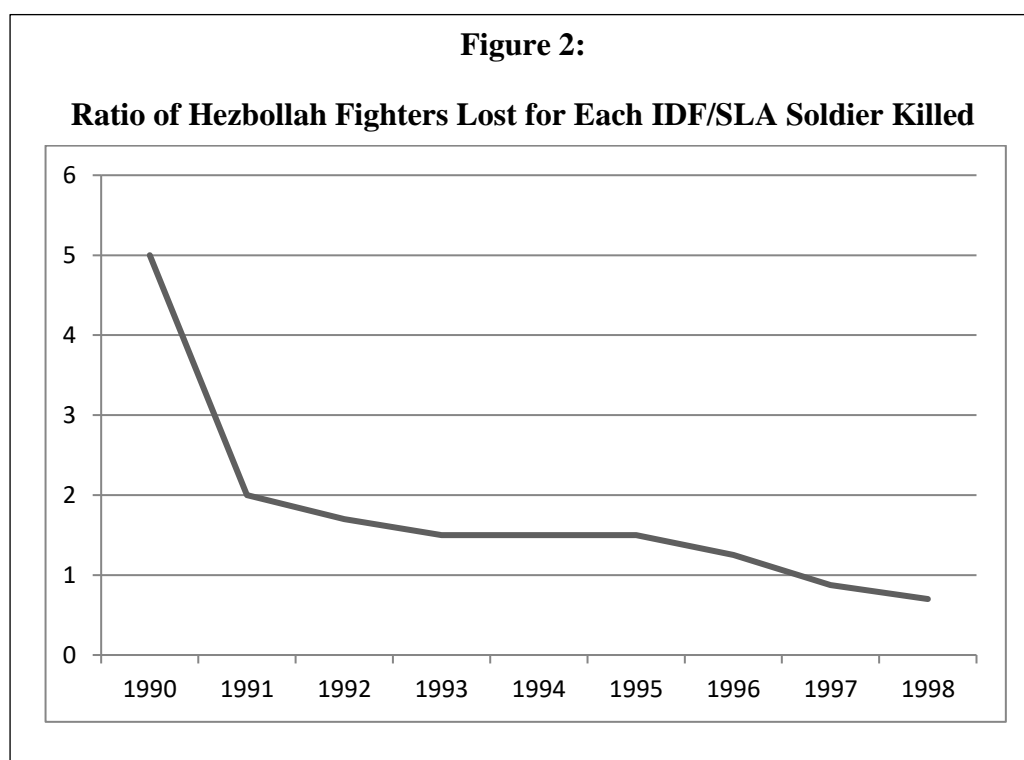
This dramatic improvement in Hezbollah's military effectiveness can largely be attributed to

the continuous incremental, yet decentralized refinement of two tactics—hit-and-run 'storming'

---

[100] *Haaretz*, August 24, 1997.

[101] Blanford, 148.

[102] Eisenstadt.

[103] Christopher Whitting, *When David Became Goliath* (MA Thesis: U.S. Command and General Staff College, 2001), 80-81.

raids on hilltop positions and roadside improvised explosive device (IED) attacks—that had important antecedents in the Lebanese Civil War.

Although Hezbollah's mass assaults on hilltop forts were an unqualified failure, the forts remained an enticing target. The fact that enemy forces were concentrated in the forts meant that these positions would offer Hezbollah a convenient means of applying pressure on Israeli and SLA forces once its military leaders developed appropriate tactics for attacking them. To this end, Hezbollah's sector commanders began adapting the Civil War urban tactics known as the 'storming' raid to the struggle against the outposts. During storming raids small combat groups of 4-5 men attacked apartment blocks by surprise and relied on the tightly integrated use of rocket propelled grenades (RPGs), assault rifles and machine guns to suppress defenders' responses. Storming raids generally lasted a matter of minutes and aimed to inflict casualties and demoralize opponents, rather than conquer territory.[104]

While the storming raid provided a template for attacking outposts, Hezbollah's leaders understood that changes in planning, fieldcraft and weapons handling skills were needed to adapt the tactic to southern Lebanon. To achieve surprise, commanders now trained their men to stealthily creep up Lebanese mountains and insisted that they wear camouflaged uniforms, rather than jeans and T-shirts overlaid with webbing.[105] To conceal preparations for attacks, Hezbollah also began digging small tunnels near SLA outposts where its fighters could store equipment and rest prior to attacking.[106] Likewise, field commanders created special reconnaissance patrols to generate better intelligence on the forts' weaknesses by creeping close to the forts at night and establishing camouflaged observation posts. From the mid-1990s, these

---

[104] Tony Badran, "Lebanon's Militia Wars," In Barry Rubin, ed., *Conflict and Insurgency in the Contemporary Middle East* (London: Routledge, 2009), 176-79.

[105] Blanford, 126.

[106] Interviews with Hezbollah personnel, Mlita, April 10, 2011.

patrols employed night vision equipment and video cameras to improve their intelligence collection capabilities.[107] These concealment and surveillance techniques increasingly enabled Hezbollah squads to strike the SLA without warning where it was weakest and least alert.

At the same time as improving assault preparations, Hezbollah commanders continuously incorporated new weapons into their storming raids. Within this context, Hezbollah began using a primitive anti-tank guided missile (ATGM), the Soviet 1960s-era AT-3 in late-1992. Although the AT-3 had been used by the PLO in the early-1980s and was already obsolete as an anti-tank weapon, Hezbollah used it to attack forts' vulnerable points, where its large warhead and 3 km range (compared to 200 m for RPGs) made it a useful addition to Hezbollah assaults.[108] From the mid-1990s onwards, Hezbollah also began to support the squad conducting a storm raid with indirect fire from a second squad located around 5 km away. Equipped with mortars, this second squad would bombard the outpost during the first squad's attack and also cover its withdrawal.[109] Eventually, Hezbollah expanded on its use of indirect mortar and Katyusha rocket fire by bombarding one outpost while a raiding party attacked another, and by harassing outposts between major operations to 'keep the pot boiling' in the words of a senior UNIFIL official.[110]

By continually refining its basic storming raid tactic, Hezbollah augmented both the sophistication and volume of its anti-outpost attacks. In late-1992 Hezbollah succeeded in simultaneously attacking eleven outposts, demonstrating a new ability to coordinate disparate

---

[107] Blanford, 124.

[108] Ibid, 132.

[109] Sergio Catignani, "Israeli counter-insurgency strategy and the quest for security in the Israeli-Lebanese conflict arena," In Clive Jones & Sergio Catignani, eds., *Israeli and Hizbollah: An Asymmetric Conflict in Historical and Comparative Perspective*. (London: Routledge, 2010), 80.

