

Learning to Mow Grass: IDF Adaptations to Hybrid Threats

A Monograph

by

MAJ Kha M. Nguyen
United States Army



School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

2017

Approved for public release; distribution is unlimited

REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>		
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 06-02-2017		2. REPORT TYPE Monograph		3. DATES COVERED (From - To) JUN 2016 – MAY 2017	
4. TITLE AND SUBTITLE Learning to Mow Grass: IDF Adaptations against Hybrid Threats			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) MAJ Kha M. Nguyen			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) US Army Command and General Staff College ATTN: ATZL-SWD-GD Fort Leavenworth, KS 66027-2301			8. PERFORMING ORG REPORT NUMBER		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) School of Advanced Military Studies, Advanced Military Studies Program			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release; Distribution is Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT From the Army Operating Concept to ADP 3-0, the US Army expects to fight hybrid threats in the current operating environment. Hybrid threats combine the characteristics of irregular forces with improved conventional capabilities. This monograph examines the adaptations of the Israel Defense Force against hybrid threats to draw relevant operational lessons for military planners. It links the nature of the hybrid threat, Israeli adaptations, and the adaptations' effects on Israeli operational art against the hybrid threat in three case studies spanning the Second Lebanon War in 2006, Operation Cast Lead in 2008, and Operation Protective Edge in 2014. The monograph observed Israeli adaptations in the three areas of materiel, doctrine, and training for comprehensiveness. After meeting a hybrid threat on the battlefield in 2006, the Israel Defense Force invested in equipment like the Merkava IV tank, Trophy active protection system, and Iron Dome. It purged Systemic Operational Design's language from its tactical doctrine. Critically, the Israel Defense Force retrained both active and reserve units for combined arms maneuver to defeat hybrid threats. Altogether, this provided Israeli operational art the means of a conventional ground force to succeed against Hamas in 2008 and 2014. The IDF lacked such a force against Hezbollah's hybrid threat in 2006, and lost. An Israeli ground force reequipped and retrained for combined arms maneuver defeated Hamas in 2008, and enabled Israeli operational art to counter Hamas' new subterranean threat in 2014. The Israeli experience from 2006 to 2014 have made clear that a ground force capable of combined arms maneuver remained a necessary component for effective operational art against a hybrid threat.					
15. SUBJECT TERMS Adaptation, Hybrid Threat, Hezbollah, Hamas, Israel Defense Force					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON MAJ Kha M. Nguyen
a. REPORT (U)	b. ABSTRACT (U)	c. THIS PAGE (U)			19b. PHONE NUMBER (include area code)
			(U)	55	

Monograph Approval Page

Name of Candidate: MAJ Kha M. Nguyen

Monograph Title: Learning to Mow Grass: IDF Adaptations to Hybrid Threats

Approved by:

_____, Monograph Director
G. Stephen Lauer, PhD

_____, Seminar Leader
Joseph Shafer, COL

_____, Director, School of Advanced Military Studies
James C. Markert, COL

Accepted this 25th day of May 2017 by:

_____, Director, Graduate Degree Programs
Prisco R. Hernandez, PhD

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other government agency.(References to this study should include the foregoing statement.)

Fair use determination or copyright permission has been obtained for the inclusion of pictures, maps, graphics, and any other works incorporated into this manuscript. A work of the United States Government is not subject to copyright, however further publication or sale of copyrighted images is not permissible.

Abstract

Learning to Mow Grass: IDF Adaptations to Hybrid Threats, by MAJ Kha M. Nguyen, US Army, 55 pages.

From the Army Operating Concept to ADP 3-0, the US Army expects to fight hybrid threats in the current operating environment. Hybrid threats combine the characteristics of irregular forces with improved conventional capabilities. This monograph examines the adaptations of the Israel Defense Force against hybrid threats to draw relevant operational lessons for military planners. It links the nature of the hybrid threat, Israeli adaptations, and the adaptations' effects on Israeli operational art against the hybrid threat in three case studies spanning the Second Lebanon War in 2006, Operation Cast Lead in 2008, and Operation Protective Edge in 2014.

The monograph observed Israeli adaptations in the three areas of materiel, doctrine, and training for comprehensiveness. After meeting a hybrid threat on the battlefield in 2006, the Israel Defense Force invested in equipment like the Merkava IV tank, Trophy active protection system, and Iron Dome. It purged Systemic Operational Design's language from its tactical doctrine. Critically, the Israel Defense Force retrained both active and reserve units for combined arms maneuver to defeat hybrid threats.

Altogether, this provided Israeli operational art the means of a conventional ground force to succeed against Hamas in 2008 and 2014. The IDF lacked such a force against Hezbollah's hybrid threat in 2006, and lost. An Israeli ground force reequipped and retrained for combined arms maneuver defeated Hamas in 2008, and enabled Israeli operational art to counter Hamas' new subterranean threat in 2014. The Israeli experience from 2006 to 2014 have made clear that a ground force capable of combined arms maneuver remained a necessary component for effective operational art against a hybrid threat.

Contents

Acknowledgement.....	v
Acronyms	vi
Illustrations.....	vii
Introduction	1
Second Lebanon War: 2006	7
Operation Cast Lead: 2008-2009.....	22
Operation Protective Edge: 2014.....	34
Conclusion.....	47
Bibliography	51
Primary Sources.....	51
Secondary Sources.....	51
Doctrinal Publications.....	56

Acknowledgement

This monograph would have not have been possible without the patience and guidance of my wife, Amanda, and my monograph director, Dr. Steve Lauer. I also want to thank the staff at the Ike Skelton Combined Arms Library, Dr. Russell Glenn, and LTC Yoav Turjanski for all their understanding and help.

Acronyms

ADP	Army Doctrine Publication
APC	armored personnel carrier
APS	active protection system
ATGM	anti-tank guided missile
CAM	combined arms maneuver
CAS	close-air support
CGS	Chief of the General Staff, IDF
DAP	Digital Army Program (Israeli)
EBO	Effects-Based Operation
FSCL	fire support coordination line
IAF	Israel Air Force
IDF	Israel Defense Forces
IED	improvised explosive device
ISIL	Islamic State in Iraq and the Levant
OCL	Operation Cast Lead
OPD	Operation Pillar of Defense
OPE	Operation Protective Edge
RMA	Revolution in Military Affairs
RAND	Research and Development Corporation
SLW	Second Lebanon War
SOD	Systemic Operational Design
TACP	tactical air control party
TC	Training Circular
TRADOC	Training and Doctrine Command
UAV	unmanned aerial vehicle
UN	United Nations

Illustrations

1	Range of Adversary Capabilities.	3
2	An overarching Theory of War	5
3	Concealed Hezbollah short-range rockets.....	13
4	AF attacks distribution in the SLW.....	16
5	Approximate IDF final locations and Hezbollah Rocket-Launching Sites.....	20
6	2008 Gazan Mortar and Rocket Attacks against Israel.....	28
7	Hamas tunnels in civilian houses	41

Introduction

Anticipating the demands of future armed conflict requires an understanding of continuities in the nature of war as well as an appreciation for changes in the character of armed conflict.

— *The US Army Operating Concept 2020-2040*

Military adaptation and innovation remains a continuing challenge for the US Army. US Army ADP 1-0, *The Army*, stresses “the integration and adaptation of technology, the organization of units, and the planning and execution of military operations” under the idea of military expertise.¹ ADP 3-0, *Operations*, claims that the side that “learns and adapts more rapidly... stands the greatest chance to seize, retain, and exploit the initiative in order to succeed over an opponent.”² Two of the three core texts for the US Army Command General Staff Officer Course specifically pertain to innovation and adaptation.

Historians and thinkers devoted much analysis to military adaptation and innovation. For Williamson Murray, innovations occurred in peacetime while adaptations happened in war.³ Dima Adamsky examined the cases of the Revolution in Military Affairs (RMA) in the United States, Soviet Union, and Israel to assess the impact of cultural factors on innovation.⁴ In *A History of Innovation*, the US Army Center for Military history used four criteria for innovations, including that the Army drove the innovations and the changes proved operationally effective.⁵ In another

¹ Army Doctrinal Publication (ADP) 1-0, *The Army* (Washington, DC: Government Printing Office, 2012), 2-4.

² Army Doctrinal Publication (ADP) 3-0, *Unified Land Operations* (Washington, DC: Government Printing Office, 2016), 2.

³ Williamson Murray, *Military Adaptation in War: With Fear of Change* (New York: Cambridge University Press, 2011), 2.

⁴ Dima Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel* (Stanford: Stanford University Press, 2010), 1.

⁵ Center for Military History (CMH) Publication 40-6-1, *A History of Innovation: U.S. Army Adaptation in War and Peace*, Jon T. Hoffman, ed. (Washington, DC: Center for Military

book, Adamsky and Bjerga argued that innovation lies between anticipation, a top-down peacetime effort, and adaptation, a bottom-up process built on “the insights produced by battleground friction and the lessons learned from the best practices.”⁶

G.S. Lauer argues a similar dialectical process of military adaptation. Anticipation is the result of two discourses. One is an internal discourse that starts from analyzing the most recent combat experience, obtains resonance with the various service components of a military, and that fits within budgetary, policy, political, and strategic limitations. The other is an external discourse with a presumed antagonist. This lasts until the forces meet in battle, and the military then must adapt to meet the new conditions. In the specific example of doctrine, adaptations lie on a spectrum from tactical techniques to wholesale paradigm shift.⁷

This study examines military adaptations in the case of the Israeli Defense Force (IDF) between 2006 and 2014 against hybrid threats. To differentiate this from the hybrid warfare in the Ukraine, it limits the idea of hybrid threats to David E. Johnson’s concepts in Figure 1. These threats’ capabilities lie between those of state actors and more irregular threats. Johnson especially notes the ease of transition from non-state irregular to hybrid threats. The Afghan mujahedeen was an irregular force in 1979, but became a hybrid threat once it received advanced Stinger missiles from the United States in 1988.⁸

History, 2009), 2, accessed December 6, 2016, http://www.history.army.mil/html/books/innovation/History_of_Innovation.pdf.

⁶ Dima Adamsky and Kjell Inge Bjerga, eds., *Contemporary Military Innovation: Between Anticipation and Adaptation*, Cass Military Studies (London: Routledge, 2012), 188.

⁷ G. Stephen Lauer, “The Tao of Doctrine: Contesting an Art of Operations,” *Joint Forces Quarterly* 82, (July 2016): 119, accessed September 5, 2016, http://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-82/jfq-82_118-124_Lauer.pdf.

⁸ David E. Johnson, *Occasional Paper*, vol. OP-285-A, *Military Capabilities for Hybrid War: Insights from the Israel Defense Forces in Lebanon and Gaza* (Santa Monica, CA: RAND, 2010), 5.