[110] Interview with Timur Göksel, (ret.) official with the United Nations Interim Force in Lebanon (UNIFIL), April 2, 2011

units' actions.[111] In October 1994, an attack by several squads, totaling 20 fighters, was so successful at suppressing a fort's defenses that its 70 Israeli defenders either fled or cowered in underground bunkers, enabling Hezbollah fighters raise their flag atop the position.[112] By 1997 Hezbollah was able to sustain simultaneous attacks on five outposts for a period of three hours, before exfiltrating under the cover of darkness.[113] As a result of its improving anti-fort tactics, below, Hezbollah's overall volume of attacks, of which attacks on outposts were the most common, increased dramatically from under 20 in 1990 to over 1,500 in 1998 (as illustrated by Figure 3, below).[114]

Figure 3:

Hezbollah Attacks (Per Year)

---
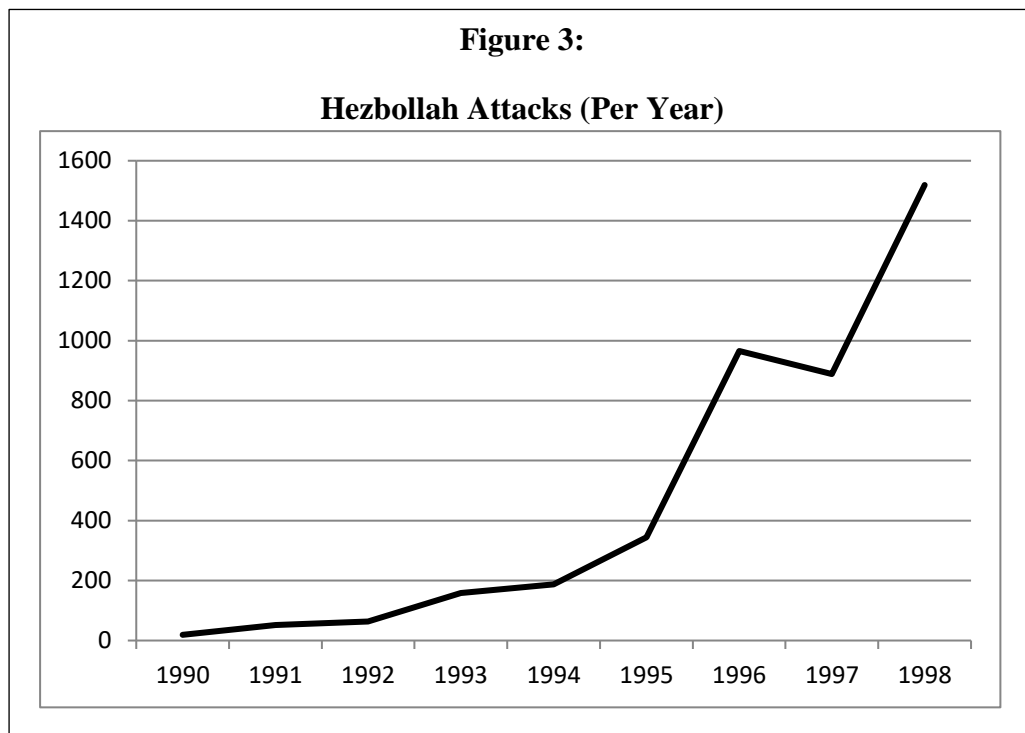
[111] Blanford, 132.

[112] Clive Jones, "Israeli Counter-Insurgency Strategy and the War in South Lebanon 1985–97," *Small Wars & Insurgencies*, 8/3 (1997), 92.

[113] O'Shea, 310-11.

[114] Eisenstadt; and Whitting, 79-80.

Although most caused few casualties, Hezbollah's incessant attacks undermined the SLA's morale. Veteran soldiers began deserting in significant numbers in 1995 and recruits became so hard to find that the SLA's leadership was forced to use press gangs to fill its ranks despite the tripling of its soldiers' salaries between 1990 and 1996.[115] Driven by Hezbollah attacks and its own crumbling morale, the SLA abandoned 25 percent of its outposts in 1999.[116]

Although assaults on outposts constituted the quantitatively most significant element in Hezbollah's campaign against the security zone, its most lethal tactic was attacks with improvised explosive devices (IEDs). Throughout the 1990s roadside, IEDs accounted for half to two-thirds of Israeli losses in the security zone.[117] Despite their lethality, IEDs were nothing new to Lebanon and had been employed by Amal during the 1970s and Hezbollah as early as 1983.[118] Indeed, Hezbollah commanders with prior IED experience almost certainly introduced the devices into the security zone.[119] However, what distinguished Hezbollah's new IED campaign from those preceding it was the pace of innovation. Hidden workshops employed commercially-available civil technologies to continuously improve Hezbollah's ability to conceal and detonate IEDs. Likewise, sector commanders incrementally improved the techniques whereby they infiltrated IED teams to targets and then employed IEDs to inflict maximum damage.[120]

---

[115] Jones, 93-94; and Venter, 291-94.

[116] Whitting, 92.

[117] Blanford, 216.

[118] Daniel Helmer, *The Long War Occasional Paper 21: Flipside of the COIN: Israel's Lebanese Incursion Between 1982-2000* (Fort Leavenworth: CSI, 2007), 51.

[119] Interview with Göksel, April 2, 2011

[120] Interview with Brigadier Hanna, April 5, 2011.

Hezbollah's first IEDs were crude and consisted of little more than explosive charges connected by wires to detonators. However, Hezbollah's fighters soon discovered that decorative fiberglass 'rocks' sold in gardening stores provided ideal concealment for explosives.[121] Then, in late-1991, Hezbollah began detonating IEDs by radio control, which precluded the need for easily-detectable detonating wires. However, as casualties mounted, Israel developed countermeasures to curb the IED threat. For example, Israeli forces responded to radio-detonation by sweeping a wide spectrum of radio frequencies with high-powered transmitters and flying electronic reconnaissance aircraft over southern Lebanon.[122]

Nonplussed, Hezbollah's IED workshops responded to Israeli countermeasures with counter-countermeasures, inaugurating a contest that one author has characterized as "a technological war of wits between Hezbollah's bomb-making engineers and the IDF."[123] For Hezbollah's part, this race saw the group sequentially introduce detonation by: computerized multi-frequency radio transmission (1993), cellular phone receivers (1995), and photo-electric devices (1997).[124] Likewise, when Israel reinforced the armor on its vehicles, Hezbollah responded in 1998 by introducing a new form of IED, explosively-formed projectiles (EFPs), which could better penetrate Israeli armored vehicles.[125]

Hezbollah's continuously-improving IEDs were complemented by incremental improvements to how they employed them. For example, field commanders came to favor road cuttings and overhangs since these features force convoys to bunch-up, increasing their

---

[121] Harik, 132.

[122] Blanford, 129.

[123] Ibid.

[124] Interview with Brigadier Hanna, April 5, 2011.

[125] Blanford, 214-15.

vulnerability to IEDs.[126] To maximize the damage inflicted on convoys, Hezbollah also began

to lay strings of IEDs, extending the lethal area of an IED ambush to up to 60 m along a road's

length.[127] After analyzing Israeli reactions to their attacks, some Hezbollah commanders started

laying pairs of IEDs with a so-called 'seven minute' trigger on the second device. When an

enemy patrol detonated the first IED, its explosion automatically triggered a timer on a second

nearly IED, detonating it after seven minutes, when the survivors of the first attack began to

treat their casualties.[128] When Israel attempted to use thermal cameras to detect Hezbollah's

nighttime movements IED teams, the latter resorted to neoprene diving suites to hide their

thermal signatures.[129]

Hezbollah's growing skill at building and using IEDs killed an increasing number of

Israeli and SLA soldiers, and damaged the morale of both forces. To stem their losses, Israeli

forces reduced their patrolling activities in the security zone beginning in 1994 and attempted

to substitute increased SLA patrols for their own declining effort.[130] However, this policy

backfired because it rendered it easier for Hezbollah's IED teams to infiltrate the security zone

and demoralized SLA soldiers who felt that their lives were being sacrificed to reduce Israeli

casualties. All the while, as illustrated by figure 4 below, Israel's annual losses more than

tripled between 1993 and 1997 as a result of the IED campaign.[131] Even the decline in Israeli

casualties after 1998 represents not so much progress in combatting the IED threat than the

---

[126] Venter, 276.

[127] Interview with Göksel, April 2, 2011

[128] Blanford, 130.

[129] Ibid, 217.

[130] Byman, 229.

[131] Eisenstadt; and Blanford, 211-44.

decision to increasingly target the already-crumbling SLA, which lost 45 soldiers in 1998 compared to only 23 the previous year.[132]

Figure 4:

Israeli Military Deaths in Lebanon

Perhaps more significant than the numbers of Israeli soldiers they killed, Hezbollah's IED campaign was fraying Israeli forces' morale and discipline. Among the disturbing trends was a 50 percent increase in soldiers seeking psychological help in the mid-1990s and the 1997 mutiny of an infantry company told they would be deployed to Lebanon.[133] By 1998, the mounting death toll had convinced many Israelis, including certain generals, to call for a unilateral withdrawal from the security zone.[134]

---

[132] Blanford, 211.

[133] Ed Blanche, "Is the Myth Fading for the Israeli Army? – Part 1," *Jane's Intelligence Review* (December 1996), 547-48; and Al Venter, "Lebanon: A Pawn in the Power Struggle," *Jane's Intelligence Review* (June 1998), 23.

[134] O'Shea, 315-16.

By May 2000, Hezbollah's campaign against the security zone had convinced Israeli policymakers that their best course of action was to unilaterally withdraw. With the SLA crumbling, Israeli units demoralized and Hezbollah constantly improving, any attempt to continue holding the zone was likely to result in a greater investment of resources in a conflict whose outcome was increasingly dubious. As if to emphasize its deteriorating position, Israel's attempt to stage an orderly withdrawal to the Israeli border degenerated into headlong flight as the SLA disintegrated and Hezbollah militants led villagers to overrun their camps and seize hastily-abandoned equipment.[135] In their failed campaign for the security zone, between 1985 and 2000, Israel lost 244 soldiers and the SLA another 410.[136] As demonstrated, Hezbollah achieved this result through the continuous incremental refinement of two tactics—hit-and-run storming raids and roadside IEDs—with which the organization's cadres were already familiar. The institutions that fostered this form of innovation were decentralized and empowered field commanders to innovate from the bottom-up.

The 34-Day War (2006)

By retreating to the international border in 2000, Israel presented Hezbollah with a novel military challenge. Because Hezbollah's cadres filled the vacuum created by Israel's withdrawal and the SLA's collapse, Hezbollah suddenly found itself controlling territory along Israel's border and, in the event of an Israeli attack, would either have to defend this territory or suffer the indignity of abandoning its Shiite inhabitants. As will be shown, Hezbollah's high command met this challenge by developing a defensive plan that built on the organization's existing expertise in three military techniques—launching rocket attacks on population centers, constructing tunnels to conceal and protect its forces, and defending urban areas with small

---

[135] Interview with senior UNIFIL official, Tyre, April 10, 2011.

[136] Whitting, 78.

networked combat groups. Hezbollah's plan proved its value in 2006 when Israel responded to sporadic cross-border attacks with a large-scale offensive. By bombarding Israeli towns with rockets and by retarding Israeli forces' advance, Hezbollah persuaded an increasingly-disillusioned Israeli public to clamor for a ceasefire after 33 days of war.

When Israel withdrew to its international boundary with Lebanon in 2000, its leaders calculated that the move would reduce Hezbollah's ability to act militarily.[137] However, despite the obstacles to continuing military operations, Hezbollah's leadership refused to abandon their struggle. To maximize the political benefits of continuing to fight, while minimizing the risk of massive retaliation, Hezbollah leaders claimed they only sought to force Israel to free the Lebanese prisoners it detained and withdraw from two miniscule territories whose ownership was disputed.[138] In keeping with these modest objectives, Hezbollah's post-2000 military campaign was sporadic and averaged only one attack every month, compared with 125 attacks per month late in the security zone campaign.[139] Until 2006, Hezbollah's calculations appeared sound as Israel refrained from escalating the conflict even after an October 2000 ambush killed three Israeli soldiers, whose bodies Hezbollah exchanged for live Lebanese and Palestinian prisoners.[140] However, Israel surprised Hezbollah by responding with massive force to a similar operation conducted on 12 July 2006, which killed ten Israeli soldiers, two of whose bodies were abducted.[141]

---

[137] Amos Harel & Avi Issacharoff, *34 Days: Israel, Hezbollah, and the War in Lebanon* (New York: Palgrave, 2008), 26.

[138] Israel claims both territories belong to Syria and will only be relinquished when Syria sign a peace treaty with Israel.

[139] Blanford, 304.

[140] Harel & Issacharoff, 56-58; and Blanford, 292-300.

[141] It was revealed in 2008 that the soldiers whose bodies were abducted had perished in the ambush. See "Goldwasser and Regev Were Killed in Initial Attack," July 17, 2008 at http://www.israelnationalnews.com/News/Flash.aspx/150040 (accessed December 2018).

Over five weeks, Israeli aircraft conducted 15,500 sorties, delivering 12,000 bombs and missiles, while Israeli artillery pounded Hezbollah positions with 140,000 artillery projectiles.[142] When long-range attacks failed to produce results, Israel's high-command ordered ground forces into Lebanon, engaging 30,000 Israeli soldiers by war's end. Despite the exceptional means Israel employed during this 33-day campaign, Hezbollah frustrated its offensive by bombarding Israel's population centers with rockets and stymying its ground forces in urban battles. Although most post-war analysts attributed Israel's strategic failure to Israeli political and military errors, the fact remains that Hezbollah's high command confronted them with an ingenious centrally-conceived defensive scheme that built incrementally on the organization's expertise with rockets, small group tactics and tunnels.[143]

Hezbollah's strategy for responding to an Israeli offensive depended on firing rockets at population centers to coerce Israel's government into accepting a ceasefire. Underlying this strategy was a belief that Hezbollah's rockets could force Israel's government to abandon its war aims and curtail its military operations by inflicting civilian casualties, damaging property and disrupting normal life. However, as Hamas' failed Qassem rocket campaign demonstrates, Hezbollah would only succeed if it was capable of launching enough rockets to inflict significant damage and continue to fire them despite Israel's countermeasures. In the years preceding 2006, Hezbollah's cadres incrementally, yet systematically developed precisely these capabilities.