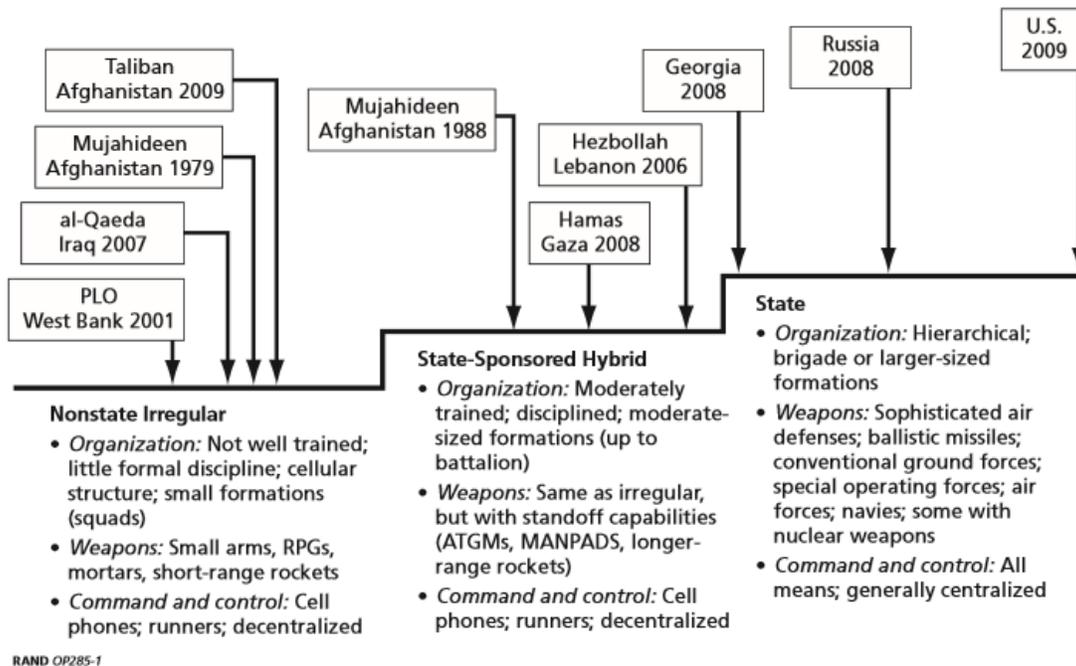


Figure 1. Range of Adversary Capabilities. David E. Johnson, *Military Capabilities for Hybrid War: Insights from the Israel Defense Forces in Lebanon and Gaza* (Santa Monica, CA: RAND, 2010), 5.

This makes the study very relevant to the US Army’s own anticipation of the future. Current Army publication stresses the likelihood of hybrid threats in future conflicts. TC 7-100, *Hybrid Threat*, echoes Johnson in describing hybrid threats employing “an ever-changing variety of conventional and unconventional organization, equipment, and tactics.”⁹ ADP 3-0, *Unified Land Operations*, similarly defines hybrid threats as “non-state actors using operational concepts and high-end capabilities traditionally associated with nation-states.”¹⁰ By including the increasing availability of lethal weapon systems as one driver of the future complex operating environment, the Army operating concept too emphasizes the growing possibility of US forces fighting hybrid threats in the future.¹¹

⁹ Training Circular (TC) 7-100, *Hybrid Threat* (Washington, DC: Government Printing Office, 2010), 1-2.

¹⁰ ADP 3-0, *Unified Land Operations*, 2.

¹¹ TRADOC Pamphlet 525-3-1, *The U.S. Army Operating Concept: Win in a Complex World*, 15.

To obtain a comprehensive view of IDF adaptations to hybrid threats, the study focuses on three areas: doctrine, training, and material. First, doctrine provides the intellectual basis for the conduct of operations. It is the “frame for the manner and methods of the employment of the means—the inherent complex interaction at the tactical level that constitutes the flow of fires and movement.”¹² Material, from tanks to digital communication systems, measures the effectiveness of technology in battle and war. Lastly, training refers to the IDF’s tactical proficiency. As one IDF general ruefully remarked, “It’s one thing to give the troops maps, target list, etc. It’s another thing to be trained for the mission.”¹³

Moreover, this monograph links IDF adaptations in terms of their contribution to IDF operational art. It uses G.S. Lauer’s model of war in Figure 2 to conceptualize the linkage between the IDF adaptations and its operational art. Operational art is an emergent way to achieve policy ends by the creative employment of available tactical means. It is a fluid discourse between policy ends and tactical means. Here, tactical doctrine is as much a mean as much as a new tank or the number of battalions.¹⁴ Operational art furthermore cannot outstrip available means. As Emile Simpson writes in *War from the Ground Up*, “If one cannot change the facts on the ground with the means allocated to do so, the facts will catch up with one’s policy and force it to change, or make it fail.”¹⁵ Hence, as changes to available Israeli means, the question is whether IDF adaptations enabled or constrained the IDF’s operational art between 2006 and 2014.

¹² Lauer, “The Tao of Doctrine: Contesting an Art of Operations,” 122.

¹³ Matt Matthews, *Long War Series Occasional Paper*, vol. 26, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War* (Fort Leavenworth, KS: U.S. Army Combined Arms Center, Combat Studies Institute Press, 2008), 44.

¹⁴ Lauer, “The Tao of Doctrine: Contesting an Art of Operations,” 121-122.

¹⁵ Emile Simpson, *War from the Ground Up: Twenty-First Century Combat as Politics, Crises in World Politics* (New York, NY: Columbia University Press, 2012), 125.

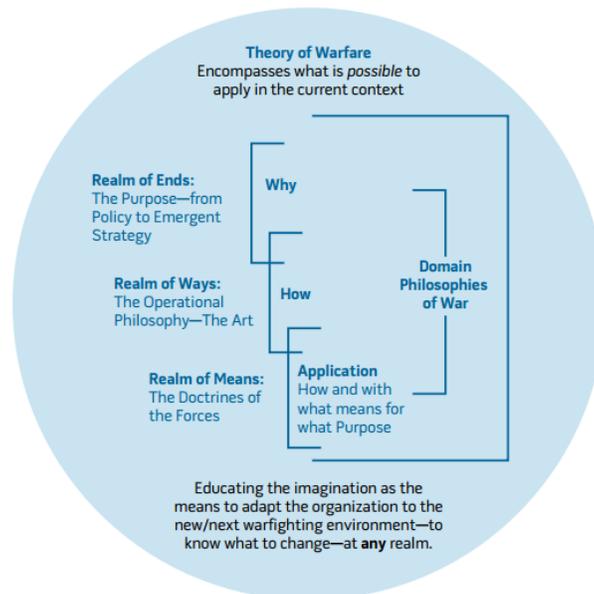


Figure 2. An overarching Theory of War. G. Stephen Lauer, “The Tao of Doctrine: Contesting an Art of Operations,” *Joint Forces Quarterly* 82, (July 2016): 121, accessed September 5, 2016, http://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-82/jfq-82_118-124_Lauer.pdf.

This research delved into an area many trod before. Mark Matthews in *We Were Caught Unprepared* argued that IDF’s embrace of Systemic Operational Design and lack of combined arms training caused its failures in 2006 Second Lebanon War. Conversely, Benjamin Lambeth countered Matthews’ conclusion on SOD and airpower by stressing the role of IDF Chief of the General Staff (CGS) Dan Halutz and Israel’s political dependence on standoff firepower. David E. Johnston from the Research and Development (RAND) Corporation studied Hezbollah and Hamas as examples of today’s emerging hybrid threats. Russel Glenn in the recent *Short War in a Perpetual Conflict* compared the cycle of Hamas and IDF adaptations against one another. MAJ Michael Kim focused on the Israelis’ evolving Merkava tank from 2006 to 2014 in “Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025.”

However, there were few English primary sources. Much of the IDF’s lessons learned remained classified or untranslated. Nonetheless, the publication of Brigadier Gal Hirsch’s memoirs in July 2016 provided a participant view of the tactical fight in the SLW. Started around 2010, the IDF website provided another source of IDF information. The Israeli Institute for National Security Studies was extremely helpful with its analyses in English.

In the following sections, this study examines IDF adaptations and operational art in three case studies between 2006 and 2014. They are the Second Lebanon War (SLW) in 2006, Operation Cast Lead (OCL) in 2008 to 2009, and Operation Protective Edge (OPE) in 2014. This provides a view for not only how the IDF adapts after encountering a hybrid threat for the first time in SLW, but subsequent adaptations as it clashes against Hamas emulation of Hezbollah. Each case studies examines IDF adaptations, hybrid threat adaptations, and the conflict. They end with the assessed impact of Israeli adaptations on IDF operational art. The criterion is whether IDF adaptations increased the means for IDF operational art to achieve policy ends after 2006. Finally, a conclusion summarizes the findings of the case studies, and provides implications for the US Army.

During this time, the IDF fought on hills, in urban areas, and even down at the subterranean level. It fought against determined and evolving hybrid threats. It did not anticipate a hybrid threat before 2006, and so its adaptations towards standoff fires failed in the SLW. Based on this experience, the IDF adapted and rebuilt a conventional ground force, which enabled its successes in OCL. Before OPE, Iron Dome negated its hybrid threat's short-range rockets capabilities and tempted the IDF back towards a standoff fires approach. Nonetheless, the IDF did not strip its ground forces as before 2006. Hence, its operational art was able to respond to Hamas's new attack tunnel threat, and still achieved the objectives of OPE. Arguably, the IDF adapted appropriately and achieved effective operational art against hybrid threats. First, however, it had to fight a hybrid threat.

Second Lebanon War: 2006

All in all, the IDF failed, especially because of the conduct of the high command and the ground forces, to provide an effective military response to the challenge posed to it by the war in Lebanon, and thus failed to provide the political echelon with a military achievement that could have served as the basis for political and diplomatic action.

— *The Winograd Commission findings on the SLW*

The IDF strategic assessment before the SLW in 2006 did not anticipate a hybrid threat.

According to the Winograd Commission, many in the IDF saw a “transition from a pattern of symmetrical wars between regular armies and sovereign, solidified countries to asymmetrical conflicts with limited or high intensity against armed elements that rely on a sympathetic local population that assists nongovernment bodies from within.”¹⁶ The IDF believed war with one of its neighbors, to include Hezbollah, would only occur on Israel’s initiative or after an American departure from the region. The IDF Chief of Staff Moshe Ya’alon told *Janes Defense Weekly*, “Our current challenges are located at the two extremes of the threat scale: a sub-conventional conflict with the Palestinians on one hand, and a growing non-conventional threat in Iran, combined with longer-range ballistic missiles, on the other.”¹⁷ Nothing in the picture that posed a need for conventionally trained ground forces.

Indeed, the IDF increasingly saw winning future wars through heavy firepower and not land maneuvers. The American experiences in Kosovo in 1999, Afghanistan in 2001, and Iraq in 2003 seemed to vindicate the American Revolution in Military Affairs concepts integrating increased technological capabilities in intelligence, surveillance, and strike.¹⁸ The IDF began to

¹⁶ David E. Johnson, *Hard Fighting: Israel in Lebanon and Gaza* (Santa Monica, CA: RAND, 2011), 17.

¹⁷ Alon Ben-David, “Country Briefing – Israel – Double Jeopardy,” *Jane’s Defense Weekly*, November 11, 2004, accessed November 21, 2016, <https://janes.ihs.com.lumen.cgsccarl.com/Janes/Display/1172116>.

¹⁸ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, xvi.

borrow terms such as *jointness* (*shiluvit*), and concepts such as Effects-Based Operations (EBO). The Second al-Aqsa Intifada (2000-2006) became a testing ground for this firepower-focused approach. In the West Bank and Gaza, the IDF operated in “reconnaissance-strike complexes.”¹⁹ Though the enemy never amounted to more than an “unskilled infantry squad,”²⁰ the IDF believed the new approach’s successes was scalable for larger conflicts.²¹

The political and social imperative for low casualties further fostered adopting a fires-based approach. The development of ‘casualty shyness’ in Israel politics started from the *Beaufort Family* and the later *Four Mothers* groups, both about casualties sustained from low-intensity operations in Lebanon. He even termed this phenomenon “Lebanon-phobia.”²² After Operation Defensive Shield in the West Bank, the word in the IDF was “zero casualties to our forces.”²³ Gal Hirsch echoed this assessment of an entire generation of officers with the mindset that “[i]t’s better to win 1:0 than 3:1,” meaning that it was preferable to kill one enemy without a single loss instead of killing three enemies while losing a soldier.²⁴ A standoff fires approach seemed to promise a bloodless victory.²⁵

¹⁹ Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel*, 106- 107.