Rocket attacks on Israel were far from a novelty in 2006 and had a history extending back to 1968 when Palestinian guerrillas in southern Lebanon began using Soviet-designed

---

[142] William Arkin, *Divining Victory: Airpower in the 2006 Israel-Hezbollah War* (Maxwell: Air University Press, 2007), 62-65.

[143] See: Avi Kober, "The Israel defense forces in the Second Lebanon War: Why the Poor Performance?" *Journal of Strategic Studies*, 31/1 (2008), 3-40; and Pierre Pahlavi & Eric Ouellet, "Institutional Analysis and Irregular Warfare: Israel Defense Forces during the 33-Day War of 2006," *Small Wars & Insurgencies*, 23/1 (2012), 32-55.

122mm 'Katyusha' rockets to bombard Israeli towns.[144] Designed in the late-1950s, Katyushas were mediocre battlefield weapons because they were inaccurate and possessed a range of only 21 km.[145] However, Katyushas' light weight (they could be transported by two men or a donkey) and fact that they could be launched from hard-to-detect disposable launchers were redeeming qualities that appealed to insurgent groups.[146]

Because of prior experience working for Palestinian guerrillas, many Hezbollah cadres were already veteran Katyusha operators when they joined the organization. However, experience with Katyusha tactics was accompanied by an awareness of their strategic drawbacks. In fact, Hezbollah's leaders judged the Palestinian Katyusha campaign strategically counterproductive. By unexpectedly bombarding Israeli towns with Katyushas, Palestinian guerrillas drove Israelis to demand that their government retaliate. Consequently, Israel responded to most Katyusha attacks by bombarding Lebanese villages, yet went so far as invading Lebanon in 1978 and 1982.[147] This dynamic, whereby Katyushas inflicted light damage on Israel, but provoked massive retaliation against southern Lebanon, drove the region's Shiite inhabitants to turn on the Palestinians and galvanized Israel into finally evicting them from the region in 1982.[148]

The Palestinian precedent, whereby Katyushas provoked retaliatory attacks and aggravated relations with south Lebanon's inhabitants, led Hezbollah's leadership to use the

---

[144] Edgar O'Ballance, *Arab Guerrilla Power, 1967-1972* (London: Faber and Faber, 1974), 91-116.

[145] Andrew Hull et al., *Soviet/Russian Armor and Artillery Design Practices* (Darlington: Darlington Productions, 1999), 361-64.

[146] Uzi Rubin, *The Rocket Campaign against Israel during the 2006 Lebanon War* (Ramat Gan: Begin-Sadat Center for Strategic Studies, 2007), 27.

[147] Sayigh, 424-521; and Helmer, 33-45.

[148] Norton, *Amal and the Shi'a*, 59-70.

rockets cautiously. Consequently, although Hezbollah acquired Katyushas in the mid-1980s, they refrained from attacking targets in Israel for half a decade.[149] This policy only changed in 1992 when Hezbollah field commanders disobeyed orders and launched Katyushas at Israeli towns in retaliation for Israel's killing Secretary General al-Musawi and his family.[150] Although unauthorized, these attacks catalyzed the development of Hezbollah's 'rocket doctrine,' whereby the organization would retaliate for Israel's use of heavy weapons against Hezbollah targets in Lebanese towns by bombarding Israeli towns with Katyushas.

Hezbollah hoped this doctrine would deter Israel from employing its overwhelming advantages in airpower and artillery and, should deterrence fail, Hezbollah planned to launch Katyushas to coerce Israel into accepting ceasefires. Hezbollah Secretary General Nasrallah articulated the new doctrine in 1992, declaring, "We have to work towards creating a situation where the enemy is subject to our conditions. We should tell him 'If you attack us [with heavy weaponry] we will use our Katyushas; if you do not attack us, we will not use our Katyushas. We will, however, keep fighting you as an occupier.'"[151] The panic caused by the small numbers of Iraqi missiles that struck Israel during the 1991 Gulf War arguably encouraged Hezbollah along this path by emphasizing Israel's supposed psychological vulnerability.[152]

To succeed, however, Hezbollah's rocket doctrine needed to be backed-up by the ability to maintain a high volume of Katyusha attacks regardless of Israeli efforts to suppress the rockets. Initially, Hezbollah cadres reemployed the Palestinian guerrillas' techniques for

---

[149] Helmer, 54-55.

[150] Hassan Nasrallah, February 27, 1992, rpt. and trans. in Nicholas Noe, ed., *Voice of Hezbollah: The Statements of Sayyed Hassan Nasrallah* (London: Verso, 2007), 61.

[151] Ibid, 62.

[152] Iver Gabrielsen, The Evolution of Hezbollah's Strategy and Military Performance, 1982-2006, *Small Wars and Insurgencies, 25/2* (2014), 260.

setting-up and launching Katyushas. However, an Israeli air and artillery offensive revealed shortcomings in Hezbollah's use of rockets in July 1993. In an offensive suggestively named Operation Accountability, Israel's armed forces targeted Lebanese villages—inflicting $29 million in damage and creating 300,000 refugees—to turn their inhabitants against Hezbollah and coerce Lebanon's government into cracking down on the organization.[153]

As threatened, Hezbollah responded by launching Katyushas. However, although Hezbollah fired 300 rockets over seven days, which helped pressure Israel into accepting a ceasefire, the operation revealed grave deficiencies in Hezbollah's rocket forces.[154] For example, poor training in ballistic calculations meant that nearly half the rockets launched failed to reach Israeli territory. To make matters worse, Hezbollah fighters were surprised by the sophistication of Israeli counterbattery radars, which enabled Israeli forces to locate the positions Katyushas were launched from and respond with artillery.[155] In Operation Accountability's aftermath, Hezbollah's military cadres addressed these problems and improved their overall performance. As Secretary General Nasrallah later admitted, "July 1993 [Operation Accountability] was a very good lesson for us as far as confronting this kind of aggression is concerned because we pinpointed our strengths and weaknesses."[156]

In response to Operation Accountability's lessons, Hezbollah divided rocket launches into two distinct sets of procedures, which were executed by separate squads. One squad, comprised of full-time combatants, would set up the launch tube and ensure that it was properly aimed. Then, the second squad would transport and fire the rocket. To avoid Israeli retaliatory artillery fire, Hezbollah pioneered the use of inexpensive wristwatch and battery timers to delay

---

[153] Human Rights Watch, *Civilian Pawns: Laws of War Violations and the Use of Weapons on the Israel-Lebanon Border*, (New York: HRW, 1996), 3-5.

[154] Blanford, 147.

[155] Interview with Göksel, April 2, 2011.

[156] Nasrallah, April 30, 1996, rpt. and trans. in Noe, ed., 150.

the rocket launchers until Hezbollah's launch teams could escape from the area.[157] Hezbollah's improved rocket tactics were exhibited in 1996, when Israel initiated another large-scale air offensive, code-named Grapes of Wrath, designed to punish Hezbollah and coerce Lebanon's government into cracking down on the organization. During this 16-day conflict, Hezbollah launched 777 Katyushas, which drove 10,000 Israelis from their homes, and sustained their rocket barrage despite Israeli efforts to stop them.[158]

Hezbollah continued improving its rocket tactics following Grapes of Wrath. In a move that the former director of Israel's Missile Defense Organization characterized as "counterintuitive yet brilliant," Hezbollah engineers improvised multi-barreled Katyusha launchers out of steel tubes and concrete, which they installed in well-camouflaged concrete bunkers.[159] Because the tubes were aimed at predetermined targets during peacetime, rather than hastily installed during wartime, Katyushas fired from these stationary launchers were more accurate than those fired by mobile launch teams. Moreover, by using multi-barreled launchers, Hezbollah dramatically increased the volume of rockets it could fire. Indeed, Israeli analysts calculated that 40 to 150 stationary launchers fired most Hezbollah rockets in 2006.[160]

In addition to developing stationary multi-barreled Katyusha launchers, Hezbollah's military cadres also improved other facets of the organization's rocket force. For example, Hezbollah introduced increasingly diverse platforms for launching Katyushas, employing both mobile launch teams and improvised launchers on pickup trucks to supplement the stationary

---

[157] Blanford, 133-34.

[158] Jones, 97-99; and Rubin, 10.

[159] Rubin, 8.

[160] Ze'ev Schiff, "How the IDF Blew Chance to Destroy Short-Range Rockets," *Ha'aretz*, September 5, 2006; and Rubin, 8-9, 37-46.

launchers.[161] Hezbollah also integrated longer-range rockets, with diameters between 200mm

and 610mm and ranges from 35 to 200 km, into its arsenal. Provided by Iran and Syria, these

new rockets offered Hezbollah the ability to strike Israeli targets hitherto unreachable, while

simultaneously complicating Israel's rocket suppression task because longer ranges meant that

rockets could hit Israel from a wider range of launching zones.

The 2006 war revealed the cumulative impact of Hezbollah's incremental development

of its rocket capabilities. As illustrated in Figure 5, Hezbollah's improvements to its launching

procedures and technologies enabled the organization to increase the volume of rockets it fired,

from an initial daily average of 43 in 1993 to 130 in 2006.[162]

Figure 5:

**Average Daily Rocket Launches During Major Campaigns**
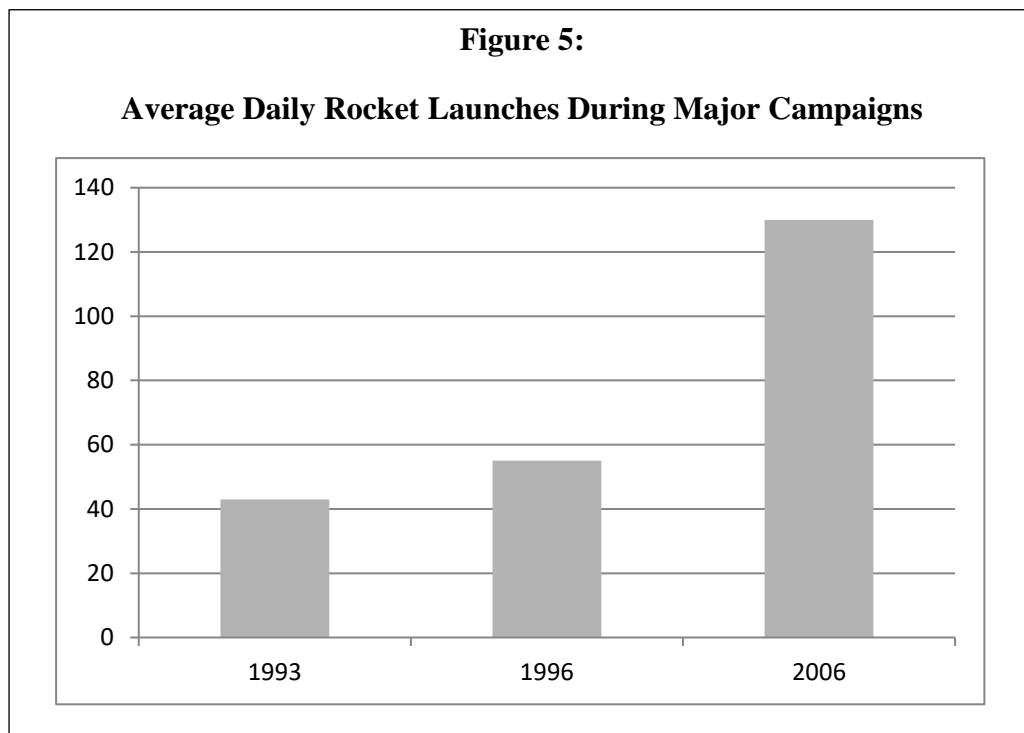
In addition to being able to launch increasing number of rockets, Hezbollah's rocket units'

adroit use of concealment, mobility and decoys thwarted Israel's hi-tech effort to destroy its

rockets. Indeed, judging by the intensity of Hezbollah's 2006 rocket campaign, Israel utterly

---

[161] Arkin, 33.

[162] Rubin, 10; and Blanford, 147-159.

failed to suppress Hezbollah's launchers, which launched as many rockets daily at the end of the war then at the beginning.[163]   As a consequence, as illustrated in Figure 6, Israel's willingness to conduct longer campaigns was matched by Hezbollah launching correspondingly larger numbers of rockets.