²⁰ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 40.

²¹ Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel*, 107-108.

²² Yagil Levy, “How Casualty Sensitivity Affects Civilian Control: The Israeli Experience,” *International Studies Perspectives* 12 (2011): 72-73.

²³ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 38.

²⁴ Gal Hirsch, *Defensive Shield: An Israeli Special Forces Commander on the Front Line of Counterterrorism*, trans. Reuven Ben-Shalom (Jerusalem, Israel: Gefen Publishing House, 2016), 311.

²⁵ Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel*, 105.

This shift away from land power arrived near the same time the IDF faced budget constraints. In 2001, the IDF lost some 2.6 billion USD in its budget.²⁶ Its five-year plan in 2003, Kela 2009 or Catapult 2009, received 566 million USD less than the proposed base budget. Yet the IDF was still fighting the Second Intifada. It had to accept some risks, and it took them “in the area of war preparedness (inventory levels, technical competence, training levels)” with the IDF ground forces.²⁷

The IDF shrank large-scale combined arms maneuver (CAM) training. The IDF’s training budget in 2006 was half of what it was in 2001.²⁸ It focused about seventy-five percent of training on counterinsurgency, and the remaining twenty-five percent on CAM. The IAF removed air-control parties from Israeli maneuver brigades so there was little joint training nor doctrine development on air-ground integration.²⁹ Battalion commanders did not train their units to integrate mortars and machine guns into maneuvers.³⁰ Instead, the view became that “fighting is training since the intifada is the war we have to win.”³¹ Between 2001 and 2005, most regular brigades had only one full field exercise.³²

The lack of training fell most heavily on the IDF reserves. The IDF reserves comprised the IDF core strength. As of October 2016, it still numbered some 445,000 or seventy-two percent of

²⁶ Aram Nerguizian, *Military Balance in a Shattered Levant* (Washington, DC: Center for Strategic and International Studies, 2015) 58, accessed October 17, 2016, <https://www.csis.org/analysis/military-balance-shattered-levant>.

²⁷ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 18.

²⁸ Michael Kim, “Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025,” (Monograph, Ft. Leavenworth, KS: US Army Command and General Staff College, 2015), 16.

²⁹ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, xix, 42-43.

³⁰ David E. Johnson, *The Challenges of the “Now” and Their Implications for the U.S. Army* (Santa Monica, CA: RAND Corporation, 2016), 5, accessed November 21, 2016, <http://www.rand.org/pubs/perspectives/PE184.html>.

³¹ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 19.

³² Ben-David, “Country Briefing – Israel – Double Jeopardy.”

the total force of 621,500.³³ The IDF cut the reserves' training budget by seventy percent in 2006.³⁴ It employed reserve units extensively in security operations in Gaza and the West Bank.³⁵ This was deleterious on the IDF reserves combat training. Some reserve units had never conducted live fire exercises within four to five years before the war. A battalion commander explained the problem, "[A] tank reservist needs a five-day refresher exercise each year. Most hardly got that in the course of three years, others in the space of five, and yet others none at all."³⁶ The IDF also did not regularly exercise its reserves' mobilization procedures.³⁷ A 2004 *Jane's* analysis said this of the IDF reserves, "[Th]eir lack of regular training has rendered them unprepared for combat."³⁸

The IDF's material acquisition prioritized standoff fires. Kela 2009 allocated a substantial part of the acquisition budget to development and procurement of unmanned aerial vehicles (UAVs). It earmarked 4.4 billion USD for newer F-16I Sufa (Storm) aircraft to deal with Iran, which consumed the majority of the IAF budget. Conversely, the IDF slowed production for the Merkava IV tank. It saw the tanks as only "suitable for old wars,"³⁹ and even considered a production shut down to save an additional 200 million USD.⁴⁰

³³ "Israel > Armed Forces," *Jane's Sentinel Security Assessment – Eastern Mediterranean*, November 23, 2016, accessed November 30, 2016, <https://janes.ihs.com.lumen.cgscarl.com/EasternMediterranean/Display/1303357>

³⁴ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 16.

³⁵ Abe F. Marrero, "The Tactics of Operation CAST LEAD" in *Back to Basics: A Study of the Second Lebanon War and Operation CAST LEAD*, ed. Scott Farquhar (Fort Leavenworth, KS: Combat Studies Institute Press, 2009), 85.

³⁶ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 27.

³⁷ Marrero, "The Tactics of Operation CAST LEAD," 85.

³⁸ Ben-David, "Country Briefing – Israel – Double Jeopardy."

³⁹ *Ibid.*

⁴⁰ "Merkava Mark 4 main battle tank," *Military Periscope*, last modified October 1, 2014, accessed 16 Nov 2016, <https://www.militaryperiscope.com.lumen.cgscarl.com/weapons/gcv/tanks/w0005608.html>.

The IDF doctrinal development with Systemic Operational Design (SOD) reflected this shift to standoff fires. SOD mainly came out of Central Command, responsible for the counterinsurgency fight in the West Bank. It combined system theory, social and biological sciences, Soviet theory, as well as postmodern theory.⁴¹ SOD sought to win wars by paralyzing the enemy's system or operational effectiveness, and hence producing a sense of helplessness in the enemy to drive them to war termination. By emphasizing effects, it de-emphasized maneuvers to occupy land.⁴² Commander Dan Halutz in 2002 said, "Victory means achieving the strategic goal and not necessarily territory. I maintain that we also have to part with the concept of a land battle."⁴³

The language of SOD, however, brought tremendous confusion. CGS Dan Halutz signed and officially endorsed SOD in April 2006. The language of SOD, however, was a mixed bag from "post-modern French philosophy, literary theory, architecture and psychology."⁴⁴ It replaced older terms like Commander's Intent or Forces and Tasks with System Boundaries, Campaign Organizing Theme, and Opposing System Rationale.⁴⁵ Other terms included "the dynamic molecule," "the swarms," "the flock," and "maneuvering by fire."⁴⁶ Given the language origins and the short time before the SLW, few IDF officers understood more than half of the 170-page document.⁴⁷

⁴¹ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 26, 30.

⁴² Levy, "How Casualty Sensitivity Affects Civilian Control: The Israeli Experience," 74.

⁴³ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 15.

⁴⁴ Mark A. Matthews, "Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview," in Scott Farquhar, 12.

⁴⁵ *Ibid*, 11.

⁴⁶ Ron Tira, "The Limitations of Standoff Firepower-Based Operations: On Standoff Warfare, Maneuver, and Decision," Institute for National Security Studies, March, 2007, accessed December 1, 2016, [http://www.inss.org.il/uploadimages/Import/\(FILE\)1188302040.pdf](http://www.inss.org.il/uploadimages/Import/(FILE)1188302040.pdf).

⁴⁷ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 26.

In contrast, Hezbollah adapted to negate the IDF's standoff fires. Hezbollah's Secretary-General, Hassan Nasrallah, described the hybrid result as "not a regular army but was not a guerrilla in the traditional sense either."⁴⁸ Believing that "Israeli society is as weak as a spider web,"⁴⁹ Hezbollah developed fires capabilities to bring the war inside Israel's borders. By 2006, it had an array of short-range Katyusha rockets and long-range Iranian Fajr and Zelzal-2 rockets. Hezbollah obtained between 12,000 to 13,000 of these rockets and missiles. It received the requisite training from Iranian advisers and trainers.⁵⁰

Hezbollah further organized and trained to survive IDF fires. Katyusha rocket teams operated independently as separate groups of lookouts, transporters, and firers to reduce signature and to maximize dispersion. The teams trained to fire a Katyusha in twenty-eight seconds,⁵¹ faster than the expected IAF response time of ninety seconds.⁵² Concentrated within five miles of the Israeli borders, Katyusha teams hid in private residences and used civilians as human shields.⁵³ They sheltered in a vast network of underground tunnels and bunkers, one of which lay undetected within 300 meters of an Israeli border position until the war.⁵⁴ This underground system stored wartime supplies to avoid wartime surface resupply vulnerable to Israeli surveillance and firepower.⁵⁵

⁴⁸ Matthews, "Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview," 6.

⁴⁹ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 16.

⁵⁰ *Ibid.*, 17.

⁵¹ *Ibid.*

⁵² David Hirst, *Beware of Small States: Lebanon, Battleground of the Middle East* (New York: Nation Books, 2010), 349.

⁵³ Benjamin Lambeth, "Learning from Lebanon, Airpower and Strategy in Israel's 2006 War against Hezbollah," *Naval War College Review*, no. 3(Summer 2012): 93.

⁵⁴ Hirst, *Beware of Small States: Lebanon, Battleground of the Middle East*, 348.

⁵⁵ Matthews, "Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview," 8.



Figure 3. Concealed Hezbollah short-range rockets. David E. Johnson, *Hard Fighting: Israel in Lebanon and Gaza* (Santa Monica, CA: RAND, 2011), 52.

Hezbollah developed the ground force to protect its rockets. This force had full-time fighters who wore uniforms, operated in teams of 15-20 and employed rockets, and advanced anti-tank guided missiles (ATGM). It also had “village guards” fighting in civilian clothing with small arms, rocket-propelled grenades, and older AT-3 Sagger anti-tank missiles. They had the training and equipment to effectively engage Israeli armor as far out as five kilometers with ATGMs like the AT-14 Kornet-E.⁵⁶ They emplaced mines and improvised explosive devices (IEDs) on the few routes trafficable to armored vehicles, and integrated indirect fires such as pre-sighted mortar targets.⁵⁷ They fought within an extensive defensive network of bunkers based on Iranian and possibly North Korean doctrine.⁵⁸ The system proved its worth in the days to come.

The Second Lebanon War (SLW) began on July 12, 2006 when Hezbollah ambushed an IDF convoy at milepost 105 around 0900 and abducted two Israeli soldiers.⁵⁹ Trying to cut off the

⁵⁶ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 48, 154.

⁵⁷ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 18.

⁵⁸ Matthews, “Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview,” 9.

⁵⁹ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 34.

attacker's routes with fires, the commander for the 91st Division responsible for the area, Gal Hirsch, found out he had no artillery. "Cutbacks, this is the price of cutbacks," he muttered.⁶⁰ Two hours later, an IDF platoon and one Merkava tank lurched into Lebanon to gain control of the area. In a sign of things to come, a massive IED exploded underneath the Merkava 4 tank. All four crewmembers died.⁶¹

By noon of 12 July, Chief of the IDF General Staff (CGS) Dan Halutz, Prime Minister Olmert, and Defense Minister Peretz were planning the response.⁶² However, they did not want to use large-ground maneuvers for fear of casualties. Despite war plans that required ground forces, IDF leaders were well aware that their ground forces were not ready for sustained land maneuver. One commander said, "Our main problem was that everyone in the army knew what had to be done, and no one wanted to do it, especially since we knew that it would cost us a lot of casualties."⁶³ General Kaplinsky warned an invasion of southern Lebanon could cost the IDF up to four hundred deaths.⁶⁴ On July 16, 2006, CGS Halutz explained, "IDF soldiers being killed on Lebanese territory...if it takes place in the range of fifteen or ten kilometers from the border, then it makes absolutely no difference what we explain."⁶⁵ Finally, on 19 July, Israeli leadership established three main objectives for the SLW: return of the abducted soldiers to Lebanon, stopping of rockets and missile firings into Israel, and the complete application of Resolution 1559 of the United Nations, which required the complete disarmament of militia groups such as Hezbollah.⁶⁶

⁶⁰ Hirsch, *Defensive Shield: An Israeli Special Forces Commander on the Front Line of Counterterrorism*, 219.