Figure 6:

Total Rocket Launches During Major Campaigns
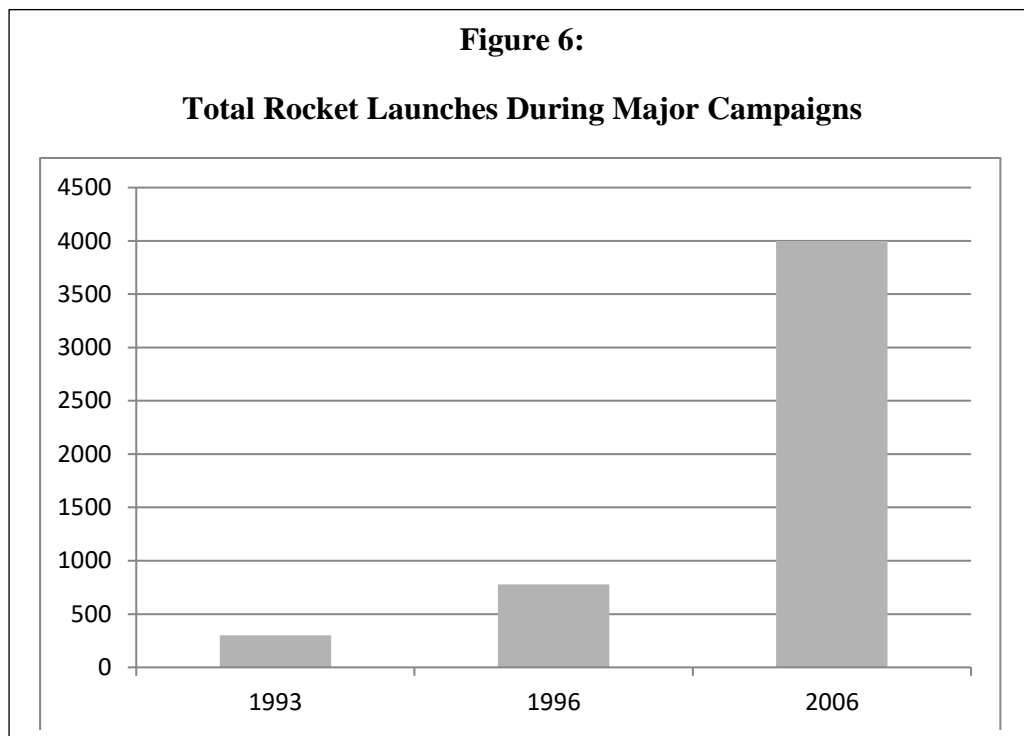
During the most recent conflict, Hezbollah demonstrated that it had developed rocket capabilities capable of significantly disrupting Israel's economy and society by launching 4,000 rockets in 31 days (there was a two-day ceasefire during the 33-day war).

While rockets were the key to Hezbollah's strategy for disrupting an Israeli offensive, it could only implement this strategy if it could thwart an Israeli ground offensive. Because 90 percent of Hezbollah's rockets were short-range Katyushas, Israeli ground forces could

---

[163] Rubin, 19-28.

dramatically curtail Hezbollah's attacks by advancing 20 km into Lebanon.[164] Hezbollah

responded to this threat by building on its prior experience with small, autonomous combat

groups and the construction of tunnels. The development and artful synthesis of these long-

standing capabilities stymied Israeli operations to such an extent that some Western military

theorists saw Hezbollah's performance as a harbinger of deadly future 'hybrid' or 'professional'

networked irregular' wars.[165]

As preceding sections demonstrate, semi-autonomous combat groups had long been

central to Hezbollah tactics, whether operating as urban guerrillas in the 1980s or launching

'storming' raids in the 1990s. Hezbollah spent the years prior to 2006 adapting its small group

tactics to the defense of southern Lebanon's towns. Hezbollah's military leadership, which was

dominated by veterans of the Civil War's urban battles, concluded that the best way of thwarting

an invasion was bogging Israeli ground forces down in urban warfare. However, while urban

warfare could neutralize Israeli forces' firepower advantage, Hezbollah veterans who had

fought alongside Palestinian groups (including Mughniya and al-Khalil) knew that overly-

centralized urban defenses would collapse.

Indeed, large well-supplied Palestinian units disintegrated in Tyre and Sidon in 1982

because their highly-centralized command structures could not cope with the pace of combat.[166]

Consequently, Hezbollah's high command concluded that small units needed to be able to fight

without guidance or logistics support from higher headquarters. To this end, Hezbollah

---

[164] Benjamin Lambeth, *Air Operations in Israel's War with Hezbollah* (Santa Monica: RAND, 2011), 145.

[165] Stephen Biddle & Jeffrey Friedman, *The 2006 Lebanon Campaign and the Future of Warfare: Implication for Army and Defense Policy* (Carlisle: Strategic Studies Institute, 2008), 61-65; and Terry Terriff et al., "Can we adapt to Fourth Generation Warfare?" In Terry Terriff et al., eds, *Global Insurgency and the Future of Armed Conflict: Debating Fourth Generation Warfare* (London: Routledge, 2008), 275-86.

[166] R.D. McLaurin, *The Battle of Tyre* (Aberdeen Proving Ground: U. S. Army, 1987), *passim*.

organized its part-time reservists into autonomous combat groups of 7-10 fighters, which were assigned distinct sectors to defend in their home towns.[167] The commanders of these combat groups were given considerable leeway to make rapid tactical decisions and fight their individual defensive battles as they saw fit.[168] With multiple combat groups' interlocking sectors constituting a coherent system covering each town, Hezbollah's defenses have been characterized as "a network of autonomous cells [i.e. combat groups] with little inter-cell systemic interaction."[169]

Tactically, Hezbollah's combat groups adapted the weapons and techniques they had perfected during the security zone campaign to their new urban defense mission. As had always been true of Hezbollah units, most fighters continued using assault rifles and RPGs. However, Hezbollah commanders also continued to build on their experience in the security zone by integrating increasing quantities of direct attacks from anti-tank missiles and indirect fire from mortars into their operations.[170] For example, Hezbollah's urban combat groups were amply supplied and well-trained to use the AT-3 anti-tank missile to strike urban targets.[171] Although obsolete for their original mission of hunting tanks, these old missiles became the 'main fear' of Israeli infantrymen because their large warheads could transform the buildings where Israeli troops sheltered from small arms fire into deathtraps.[172] In another example of expanding on

---

[167] Exum, 5.

[168] Ibid, 7-10.

[169] Matt Matthews, *We Were Caught Unprepared: The 2006 Hezbollah-Israeli War* (Fort Leavenworth: CSI, 2008), 21.

[170] Interview with Brigadier Hanna, April 5, 2011.

[171] Exum, 7; and Harel & Issacharoff, 174-75.

[172] Steven Erlanger & Richard Oppel, "Israel Surprised by Militants' Arsenal and Tactics," *International Herald Tribune*, August 8, 2006.

its prior experience, Hezbollah made considerable and accurate use of mortars in 2006 to support its combat groups.[173]

To enhance its combat groups' ability to wage urban battles and enable other fighters to protect stationary rocket launchers, Hezbollah's engineers improved upon the organization's long history of tunnel-building to develop an extensive, elaborate and well-concealed network of bunkers and tunnels. During the Lebanese Civil War all sides built tunnels and underground bunkers in the zones they controlled, which oftentimes enabled outnumbered defenders to halt offensives launched by superior attackers.[174] Indeed, tunnels and bunkers enabled: Palestinian fighters to long oppose the 1975-76 Christian assault on Tel Zaatar, Christian militias to frustrate the 1978 Syrian offensive on Ashrafiyeh, and Palestinian groups to offer their most significant resistance to Israel's 1982 invasion.[175]

Consequently, it was only natural that Hezbollah's cadres, who were themselves Civil War veterans, would resort to tunneling as well. Our interviews reveal that local commanders began building their first tunnels on the outskirts of Israel's security zone in the late-1980s. Although the tunnels were initially conceived of merely as places to conceal arms, sector commanders continuously expanded and improved them. Indeed, by the end of the security zone campaign, Hezbollah's tunnel complexes had achieved a high degree of sophistication, with invisible entrances located on hills' reverse slopes linked by underground passages to concealed fighting positions on their forward slopes.[176]

---

[173] Biddle & Friedman, 42.

[174] Paul Jureidini et al., *Military Operations in Selected Lebanese Built-Up Areas, 1975 – 1978* (Aberdeen Proving Ground: U. S. Army, 1979), 15, 52.

[175] Ibid, *passim*; and McLaurin, 31-32.

[176] Interviews with Hezbollah personnel, Mlita, April 10, 2011; and Interview with Nicholas Blanford, Journalist Specialized in Lebanese Affairs, April 7, 2011..

Between 2000 and 2006, Hezbollah's engineers studied foreign tunneling techniques to improve their tunnel and bunker designs. One source of inspiration was the Popular Front for the Liberation of Palestine—General Command (PFLP-GC), which built tunnels massive enough to accommodate trucks in the 1970s, yet whose indiscreet construction techniques invited destructive air raids.[177] North Korea was another source of tunnel-building techniques. North Korean military engineers historically excelled at designing underground bunker systems and purportedly advised Hezbollah personnel.[178] Finally, Hezbollah also studied the National Liberation Front's tunnel networks from the Vietnam War.[179] When questioned about the eclectic influences on Hezbollah's tunnel-building advances, a senior Hezbollah official admitted that the organization had sought innovative ideas from every possible source.[180]

Combining their prior experience with foreign inputs, Hezbollah built underground tunnel and bunker networks unrivaled in the modern Middle East. For example, Hezbollah built 600 ammunition and weapons bunkers to enable its combat groups to fight autonomously of one another. By providing each combat group with three bunkers whose locations were known only to its members, Hezbollah planners calculated that units could keep fighting even if Israeli forces destroyed or overran one or two bunkers.[181] Underneath strategic towns, these supply bunkers were oftentimes integrated into elaborate tunnel systems, whose multiple entrances and strategically-placed CCTV cameras enabled Hezbollah fighters to stage

---

[177] Blanford, 335.

[178] Carl Wege, "The Hizballah-North Korean Nexus," *Small Wars*, January 23, 2011..

[179] Matthews, 22.

[180] Interview with Dr. Ibrahim Moussawi, Hezbollah Chief of Media Relations, April 8, 2011.

[181] Matthews, 19.

sophisticated ambushes.[182] Hezbollah also built massive fighting positions in rural locations that Israeli soldiers euphemistically referred to as 'nature reserves' to provide close-in defenses for its stationary multi-barreled Katyusha launchers.[183] Unlike its early tunnels, many of these fortifications featured reinforced concrete, steel blast-doors, electricity and running water.

The impact of Hezbollah's incremental improvement on its preexisting expertise with rockets, combat groups and tunnels was dramatically revealed in 2006. As planned, Hezbollah initiated a rocket campaign of unparalleled volume and sophistication in response to Israel's offensive. Over the next 33 days, Hezbollah's rockets killed 53 Israelis, severely wounded 250 and damaged or destroyed 6,000 buildings.[184] To make matters worse, Hezbollah's use of camouflage, decoys and well-protected launchers thwarted Israeli efforts to destroy its launchers, enabling Hezbollah to sustain its rocket barrage until war's end.[185] Consequently, 300,000 Israelis fled their homes and 40 percent of northern Israel's businesses temporarily closed, generating $5.5 billion in economic losses.[186]

When Israeli ground forces began advancing on 17 July, they swiftly encountered well-prepared defenses in towns and the 'nature preserves' housing Hezbollah's rockets. Indeed, Hezbollah's nature reserves' concealed tunnel and bunker complexes came as a surprise to Israeli troops and repulsed their initial attacks. Faced with setbacks, the Israeli high command concluded after 10 days of combat that "a nature reserve can swallow an entire [Israeli] battalion" and issued instructions to avoid attacking them.[187] As a result, Hezbollah's stationary

---

[182] Ibid, 50-51.

[183] Exum, 3.

[184] Rubin, 14; and Arkin, 60.

[185] Rubin, 22-29.

[186] Lambeth, 445-46.

[187] Harel & Issacharoff, 132-38.

Katyusha launchers were able to continue firing rocket even when surrounded.[188] When Israeli forces advanced into towns, the reservists comprising Hezbollah's urban combat groups exploited their tunnel networks to stymy their advance. Engaging in extended short-range firefights, many Hezbollah combat groups held their ground for 5 to 12 hours against vastly superior forces. Consequently, individual towns and villages delayed the Israeli advance for days at a time, with Marun a'Ras resisting for seven days, Bint Jubayl for over four, Ghunduriyah for two and Tayyibah for one.[189]

Surprised by Hezbollah's effective ground defenses and undiminished ability to launch rockets, Israeli policymakers agreed to an armistice after 31 days of combat. By the time the armistice entered into effect 60 hours later, Hezbollah had lost approximately 250 combatants to Israel's 119.[190] For a violent non-state organization to perform so well fighting defensively against a regional power is a rare accomplishment. Hezbollah achieved this result by incrementally and artfully building on the organization's tactical repertoire. Indeed, the defining characteristics of Hezbollah's campaign—unguided rockets, small combat groups and tunnels—had been employed by the organization long before 2006. However, the nature of Hezbollah's improvement on these tactics suggests that the organization's pursuit of innovation was more centralized and top-down than ever before. In fact, only a centralized program of studying foreign fortifications could have produced the standardized fortifications, incorporating North Korean and Vietnamese techniques, the Israelis encountered in 2006. Thus, while Hezbollah's innovation remained incremental in nature, the innovative process was more centralized than had previously been the case.

---

[188] Exum, 12.

[189] Biddle & Friedman, 35.

[190] Harel & Issacharoff, vii, 176.

Conclusion

If Hezbollah is symptomatic of other organizations of its ilk, our examination of this case has powerful implications for our understanding of how violent non-state actors develop new capabilities. Within this context, we found that Hezbollah predominantly enhanced its military power via incremental innovation. However, the fact that Hezbollah and other violent non-state actors engage in incremental innovation in no way signifies that their innovations are less impactful than the discontinuous innovations that states can pursue.

Indeed, as demonstrated, incremental innovation enabled Hezbollah to maintain and improve its combat effectiveness vis-à-vis an Israeli adversary that pursued both discontinuous and incremental innovations. While all Hezbollah innovation was incremental, the dynamics that generated innovations evolved over time. Field commanders in direct contact with enemy forces developed innovations in a bottom-up fashion throughout most of Hezbollah's existence. The Jihad Council then diffused locally-successful innovations throughout the organization. However, the transition from a continuous conflict to more episodic confrontations later led Hezbollah to adopt a more centralized and top-down approach.