⁶¹ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 55.

⁶² Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 36.

⁶³ Lambeth, "Learning from Lebanon, Airpower and Strategy in Israel's 2006 War against Hezbollah," 96.

⁶⁴ *Ibid.*

⁶⁵ Levy, "How Casualty Sensitivity Affects Civilian Control: The Israeli Experience," 78.

⁶⁶ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 59.

The IDF's initial operational art initially relied mainly on standoff firepower. It attacked Hezbollah rocket force, bridges, warehouses, fuel dumps, command and control nodes, and airports.⁶⁷ The IAF over the next thirty-four days flew 15,000 combat sorties striking 7,000 targets. The Israeli Ground Forces fired 180,000 artillery shells,⁶⁸ more than it did than it did in the 1973 Yom Kippur War.⁶⁹ The IAF notably destroyed Hezbollah's medium-range rockets and as much as ninety percent of its long-range fires systems.⁷⁰ In line with SOD, the IDF expected the standoff firepower to change Hezbollah's calculation of the situation.⁷¹ On 13 July, when he phoned Olmert to tell him of the destruction of Hezbollah's long-range rocket force supposedly acclaimed, "We won the war."⁷² A general on Halutz's staff by 22 July said, "The goal is not necessary to eliminate every Hezbollah rocket. What we must do is disrupt the military logics of Hezbollah."⁷³

⁶⁷ David Rodman, *Sword and Shield of Zion: The Israeli Air Force in the Arab Israeli Conflict, 1948-2012* (Brighton, US: Sussex Academic Press, 2013), 46.

⁶⁸ Hirst, *Beware of Small States: Lebanon, Battleground of the Middle East*, 373.

⁶⁹ Lambeth, "Learning from Lebanon, Airpower and Strategy in Israel's 2006 War against Hezbollah," 95.

⁷⁰ Rodman, *Sword and Shield of Zion: The Israeli Air Force in the Arab Israeli Conflict, 1948-2012*, 46.

⁷¹ Matthews, "Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview," 13.

⁷² *Ibid*, 14.

⁷³ *Ibid*, 16.

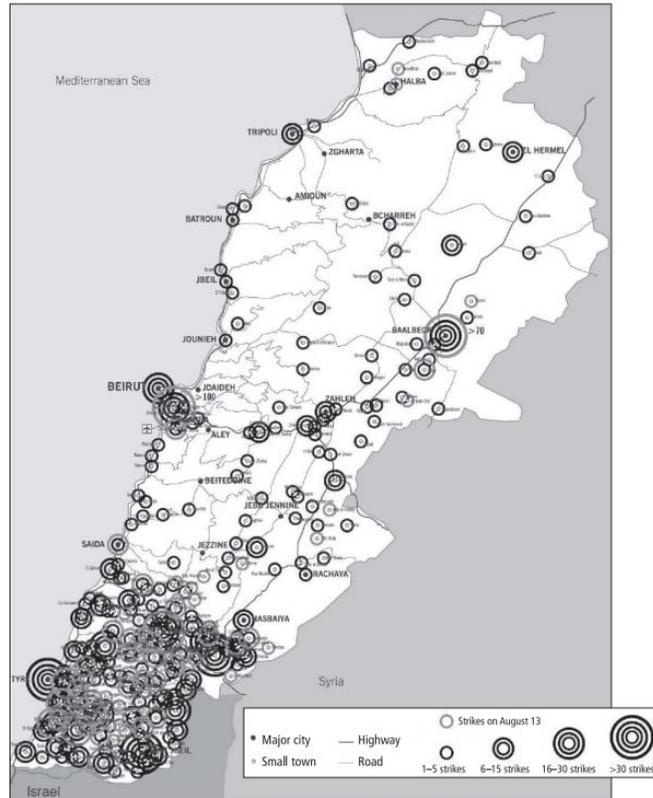


Figure 4. IAF attacks distribution in the SLW. David E. Johnson, *Hard Fighting: Israel in Lebanon and Gaza* (Santa Monica, CA: RAND, 2011), 63.

IDF also conducted raids into southern Lebanon along with standoff fires. It received a painful lesson right away against Hezbollah hybrid capabilities. The elite Maglan attacked Maroun al-Ras on 17 July. Soon, the IDF had to reinforce the attack with at least two other battalions.⁷⁴ When Gal Hirsch asked one of these battalion commanders when he last conducted a battalion exercise, the answer was “Never.”⁷⁵ It took until 23 July for the IDF to secure the town.⁷⁶ Likewise, at Bint Jbeil, Gal Hirsch’s July 26 attack made poor progress against a tenacious Hezbollah defense using small arms, RPGs, anti-tank missiles, mortars, and short-range rockets.⁷⁷

⁷⁴ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 67-68

⁷⁵ Hirsch, *Defensive Shield: An Israeli Special Forces Commander on the Front Line of Counterterrorism*, 257.

⁷⁶ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 68.

⁷⁷ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 47.

The IDF reserves fared no better. Their call up began on 22 July. It was the largest in four years.⁷⁸ It was also disorderly. Reserve logistical units lagged 24-48 hours behind schedule. Reservists found “missing, obsolete, or broken equipment” upon mobilization, especially in regards to body armor, ammunition, night-vision devices. IDF reserves attacking across the borders soon found themselves without adequate sustenance. A reservist in the Alexondri Brigade said, “We went as long as two-and-a-half days with daily rations of a can of tuna, a can of corn and a couple of pieces of bread—to share between four soldiers... 25 soldiers collapsed from dehydration and had to be evacuated.”⁷⁹ So worried about the reserves’ actual combat ability, officers in the reserve paratrooper division repeatedly cancelled orders at the last minute because they feared “the soldiers would have been going on suicide missions.”⁸⁰

The lack of joint training between the IAF and ground forces now actually disrupted the IDF effort to defeat Hezbollah’s short-range rockets. Once ground troops entered the fight, the IAF and the ground forces agreed on a ‘yellow line’ paralleling Israel’s northern border to speed the IAF attacks against medium-range Hezbollah rockets. The line was analogous to the US Army concept of the fire support coordination line (FSCL). The IAF was able to attack any targets of opportunity north of the line without time-consuming coordination with NORTHCOM. However, up to seventy percent of Hezbollah rocket forces were south of this line. Soon the IAF pushed to move the line south to speed attacks on Hezbollah rockets while NORTHCOM wanted to keep as far north as possible to prevent fratricide. NORTHCOM prevailed and the line stayed north of where most of Hezbollah short-range rockets force operated.⁸¹

⁷⁸ Lambeth, “Learning from Lebanon, Airpower and Strategy in Israel’s 2006 War against Hezbollah,” 89.

⁷⁹ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 27, 44, 49-50.

⁸⁰ Ibid.

⁸¹ Benjamin Lambeth, “Forging Jointness Under Fire: Air-Ground Integration in Israel’s Lebanon and Gaza Wars,” *Joint Forces Quarterly* 66, (July 2012): 49-50.

The same air-ground integration issue plagued tactical units. Fighter crews used different terms of reference than supported ground units. Based on whose maps, a single target had three different names. The Israeli Air Force micromanaged its helicopters to reduce collateral damage, but this slowed down response times for ground forces. The IAF commander at the time, Major General Shkedy pinpointed the origin of these doctrinal and training issues to the lack of peacetime training. He noted that it was “hard for the IAF to practice CAS with a ground force that isn’t practicing.”⁸²

Altogether, IDF’s operational art failed to stem the rain of rockets nor had it brought any change in Hezbollah’s military logic. Hezbollah’s effort to cover and conceal its forces worked. A US monitor of the war estimated the IAF’s airstrikes struck only seven percent of Hezbollah’s military resources.⁸³ Instead, Hezbollah was able to carry its strategy to deny “Israel’s need for a clear and unambiguous victory in a short war” firing rockets continuously into Israel.⁸⁴ It was still firing about 170 rockets a day into northern Israel by the war’s third week. The unceasing rockets created the politically indefensible image of innumerable Israelis sheltering in bunkers for days on end. This was a “major source of frustration” for the Olmert government. On 26 July, General Kaplinsky told Halutz he must demand a ground offensive.⁸⁵

By August 9, Israel’s political leadership finally agreed to a major offensive. Its goals were to disrupt Hezbollah rocket fires and IDF forces on the southern bank of the Littani. Cease-fire negotiations were already finalizing, and the Israeli leadership wanted to end the war not” with the

⁸² Benjamin Lambeth, “Forging Jointness Under Fire: Air-Ground Integration in Israel’s Lebanon and Gaza Wars,” *Joint Forces Quarterly* 66, (July 2012): 49-50.

⁸³ Matthews, “Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview,” 14.

⁸⁴ Lambeth, “Learning from Lebanon, Airpower and Strategy in Israel’s 2006 War against Hezbollah,” 98-99.

⁸⁵ *Ibid*, 89-93.

image of Israel as the losing side.”⁸⁶ The order arrived at NORTHCOM 11 August.⁸⁷ The resulting IDF ground offensive on August 12 was the IDF last effort to redress its failing consciousness of victory.

The offensive yielded little, however, given the IDF’s adaptations disfavoring ground maneuvers. The use of SOD’s language certainly produced confusion. NORTHCOM issued orders with words like “designing the line” and “special security perimeter.” Though Hirsch did not understand these terms, he still used SOD’s language in his orders. Briefing his division, Gal said he wanted “pressure on the whole field – a fast take over” through “parallel movement of a few separate efforts” and “swarms of infantry soldiers.”⁸⁸ Ron Tira concluded, “[Wh]en Division 91 gave its battle orders to its brigades, the orders were such that they were impossible to understand.”⁸⁹ Even Hirsch admitted in his memoirs that some of his subordinate brigade commanders did not understand his orders.⁹⁰ His division failed to complete the occupation of Bint Jbeil and Eita a-Sha’ab.⁹¹

The other IDF divisions also performed poorly against Hezbollah’s new capabilities. Northern Command’s main effort, the 98th Division, culminated when Hezbollah shot down one of the IAF supporting CH-53 heavy-lift helicopter. Used to flying in a more permissive counterinsurgency environment, the helicopter highlighted itself against the skyline, making it a

⁸⁶ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 71-73.

⁸⁷ Lambeth, “Learning from Lebanon, Airpower and Strategy in Israel’s 2006 War against Hezbollah,” 90.

⁸⁸ Hirsch, *Defensive Shield: An Israeli Special Forces Commander on the Front Line of Counterterrorism*, 301-303.

⁸⁹ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 54.

⁹⁰ Hirsch, *Defensive Shield: An Israeli Special Forces Commander on the Front Line of Counterterrorism*, 301.