At base, Hezbollah's military successes are a product of the organization's ability to incrementally improve on certain core military tactics. Consequently, even those capabilities that appeared the most dramatic to outside observers, such as the group's early use of suicide car bombs and later reliance of underground fortifications, were evolutionary developments of techniques that Hezbollah's cadres were long familiar with. In other areas, such as the organization's continuous refinement of autonomous combat group tactics, the incrementality of Hezbollah's innovation is even more apparent. However, despite their resolutely incremental character, the net effect of Hezbollah's innovations was a consistent ability to inflict casualties on Israel's armed forces, despite the latter's best efforts to counter to Hezbollah's tactics.

Although this study focuses on one particularly successful organization, there are strong reasons for anticipating that its lessons about how violent non-state groups innovate can be applied much more widely. In fact, our findings mirror the empirical accounts presented in recent historic studies of the Irish Republican Army (1919-22) and the Provisional Irish Republican Army (1969-97).[191] In these cases, as with Hezbollah, incremental innovation proved critical for combating conventional armed forces' superior resources. When weighed against violent non-state actors' proven ability to innovate incrementally, there is little evidence that such groups can innovate discontinuously.

Indeed, even highly-competent violent non-state actors routinely fail to achieve discontinuous innovations. For example, technologically-savvy groups such as Aum Shinrikyo and the PFLP-GC failed to generate the sought-after capabilities despite significant investments in discontinuous innovation. Less well known, but more significant, even Hezbollah failed on three occasions to develop discontinuous innovations.[192] During the 1990s, Hezbollah devoted high-quality personnel and significant resources to create an elite unit of frogmen trained to infiltrate behind Israeli lines and sabotage ships.[193] Hezbollah also acquired ultra-light aircraft for raiding targets within Israel during this period.[194] Most recently, Hezbollah acquired

---

[191] W.H. Kaut, *Ambushes and Armour: The Irish Rebellion, 1919-1921* (Dublin : Irish Academic Press, 2010), *passim*; and Oppenheimer, *passim*.

[192] A focused comparison between Hezbollah's unsuccessful discontinuous innovations and successful incremental innovations would help explicate why non-state actors are more successful at the latter than the former. However, the data on Hezbollah's failed efforts at discontinuous innovation is too poor to determine what factors led to failure.

[193] Blanford, 350; BBC Summary of World Broadcasts, January 30, 2001; and Mohammad Aslam, "Hezbollah: Subaqueous Endeavors," *Foreign Policy Journal*, February 2, 2013 at: http://www.foreignpolicyjournal.com/2013/02/02/hezbollah-subaqueous-endeavors-2/ (accessed February 2013).

[194] Venter, *Barrel of a Gun*, 277-78; and Sunday Herald, June 17, 1990.

unmanned aerial vehicles (UAVs) and trained its personnel to use them against installations deep within Israel.[195]

However, compared to its incremental innovations, none of Hezbollah's efforts at discontinuous innovation can be judged successful. Timely Israeli countermeasures prevented Hezbollah from ever employing its frogmen and ultra-light aircraft.[196] Similarly, although Hezbollah flew a UAV sortie over Israel in 2004, improved Israeli defenses shot down Hezbollah's UAVs during subsequent efforts to use them to launch attacks (2006) and conduct reconnaissance missions (2012).[197] Even Hezbollah's efforts to assimilate shoulder-launched surface-to-air missiles for combatting Israeli helicopters largely failed, with Hezbollah destroying only one such helicopter in thirty years.[198] The lesson to draw from these experiences is that incremental innovation offers the best means for violent non-state groups to enhance their capabilities. While a well-organized violent non-state actor can successfully compete with states in fielding incremental innovations, even the most powerful groups repeatedly fail when it comes to discontinuous innovation.

While our findings about the incremental nature of violent non-state actor innovations are categorical, such is not the case when it comes to the mechanisms that produce innovations. During the first two periods we examined, Hezbollah relied on bottom-up organizational dynamics. Indeed, during Hezbollah's first years innovation occurred via a veritable

---

[195] Blanford, 323-24; and "More Details of Hezbollah UAV Scare," *Flight International*, December 7, 2004.

[196] Israel claims to have shot down one Hezbollah ultra-light aircraft and another accidently exploded after take-off. See Venter, *Barrel of a Gun*, 277-78; and *The Jerusalem Post*, February 22, 1996. Hezbollah's frogmen fought as infantry in South Lebanon during the 1990s, but have reportedly never conducted a naval operation. See Blanford, 350.

[197] The Jerusalem Post, November 8, 2004; BBC Summary of World Broadcasts, December 5, 2004; The Jerusalem Post, August 8, 2006; Arkin, 29.

[198] Gabrielsen, 274.

'revolution from below' wherein field commanders disregarded Iranian advisors and instead developed tactics based on their prior civil war experience. Later, during the struggle for the 'security zone', Hezbollah institutionalized this dynamic by devolving control for operations to unit commanders based in Southern Lebanon and establishing an overarching Jihad Council to disseminate tactical lessons. Although the data is more fragmentary, Hezbollah's defensive preparations prior to 2006 suggest that its innovative efforts became more centralized during this period.

Such a change in Hezbollah's pursuit of innovation is perhaps best explained by the dichotomy of 'wartime' and 'peacetime' innovation. So long as Hezbollah was engaged in continuous operations against Israel, the most efficacious means of innovating was to endow field commanders with the autonomy needed to experiment with new tactics. When one commander or unit developed a technique considered particularly promising, the Jihad Council and Hezbollah's training camps ensured the innovation was diffused. However, Israel's withdrawal from the security zone in 2000 fundamentally transformed its conflict with Hezbollah from one that had been continuous into one that now became episodic. This, in turn, deprived Hezbollah's field commanders of the ability to test and refine tactics against a 'live' adversary. Consequently, Hezbollah's leadership now relies on a more centralized, top-down process for developing and experimenting with tactics.

These findings have powerful implications for our understanding of how violent non-state actors innovate. Whereas policymakers and scholars alike long considered highly-centralized organizations pursuing discontinuous innovations the most dangerous form of violent non-state group, our research demonstrates that such organizations are, in fact, the least likely to successfully innovate. Indeed, based on Hezbollah's record, the most formidable violent non-state actors are actually those that relentlessly pursue incremental innovations in a bottom-up fashion. Since our findings coincide, in part, with those of Oppenheimer and

Moghadam, yet contradict much of the literature on non-state actor innovation, scholars should arguably examine in greater depth incremental and bottom-up processes within insurgent and terrorist groups.[199] Moreover, in light of these findings, the putative threat of existing non-state actors successfully employing such novel technical means as weapons of mass destruction or cyber-warfare appears likely exaggerated. Contrarily, the danger posed by well-organized non-state organizations pursuing incremental innovations is quite real and such actors can indeed out-innovate well-resourced conventional armed forces.

---

[199] See Oppenheimer; and Moghadam.