⁹¹ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 73-74.

very visible target for a Hezbollah SA-7 man-portable surface-to-air missile crew.⁹² In the most egregious episode, the 162nd Division stalled on August 12 due to the Hezbollah defense along the Wadi al-Saluki. Infantry and tank units did not support each other's attacks. The tanks ran straight into a Hezbollah defense using IEDs, mines, and ATGMs. Tellingly, all of the tank crews failed to use the Merkava's defensive smoke system, and Hezbollah hit eleven out of twenty-four tanks.⁹³ Stout Hezbollah defenses already stopped the remaining 366th division's attack on 9 August.⁹⁴

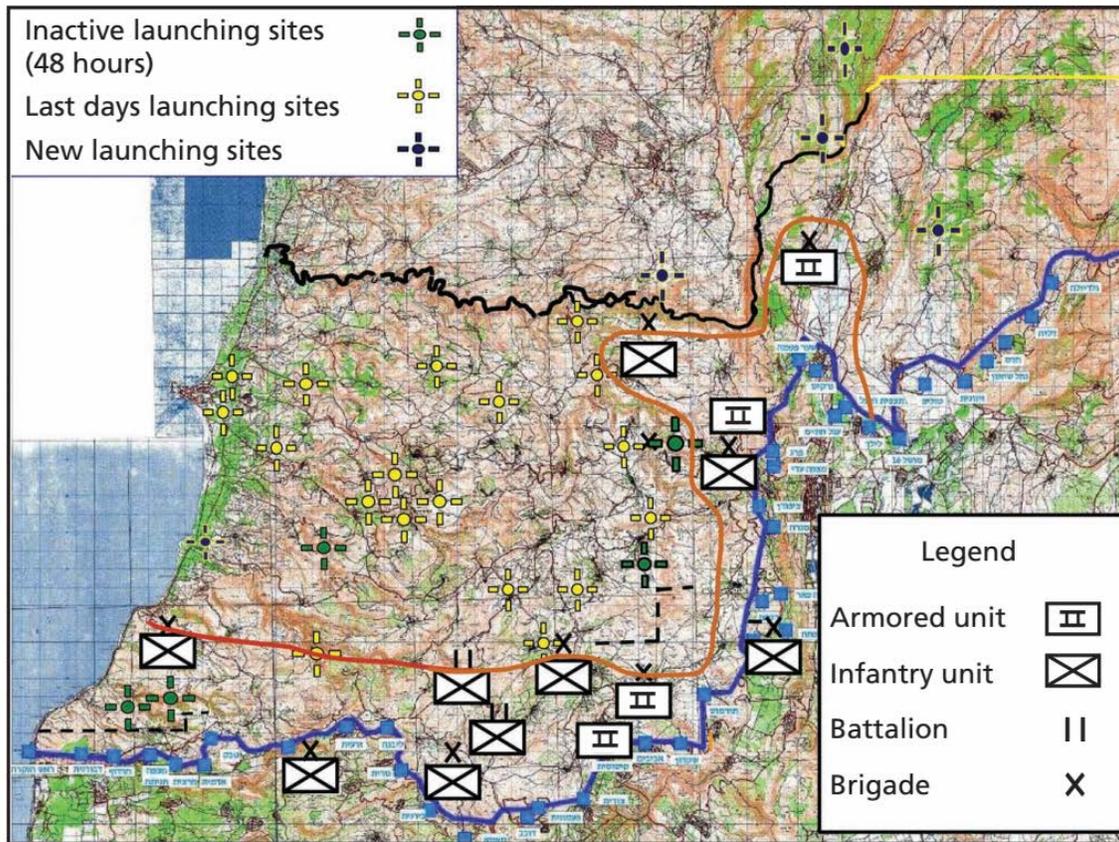


Figure 5. Approximate IDF final locations and Hezbollah Rocket-Launching Sites. David E. Johnson, *Hard Fighting: Israel in Lebanon and Gaza* (Santa Monica, CA: RAND, 2011), 77.

⁹² Johnson, *The Challenges of the “Now” and Their Implications for the U.S. Army*, 6.

⁹³ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 54-55.

⁹⁴ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 77.

Hours before the ceasefire on August 14, 2006, Hezbollah boldly launched another 250 rockets into Israel.⁹⁵ Before 2006, the IDF's peacetime innovation pursued standoff fires and gutted its ground forces conventional capability. As a result, IDF units lacked the skills to tackle Hezbollah's conventional defenses of places like Bint Jbeil and Wadi al-Saluki. For the reserves, one summarized the issue well, "For the last six years we were engaged in stupid policing missions in the West Bank... The result was that we were not ready to confront real fighters like Hezbollah."⁹⁶ The use of SOD confused commanders at all levels. The lack of cross-service training atrophied necessary air-ground integration skills and doctrine to fight against Hezbollah's improved defenses. In effect, it had no effective *means* to modify its operational art when standoff fires failed to pressure Hezbollah.

This was what happened in 2006. IDF operational art failed because it lacked the means to defeat Hezbollah's hybrid threat. When the war started on 12 July 2006, the IDF believed standoff fires could achieved the strategic goals of the Israeli government. It did not. Hezbollah's multitude of survival mechanisms for its rocket forces inured it to IDF standoff fires. However, the IDF ground forces were incapable of redressing the situation because of the IDF innovations prior to the war. Even with some 10,000 soldiers operating in southern Lebanon by August 5, the IDF had penetrated no more than four miles, and had left large swathes of unsecured land along the border zone, including the towns like Bint Jbeil.⁹⁷ Its last offensive failed because the units lacked the doctrine, material, and training to succeed against Hezbollah New Model army. As a result, it did not achieve the three most important objective of the campaign.⁹⁸

⁹⁵ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 56.

⁹⁶ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 49.

⁹⁷ *Ibid.*, 50.

⁹⁸ Lambeth, "Learning from Lebanon, Airpower and Strategy in Israel's 2006 War against Hezbollah," 83

Operation Cast Lead: 2008-2009

The IDF is fully aware of the failures and lessons that were revealed in the different fields during the Second Lebanese War, and to the perception that was created among the Israeli public, therefore it is in a midst of a comprehensive and continuing process of correction.

— Israel Defense Forces, January 30, 2008

The IDF immediately changed its priorities to prepare against a hybrid threat. Before he departed, CGS Halutz immediately established seventy fact-finding teams to identify issues in the IDF operations.⁹⁹ In 2007, the new CGS Gabi Ashkenazi announced 2007 as “the year of strengthening and preparedness.”¹⁰⁰ He introduced the IDF five-year plan, “Teffen 2012,” to achieve this goal.¹⁰¹ The SLW produced a dramatic jump in Israeli defense spending. It went from 7.53 billion USD in 2006 to some 9.26 billion USD in 2007. This was a twenty-two percent increase.¹⁰² The result was “[t]raining, training and training as well as innovative thinking,”¹⁰³

After the SLW, the IDF trained focusing on combined arms maneuver. Now, it dedicated eighty percent of its training on CAM. It doubled the regular forces training time, and instituted regular live-fires exercises for brigade combat teams.¹⁰⁴ For example, the tank brigade bloodied at Wadi al-Saluki, Armored Brigade 401, spent twelve weeks on urban operations and armored maneuvers. The reserve armored corps conducted live-fire exercises and division-scale maneuver

⁹⁹ Matthews, “Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview,” 22.

¹⁰⁰ Israel Defense Forces, “Winograd Commission: IDF Response to the Final Report.”

¹⁰¹ Matthews, “Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview,” 22.

¹⁰² Nerguizian, *Military Balance in a Shattered Levant*, 58.

¹⁰³ Matthews, “Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview,” 22.

¹⁰⁴ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 101.

training.¹⁰⁵ Units trained in the IDF's Tze'elim urban facility near Be'er Sheba, a nineteen square kilometer training ground built by the US Army Corps of Engineers.¹⁰⁶ They learned to fight battles integrating tanks, armored infantry vehicles, infantry, and armored engineer assets like the D-9 Dozer, artillery, and air assets.¹⁰⁷ The exercises further strengthened habitual relationship between reserves and active units.¹⁰⁸

The ground forces and the IAF greatly increased joint training after the SLW. IAF commanders pushed for tighter cross-service integration in day-to-day and training operations.¹⁰⁹ Tactical air control parties (TACPs) also came back to ground forces brigade combat teams.¹¹⁰ Now between seventy to eighty percent of the IDF's brigade-level exercises included fixed-wing or rotary-winged CAS. Just right before OCL, the slated ground units conducted a major training exercise with the IAF to ensure their ability for air-ground operations.¹¹¹

The training complemented the update to IDF's air-ground doctrine. After the war, the IAF and ground forces conducted many cross-service visits to understand each other capabilities and limitations, and to develop "a more common language."¹¹² The IDF Directorate of Operations (J-3) even led an effort with all three services to update joint tactics, techniques, and procedures. By

¹⁰⁵ Matthews, "Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview," 23-24.

¹⁰⁶ Russell W. Glenn, *Army Research Paper*, vol. 9, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army* (Russell, A.C.T.: Department of Defence, 2016), 22.

¹⁰⁷ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 58.

¹⁰⁸ Marrero, "The Tactics of Operation CAST LEAD," 88.

¹⁰⁹ Benjamin Lambeth, "Israel's War in Gaza: A Paradigm of Effective Military Learning and Adaptation," *International Security* 37, no. 2 (Fall 2012): 84.

¹¹⁰ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 101.

¹¹¹ Lambeth, "Israel's War in Gaza: A Paradigm of Effective Military Learning and Adaptation," 108.

¹¹² *Ibid.*, 91-92.

2008, the IAF attack helicopter force was virtually army aviation. Additionally, TACP now had the authority to request air support on their own initiative, which reduced coordination at IAF Headquarters.¹¹³

The focus on CAM also influenced ground forces doctrine. The IDF emphasized a clearer lexicon throughout the force by unit and institutional training.¹¹⁴ The Israeli Army returned to using terms like *attack* and *defend*. It emphasized that “tactical forces need: a *defined objective*, clear *missions*, understandable ‘in order to’ and ‘until when.’”¹¹⁵ To questions about IDF doctrinal changes, one officer answered, “SOD cancelled.”¹¹⁶ In contrast to the timid logistics during the SLW, ‘push’ logistics became the order of the day.¹¹⁷ The Jerusalem Post claimed the IDF Armored Corps returned to an emphasis on speed and firepower to defeat its enemies.¹¹⁸ Practically speaking, one IDF office added, “The tanks are now driving faster and using smokescreens.”¹¹⁹

The IDF did not abandon the concept behind standoff fires. Just before OCL, the NORTHCOM Commander Gadi Eisenkot publicly claimed, “[W]hat happened in the Dahiya quarter in Beirut in 2006 will happen in every village from which Israel is fired on. We will apply disproportionate force on it and cause great damage and destruction there... This is not a

¹¹³ Lambeth, “Forging Jointness Under Fire: Air-Ground Integration in Israel’s Lebanon and Gaza Wars,” 51-52.

¹¹⁴ Marrero, “The Tactics of Operation CAST LEAD,” 87.

¹¹⁵ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 100.

¹¹⁶ Matthews, “Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview,” 23.

¹¹⁷ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 23.

¹¹⁸ Russel W. Glenn, *All Glory Is Fleeting: Insights from the Second Lebanon War* (Santa Monica, CA: RAND Corporation, 2012), 36, accessed October 16, 2016, <http://www.rand.org/pubs/monographs/MG708-1.html>.

¹¹⁹ Matthews, “Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview,” 23.

recommendation. This is a plan. And it has been approved.”¹²⁰ Another senior IDF officer said that OCL aimed to “hit Hamas disproportionately and thereby create an image that Israel is ready to go berserk in response to rocket fire from Gaza.”¹²¹ To many observers, the IDF’s continued reliance on massive standoff fires became the Dahiyah Doctrine, named after the Beirut suburb the IAF reduced to rubble during the SLW.¹²²

Nonetheless, Teffen 2012 re-prioritized ground forces ahead of airpower.¹²³ For CGS Ashkenazi, it aimed to enable IDF ground forces “to move and fight over any terrain facing high threat levels in a fire-saturated environment.”¹²⁴ The IDF procured some “10,000 ceramic protection vests; 30,000 helmets; 40,000 combat vests” and “60,000 night vision goggles.”¹²⁵ The debate around the Merkava Mk IV tank temporarily ended. The Teffen Plan bought more Merkava Mk IV tanks, upgraded older models to the Mk IV standard, and continued the development of the Merkava-based Namer armored personnel carrier (APC).¹²⁶ The IDF also reinforced the belly armor on its tanks to counter the IEDs it faced in the SLW.¹²⁷ Amor units fielded the IDF Digital Army Program, which provided near real-time locations of ground units on digital maps for headquarters to maintain situational awareness.¹²⁸

¹²⁰ Jean-Loup Samaan, *Another Brick in the Wall: The Israeli Experience in Missile Defense* (Carlisle, PA: Strategic Studies Institute, US Army War College, 2015), 35-36.

¹²¹ Matthew F. Quinn, “Assessing Israeli Military Effectiveness” (Master’s Thesis, Monterrey, CA: Naval Postgraduate School, 2014), 39.

¹²² Levy, “How Casualty Sensitivity Affects Civilian Control: The Israeli Experience,” 80.

¹²³ Nerguizian, *Military Balance in a Shattered Levant*, 54.

¹²⁴ Kim, “Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025,” 56-57.

¹²⁵ Matthews, “Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview,” 23.

¹²⁶ Kim, “Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025,” 56.

¹²⁷ “Merkava Mark 4 main battle tank.”

¹²⁸ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 92-93.

The IDF also realized the need for a rocket defense system. General Yaakov Amidror, former head of Israeli Military Intelligence, admitted, “In any future war, decision makers will face immense public pressure to stop or reduce the rocket fire on the civilian rear.”¹²⁹ Contrary to the US-led effort for the Arrow system, IDF was now pushing the development of rocket and missile defense systems on its own. Rafael Advanced Defense Systems started the Iron Dome project in February 2007 to defeat short-range rockets like those that Hezbollah rained on northern Israel in the SLW. Israel also started the David’s Sling program medium to long-rang rockets.¹³⁰ However, Iron Dome was not on schedule to deploy until 2010.¹³¹ The IDF had no technical solution to the rocket problem until then.

That threat was maturing in Gaza’s dense urban environment, itself a challenge to the IDF’s standoff fires system. Gaza contained about 5,045.5 persons per square kilometer, even more than the megacity of Los Angeles. Streets were narrow, often too small for IDF vehicles. Residents built bridges of corrugated metal across these passageways, which reduced the line of sight of overhead surveillance systems like UAVs.¹³²

Hamas maximized the defensive advantages of this urban environment. It used mosques, schools, hospitals and private homes as communication centers, fighting positions, and weapon and supply storage. Its military forces even hid in the eight United Nations-sponsored (UN) refugee camps within Gaza.¹³³ Hamas established a defense in depth based on this urban terrain. The first

¹²⁹ Alon Ben-David, “Adapt or die: Israel Defence Force,” *Janes Defense Weekly*, May 1, 2008, accessed December 8, 2016, <http://janes.ihs.com/Janes/Display/1176979>.

¹³⁰ Samaan, *Another Brick in the Wall: The Israeli Experience in Missile Defense*, 25-26.

¹³¹ Jim Zanotti et al, *Israel and Hamas: Conflict in Gaza (2008-2009)* CRS Report R40101 (Washington, DC: Library of Congress, Congressional Research Service, February 19, 2009), 33.

¹³² Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 13.

¹³³ Penny L. Mellies, “Hamas and Hezbollah: A Comparison of Tactics,” in Scott Farquhar, 59.

line was one or two kilometers inside from the border fence. The second was along the outskirts of the major urban areas in Gaza, and the third line was inside the urban areas. The third line was the main defensive zone using a network of tunnels and kill zones supplemented with booby-trapped buildings and roads.¹³⁴

Hiding in this environment was another emulation from Hezbollah, a rocket force. In 2007, Hamas acquired long-range rockets from Iran, ATGMs, and stronger IEDs.¹³⁵ It attained or copied the 122mm Grad rocket, or Katyushas, enabling to hit further away towns like Ashkelon.¹³⁶ Hamas increased the number and capabilities the homemade Qassam rockets. It soon was able to launch some of the rockets without stationary launchers.¹³⁷ Like Hezbollah, its rocket force worked in small mobile launch teams.¹³⁸

Notably, Hamas tried to develop the ground capability Hezbollah possessed in 2006. Its fighters came from the Izzedine al-Qassam Brigades, and received six months basic training in rockets and mortars. They received additional training in ATGMs, MANPADs, and rockets in Lebanon from Iranian, Syrian, and Hezbollah trainers. By 2008, this force numbered around 15,000 fighters¹³⁹ in territorial brigades each of about 1,000 fighters.¹⁴⁰ This force proved its effectiveness in purging elements of Fatah's military in the political struggle for the Gaza Strip in 2007.¹⁴¹

¹³⁴ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 54.

¹³⁵ Mellies, "Hamas and Hezbollah: A Comparison of Tactics," 50-51.

¹³⁶ Jim Zanotti et al, *Israel and Hamas: Conflict in Gaza (2008-2009)* 9.

¹³⁷ Samaan, *Another Brick in the Wall: The Israeli Experience in Missile Defense*, 22. Uzin Rubin called them "man portable rockets."

¹³⁸ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 53.

¹³⁹ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 107-108.

¹⁴⁰ Lambeth, "Israel's War in Gaza: A Paradigm of Effective Military Learning and Adaptation," 103.

¹⁴¹ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 12.

However, Hamas began this process barely a year before OCL in 2007 while Hezbollah's preparations started in 2000, or six years before the SLW. The result was that "[i]f Hezbollah is the Delta Force, then Hamas is the National Guard."¹⁴² The performances of Hamas' ground forces OCL soon proved this assessment.

Near the end of 2008, Hamas had broken the Egyptian-brokered truce between it and Israel. Having already withdrawn from Gaza, the IDF was reluctant to return in a case of "Gaza Phobia." CGS Ashkenazi recommended trying all form of escalations before a major invasion. Hamas intensified and expanded the attacks, threatening some 750,000 Israelis. The IDF was not able to ignore the growing danger anymore.¹⁴³ The stated strategic objectives for OCL were to reduce the threats to southern Israel residents by weakening Hamas, reducing rocket fire from the Gaza Strip, and restoring Israel's deterrence in the region.¹⁴⁴ To accomplish these ends, the IDF had standoff fires and a capable ground maneuver force.

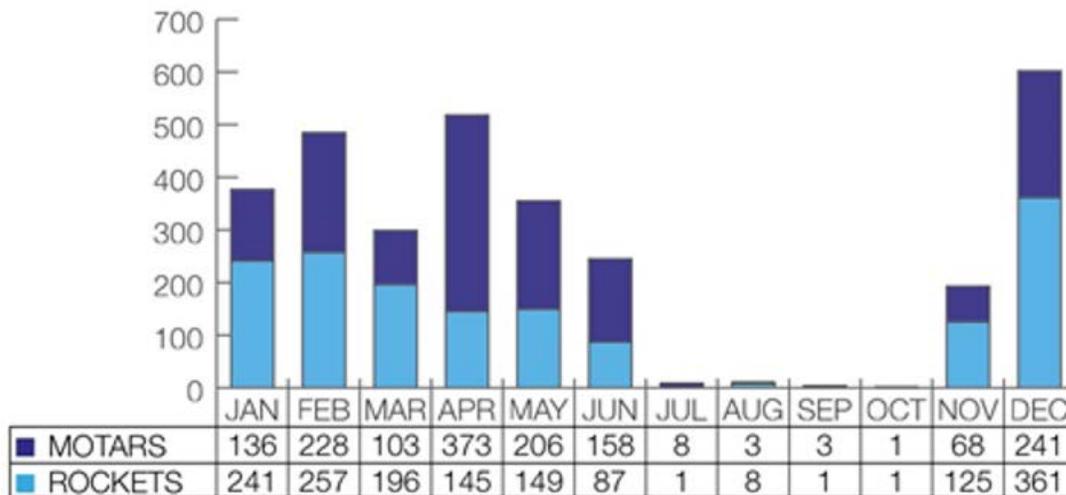


Figure 6. 2008 Gazan Mortar and Rocket Attacks against Israel. Russell W. Glenn, *Army Research Paper*, vol. 9, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army* (Russell, A.C.T.: Department of Defence, 2016), 10.

¹⁴² Matthews, "Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview," 25.

¹⁴³ Levy, "How Casualty Sensitivity Affects Civilian Control: The Israeli Experience," 81.

¹⁴⁴ Zanotti et al, *Israel and Hamas: Conflict in Gaza (2008-2009)*, "Summary."

The initial air phase used standoff fires to surprise Hamas, to destroy planned targets, and to prepare the battlespace for ground maneuver.¹⁴⁵ At 1130 on 27 December, IAF fighters screamed eastward from the Mediterranean striking 180 targets. The Israeli Navy bombarded off the coast of Gaza,¹⁴⁶ and established a sea blockade.¹⁴⁷ Just like in SLW, standoff fires did not stem the tide of rockets. The IAF by itself found it hard to find dynamic targets in Gaza's plentiful structural and civilian cover. Despite the abundant mix of IAF UAVs and other sensors, Hamas reduced its exposure windows between fifteen to sixty seconds.¹⁴⁸ Its rocket attacks on southern Israel increased to eighty a day.¹⁴⁹

Learning from the SLW, the IDF then began its "air-ground phase" during the early hours of darkness on 3 January 2009. The ground campaign plan aimed to isolate Gaza City from southern Gaza, and control the main north-south running highway in Gaza. Three brigades focused on Gaza City. The Paratrooper Brigade attacked south along the Mediterranean coast, the Givati Brigade attacked westward from the vicinity of the Karni Crossing to isolate Gaza City from the south, and the Golani Brigade attacked in the middle of the two other brigades.¹⁵⁰ Tactical

¹⁴⁵ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 112.

¹⁴⁶ Matthews, "Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview," 35.

¹⁴⁷ Anthony H. Cordesman, *The "Gaza War" A Strategic Analysis* (Washington, DC: Center for Strategic and International Studies, 2009), 37, accessed October 16, 2016, <https://www.csis.org/analysis/gaza-war>.

¹⁴⁸ *Ibid.*, 18.

¹⁴⁹ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 17.

¹⁵⁰ Marrero, "The Tactics of Operation CAST LEAD," 92.

objectives included targeting key Hamas leaders, and destroying Hamas' rocket abilities and tunnels.¹⁵¹

The IDF's adaptations to rebuild combined arms maneuver capabilities paid dividends. Headquarters issued orders with clearly stated mission goals and objectives.¹⁵² They aimed to keep maneuvers rapid.¹⁵³ In contrast to the SLW, brigades planned their axes of attack to avoid obvious avenues of approach and ambush sites,¹⁵⁴ and pushed supplies to battalion forward support areas.¹⁵⁵ Knowing that Hamas lacked the training and equipment for night fighting, they maneuvered primarily at night.¹⁵⁶

The use of fires demonstrated the IDF's increased ability to conduct combined arms maneuver. Brigade commanders had practical control of attack helicopters, UAVs, and on-call fixed-wing CAS.¹⁵⁷ Each brigade's TACP now had the authority to approve danger close missions within 600m of ground troops, an authority held at the IAF commander level during the SLW.¹⁵⁸ New operating procedures allowed helicopters to provide rotary-CAS within 100m of friendly force. Reflecting this partnership, the IAF actually fired more precision munitions from helicopters during the twenty-four day long OCL than the thirty-four day long SLW (1,120 compared to

¹⁵¹ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 61-62.

¹⁵² Marrero, "The Tactics of Operation CAST LEAD," 91.

¹⁵³ Cordesman, *The "Gaza War" A Strategic Analysis*, 40.

¹⁵⁴ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 16.

¹⁵⁵ Marrero, "The Tactics of Operation CAST LEAD," 96.

¹⁵⁶ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 64.

¹⁵⁷ Cordesman, *The "Gaza War" A Strategic Analysis*, 41.

¹⁵⁸ Lambeth, "Forging Jointness Under Fire: Air-Ground Integration in Israel's Lebanon and Gaza Wars," 52.

1,070).¹⁵⁹ The brigades used their artillery both for counter-fire, and for screening their maneuvers.¹⁶⁰

The IDF was better at integrating all elements of combined arms maneuver than in the SLW. Unlike Wadi al-Saluki, infantry in OCL fought in conjunction with tanks, armored bulldozers, and fires to turn the enemy out of their defensive positions.¹⁶¹ Units used imagery sent from UAVs flying 500 meters ahead of formations to identify obstacles, likely enemy positions, fields of fires, or ambush sites.¹⁶² The IDF then employed the armored Caterpillar D-9 bulldozer to create new avenues of approach through walls and buildings to avoid Hamas' kill zones.¹⁶³ They used rocket-launched line charges to clear Gaza's narrow roads.¹⁶⁴ Learning from their training at Be'er Sheva, they sent dog teams into buildings to sniff out enemy fighters and explosives first. Everyone also entered through breaches to avoid the fatal funnels of doors and windows.¹⁶⁵

The IDF's material adaptations proved beneficial. Widespread NVG-use enabled night maneuvers.¹⁶⁶ Merkava Mk II, III, and IV tanks with additional belly armor withstood the majority of IEDs, and there were no tank crew casualties unlike the SLW.¹⁶⁷ IDF tanks survived repeated

¹⁵⁹ Lambeth, "Israel's War in Gaza: A Paradigm of Effective Military Learning and Adaptation," 103, 110.

¹⁶⁰ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 136.

¹⁶¹ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 16.

¹⁶² Russel W. Glenn, *Glory Restored? The Implications of the 2008-2009 Gaza War in Times of Extended Conflict* (Suffolk, VA: Joint Irregular Warfare Center, 2010), 41.

¹⁶³ Marrero, "The Tactics of Operation CAST LEAD," 93.

¹⁶⁴ Cordesman, *The "Gaza War" A Strategic Analysis*, 40.

¹⁶⁵ Glenn, *Glory Restored? The Implications of the 2008-2009 Gaza War in Times of Extended Conflict*, 44.

¹⁶⁶ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 64.

¹⁶⁷ Cordesman, *The "Gaza War" A Strategic Analysis*, 57.

Hamas anti-tank attacks.¹⁶⁸ By rapidly providing accurate target information, the Digital Army Program helped to speed up the sensor-to-shooter time to as fast as under one minute.¹⁶⁹

The result was devastating for Hamas. The smokescreen protected advancing ground troops.¹⁷⁰ IDF units suppressed Hamas to deny them the ability to concentrate direct fires like Hezbollah in 2006.¹⁷¹ The ability to create new avenues of approach enabled IDF forces to bypass Hamas urban strongpoints.¹⁷² IDF rapid maneuvers drove Hamas from “generally well-organized and well-prepared positions back to improvised positions.”¹⁷³ Complementary to the standoff fires, the maneuvers in effect created new targets of opportunity for the IAF and cleared its fields of fire.¹⁷⁴

On 11 January 2009, the IDF reserve troops entered the fight. Unlike the haphazard mobilization during the SLW, the reserve brigades trained for two weeks at the Ground Training Center in Tze’elim prior to their deployment, and received new equipment. The reserve brigades moved into sectors the active brigades had already secured, enabling them to continue other offensive operations.¹⁷⁵ The active brigades turned to southern Gaza to destroy more of Hamas tunnel network near the Egyptian border.¹⁷⁶

¹⁶⁸ Kim, “Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025,” 67.

¹⁶⁹ Lambeth, “Israel’s War in Gaza: A Paradigm of Effective Military Learning and Adaptation,” 105.

¹⁷⁰ Levy, “How Casualty Sensitivity Affects Civilian Control: The Israeli Experience,” 82.

¹⁷¹ Mellies, “Hamas and Hezbollah: A Comparison of Tactics,” 70.

¹⁷² Cordesman, *The “Gaza War” A Strategic Analysis*, 41.

¹⁷³ Kim, “Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025,” 64.

¹⁷⁴ Lambeth, “Forging Jointness Under Fire: Air-Ground Integration in Israel’s Lebanon and Gaza Wars,” 52.

¹⁷⁵ Matthews, “Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview,” 33.

¹⁷⁶ Zanutti et al, *Israel and Hamas: Conflict in Gaza (2008-2009)*, 4.

IDF land operations completed the operation's main objective: the reduction of rocket fires. IDF combined arms maneuver operations occupied and disrupted Hamas launch areas.¹⁷⁷ By the last week of the operation, Hamas averaged only four rocket attacks per day from the previous fifty at the start of the conflict. Israel accepted an Egyptian ceasefire on January 18.¹⁷⁸ In stark contrast to the dispirited feelings after the SLW, now radio stations throughout Israel played Zionist songs to celebrate the success of OCL.¹⁷⁹

After 2006, the IDF's adaptations rebuilt its conventional capability. Its renewed emphasis on training created units able to conduct combined arms maneuver at night and fight through urban defensive positions. It cleaned up doctrinal language, which ensured clear understanding of orders. The IAF and ground forces created new procedures and authority levels within doctrine to improve the IDF joint air-ground system. Material adaptations, like increased belly armor, ensured survivability against a hybrid enemy's improved lethality.¹⁸⁰

As a result, IDF operational art in OCL stood in stark contrast to the SLW in the means available and achievements. IDF still relied on standoff fires. In three weeks, the IAF conducted some 2,300 successful airstrikes.¹⁸¹ Some seventy percent of Hamas combatants killed during OCL were at the hands of Israeli airpower.¹⁸² Moreover, the IDF here had the additional means with a capable ground force able to maneuver, and defeat hybrid enemies on the battlefield. It planned

¹⁷⁷ Daniel Byman and Gad Goldstein, *The Challenge of Gaza: Policy Options and Broader Implications* (Washington, DC: Saban Center for Middle East Policy, Brookings, 2011), 15, accessed November 30, 2016, <https://www.brookings.edu/research/the-challenge-of-gaza-policy-options-and-broader-implications/>.

¹⁷⁸ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 118-120.

¹⁷⁹ Lambeth, "Israel's War in Gaza: A Paradigm of Effective Military Learning and Adaptation," 101.

¹⁸⁰ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 68.

¹⁸¹ Cordesman, *The "Gaza War" A Strategic Analysis* 41.

¹⁸² Lambeth, "Israel's War in Gaza: A Paradigm of Effective Military Learning and Adaptation," 102.

from the start to employ ground troops to reduce the rocket threat. They successfully reduced Hamas rocket firing to four a day.¹⁸³ OCL reinforced the IDF's recognition of the need for conventionally trained ground forces against hybrid enemies. In 2009, Major General Avi Mizrachi, commander of IDF ground forces, stated, "[A] war cannot be won without moving forces on the ground . . . only a ground maneuver will end the conflict and win the war."¹⁸⁴

With this additional mean, the IDF accomplished all of the established strategic ends within a month.¹⁸⁵ After the war, Hamas rocket and mortar firing in all of 2009 totaled only 312, which paled in comparison to the 4,000 it fired in 2008. The operation restored a level of deterrence for Israel. Immediately after OCL, Gazans turned against rocket attacks for fear of inviting another devastating IDF invasion. Ayman Taha, a former fighter and Hamas leader, similarly said, "The current situation required a stoppage of rockets. After the war, the fighters needed a break and the people needed a break."¹⁸⁶

Operation Protective Edge: 2014

This is no Iron Dome, but a Sisyphean task, gathering technology and intelligence along with forces on the ground.

— IDF Major General Sami Turgeman, Commander, Southern Command

By 2014, Iron Dome was operational and seemed to provide a technological solution to the short-range rocket threat. The first Iron Dome batteries deployed in the southern towns of Ashdod,

¹⁸³ Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, 118.

¹⁸⁴ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 68.

¹⁸⁵ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 18.

¹⁸⁶ Byman and Goldstein, *The Challenge of Gaza: Policy Options and Broader Implications*, 14-15.

Ashkelon, and Be'er Sheva; all towns threatened by Hamas.¹⁸⁷ It aimed to defeat rockets with a range of four to seventy kilometers.¹⁸⁸ The first big test came in November 2012 with the weeklong Operation Pillar of Defense (OPD).¹⁸⁹ Hamas fired approximately 1,506 rockets into Israel but only fifty-eight fell in urban areas. While Theodore Postol argued that Iron Dome's success rate was only five percent or less, the IDF claimed a success rate of eighty-five percent.¹⁹⁰ Aram Nerguizian argued that based at least on the number of intercept attempts and successful intercepts, Iron Dome was successful some 73.4 percent during OPD.¹⁹¹ In Israel, the system became a huge military and political success story.¹⁹² Standoff fires still failed to curtail rocket fires during OPD, but Iron Dome provided time for Israeli decision-makers to analyze and to construct measured responses. In this case, it allowed them to avoid another ground invasion of the Gaza Strip.¹⁹³

If anything, the success of Iron Dome strengthened the IDF's reliance on standoff fires. Its effectiveness negated the rocket threat against Israeli people. The IDF did not have to use ground troops in OPD as it did in OCL.¹⁹⁴ As a result, force buildup once again emphasized air fire capabilities and intelligence at the expense of ground maneuver forces. Due to budget battles,

¹⁸⁷ Samaan, *Another Brick in the Wall: The Israeli Experience in Missile Defense*, 25-26.

¹⁸⁸ Nerguizian, *Military Balance in a Shattered Levant*, 38.

¹⁸⁹ Jeremy M. Sharp, *Israel's Iron Dome Anti-rocket System: U.S. Assistance and Coproduction*, CRS Reports & Analysis IN 10158, (Washington, DC: Congressional Research Service, September 30, 2014)1, accessed December 1, 2016, <https://fas.org/sgp/crs/mideast/IN10158.pdf>.

¹⁹⁰ Samaan, *Another Brick in the Wall: The Israeli Experience in Missile Defense*, 30-31.

¹⁹¹ Nerguizian, *Military Balance in a Shattered Levant*, 88.

¹⁹² Emily Landau and Azriel Bermant, "Iron Dome Protection: Missile Defense in Israel's Security Concept" in *The Lessons of Protective Edge*, ed. Anat Kurz and Schlomo Brom (Tel Aviv: Institute for National Security Studies, 2014), 38, accessed October 31, 2016, http://www.inss.org.il/uploadImages/systemFiles/ZukEtanENG_final.pdf.

¹⁹³ Nerguizian, *Military Balance in a Shattered Levant*, 88.

¹⁹⁴ Samaan, *Another Brick in the Wall: The Israeli Experience in Missile Defense*, 29.

procurement of systems like the Namer and Merkava proceeded slowly.¹⁹⁵ In January 2012, the IDF froze all work orders for the Merkava tank and Namer APC.¹⁹⁶ At a conference in 2013, CGS Benny Gantz assessed that the IDF would not have to conduct large-scale ground maneuvers in the near future.¹⁹⁷ The 2013 restructuring plan favored air, intelligence, and cyber warfare units.¹⁹⁸ For example, the IDF spent its money to upgrade Iron Dome's various tracking and firing mechanisms and expanded the number of batteries deployed from five to nine.¹⁹⁹

Unlike the situation before the SLW, however, the IDF did not wholly banish the idea of a conventional ground force. At the same conference, the outgoing Northern Command Commander, General Gershon Hacohen charged the IDF was now too enamored with the “science of war” instead of the “art of war.” “Technology cannot solve everything,” he said.²⁰⁰ Far from stripping its forces of readiness, the IDF at least maintained the ability for a limited ground incursion against Hamas in the Gaza Strip.²⁰¹

¹⁹⁵ Gabi Siboni, “Operations Cast Lead, Pillar of Defense, and Protective Edge: A Comparative Review,” in Kurz and Brom, 33

¹⁹⁶ “Namer infantry fighting vehicle” Military Periscope, last modified November 1, 2016, accessed November 29, 2016, <https://www.militaryperiscope.com.lumen.cgscarl.com/weapons/gcv/apc/w0007331.html>.

¹⁹⁷ Kim, “Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025,” 77.

¹⁹⁸ “Army,” Military Periscope, last modified September 1, 2015, accessed October 31, 2016, <https://www.militaryperiscope.com.lumen.cgscarl.com/nations/mideast/israel/army/index.html>.

¹⁹⁹ Sharp, *Israel's Iron Dome Anti-rocket System: U.S. Assistance and Coproduction*, 1.

²⁰⁰ Kim, “Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025,” 78.

²⁰¹ Siboni, “Operations Cast Lead, Pillar of Defense, and Protective Edge: A Comparative Review,” 32.

OCL confirmed the IDF's training focus on high-intensity conflict. The reserves continued to conduct annual drills, to include a "war drill" simulating a conventional invasion of Israel.²⁰² The IDF blog highlighted events such as master gunner schools for tankers and artillerymen,²⁰³ logistics exercise for conventional war,²⁰⁴ and urban warfare training.²⁰⁵ After OCL, the IDF increased the number of urban training facilities from fifteen to twenty with more underground facilities. Ground Forces Command declared that twenty-five percent of future infantry training would be in such facilities. It even widened streets at the Urban Warfare Training Center at Tze'elim to integrate more armor units.²⁰⁶

For its ground forces, IDF material adaptations increased survivability and awareness on the battlefield. Battalion 13 of the Golani fielded the heavier Namer APC based on the Merkava IV chassis in 2010.²⁰⁷ The Trophy active protection system (APS) became operational in 2009,²⁰⁸ and the IDF prioritized its fielding after an ATGM damaged an Israeli tank in the Gaza Strip in 2010.²⁰⁹ Proving its worth, Trophy successfully intercepted a tandem-warhead RPG-29 in the Gaza Strip

²⁰² "The War Drill: New Exercise for Artillery Reservists," Israel Defense Forces, January 31, 2012, accessed November 29, 2016, <https://www.idfblog.com/2012/01/31/artillery-corps-reserve-soldiers-conduct-drill/>

²⁰³ "Master Gunners: The IDF's Tank and Artillery Experts," Israel Defense Forces, July 8, 2013, accessed November, 2016, <https://www.idfblog.com/2013/07/08/master-gunners-the-idfs-tank-and-artillery-experts/>

²⁰⁴ "The IDF's Fuel in the Heat of Battle" Israel Defense Forces, November 11, 201, accessed November 29, 2016, <https://www.idfblog.com/2013/11/11/the-idfs-fuel-in-the-heat-of-battle/>.

²⁰⁵ "Future IDF Infantry Officers Train for Complex Urban Warfare Scenarios," Israel Defense Forces, September 2, 2013, accessed November 29, 2016, <https://www.idfblog.com/2013/09/02/photos-future-idf-infantry-officers-train-complex-urban-warfare-scenarios/>.

²⁰⁶ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 24.

²⁰⁷ "Namer infantry fighting vehicle."

²⁰⁸ "Army."

²⁰⁹ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 87.

with no damage to the Merkava Mk IV tank in March 2011.²¹⁰ Though it planned to decrease the total armor force, the IDF renewed the procurement for Merkava Mk IV tanks in 2013.²¹¹ It also expanded the DAP system fielding to the company level.²¹²

As for Hamas, it launched a public inquiry into its military wing's poor performance during OCL.²¹³ It focused on improving three capabilities: rockets, ground forces, and the tunnel system.²¹⁴ Hamas learned to extend the shelf life and ranges of its homemade Qassam rockets.²¹⁵ In 2013, CGS Benny Gants admitted that Hamas now had the ability to make its own 200mm rocket with a range of 80 km.²¹⁶ It worked to develop salvo fires in an attempt to defeat Iron Dome.²¹⁷

Hamas greatly strengthened the capabilities of its ground forces. It restructured into six "brigades" of between 2,500 to 3,000 men.²¹⁸ The brigades had a hierarchical structure with subordinate battalions and companies.²¹⁹ These brigades fought under a regional commander, and

²¹⁰ "Trophy active protection system (APS)" Military Periscope, last modified August 1, 2010, accessed November 29, 2016, <https://www.militaryperiscope.com.lumen.cgscarl.com/weapons/artguns/cmbtveh/w0006949.html>.

²¹¹ Nerguizian, *Military Balance in a Shattered Levant*, 24.

²¹² Glenn, *Army Research Paper*, vol. 9, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 93.

²¹³ Lambeth, "Israel's War in Gaza: A Paradigm of Effective Military Learning and Adaptation," 101-102.

²¹⁴ Jeffrey White, "The Combat Performance of Hamas in the Gaza War of 2014," *CTC Sentinel*, September 2014, 9, accessed November 30, 2016, <https://www.ctc.usma.edu/posts/september-2014>.

²¹⁵ Byman and Goldstein, *The Challenge of Gaza: Policy Options and Broader Implications*, 5.

²¹⁶ Jeremy Binnie and Mohammed Najib, "Gaza militants unveil new rockets," *Jane's Defense Weekly*, July 11, 2014, accessed November 29, 2016, <https://janes.ihs.com.lumen.cgscarl.com/Janes/Display/1716607>.

²¹⁷ Udi Dekel, "Operation Protective Edge: Strategic and Tactical Asymmetry," in Kurz and Brom, 16.

²¹⁸ White, "The Combat Performance of Hamas in the Gaza War of 2014," 11.

²¹⁹ Yoram Schweitzer, "Defining the Victor in the Fight against an Army of "Terrorilla"," in Kurz and Brom, 22.

trained to conduct prepared defenses integrating rockets, mortars, anti-tank fires, and IEDs.²²⁰ Syrian and Iranians trained Hamas fighters using the same program for Hezbollah.²²¹ Hamas acquired deadlier anti-tank weapons like the Kornet ATGMs and tandem-warhead RPG-29s.²²² It trained its fighters to rig houses with explosives to use against IDF soldiers.²²³ Critically, both rocket and ground forces began to expand and to exploit Gaza's tunnel networks.

After encountering massive IDF fires in OCL, Hamas looked to expand the current system of tunnels under Gaza for military use.²²⁴ After Hamas took over the Gaza Strip 2007, its Qassam Brigades took over the tunnels and began expanding them for military purposes. IDF supremacy in air firepower and surveillance in 2008, according to the Hamas commander Abu Laith, intensified this process.²²⁵ Hamas increased the use of tunnels to protect its rocket force from IDF standoff fires.²²⁶ They fired more rockets from underground positions and from concealed positions by remote control.²²⁷

²²⁰ Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 75.

²²¹ Byman and Goldstein, *The Challenge of Gaza: Policy Options and Broader Implications*, 16.

²²² White, "The Combat Performance of Hamas in the Gaza War of 2014," 11.

²²³ "Hamas Manual Calls for Hiding Bombs in Civilian Homes," Israel Defense Force, August 25, 2014, accessed December 13, 2016, <https://www.idfblog.com/2014/08/25/hamas-manual-calls-for-hiding-bombs-in-civilian-homes/>.

²²⁴ Elad Popovich, "A Classical Analysis of the 2014 Israeli-Hamas Conflict," *CTC Sentinel*, November/December 2014, 21, accessed November 30, 2016, <https://www.ctc.usma.edu/posts/novemberdecember-2014>.

²²⁵ Nicole J. Watkins and Alena M. James, "Digging Into Israel: The Sophisticated Tunneling Network of Hamas," *Journal of Strategic Security* 9, no. 1 (2016): 86-88.

²²⁶ White, "The Combat Performance of Hamas in the Gaza War of 2014," 9.

²²⁷ William Booth, "Here's what really happened in the Gaza war (according to the Israelis)," *Washington Post*, September 3, 2014, accessed December 6, 2016, https://www.washingtonpost.com/news/worldviews/wp/2014/09/03/heres-what-really-happened-in-the-gaza-war-according-to-the-israelis/?utm_term=.5b8aec7d318d.

More importantly, Hamas saw the tunnels as a new way to attack Israel. It devoted about forty percent of its budget to build and maintain the tunnel networks.²²⁸ Hamas began to build ‘attack tunnels,’ some up to a depth of thirty-five to forty meters, from Gaza into Israel to attack and capture IDF forces on the border. It created a unit of ‘chosen ones’ for this special mission.²²⁹ To avoid the IDF’s surveillance over the Gaza Strip, Hamas concealed the excavation, limiting themselves to low noise hand digging as much as possible.²³⁰ It reportedly paid homeowners \$20,000 to hide tunnel entrances in their houses.²³¹ The success of Iron Dome in neutralizing rocket fires only underscored the attack tunnels effort.²³² By March 2014, Hamas leader Ismail Haniyed proclaimed during a rally, “The tunnels we are inaugurating today are the new Hamas strategy in the war against Israel--the strategy of the tunnels. From belowground and aboveground, you, the occupiers, will be dismissed. You have no place in the land of Palestine.”²³³

²²⁸ Watkins and James, “Digging Into Israel: The Sophisticated Tunneling Network of Hamas,” *Journal of Strategic Security* 9, no. 1 (2016), 95.

²²⁹ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, ix-x, 64.

²³⁰ Watkins and James, “Digging Into Israel: The Sophisticated Tunneling Network of Hamas,” 95.

²³¹ Byman and Goldstein, *The Challenge of Gaza: Policy Options and Broader Implications* 7.

²³² Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 62.

²³³ Watkins and James, “Digging Into Israel: The Sophisticated Tunneling Network of Hamas,” 89.



Figure 7. Hamas tunnels in civilian houses. State of Israel, 2015, *The 2014 Gaza Conflict 7 July – 26 August 2014: Factual and Legal Aspects*, 49, accessed September 1, 2016, <http://mfa.gov.il/ProtectiveEdge/Documents/2014GazaConflictFullReport.pdf>.

By mid-2014, Hamas had to do something to remedy its faltering political situation. The establishment of the Sisi government in Egypt sealed the Rafah border crossing, and dramatically cut into the activities of the aforementioned economics tunnels. Hamas lost another backer with the Syrian Revolution, and its split with the Assad regime lost it the support of Iran. By 2014, it even signed an agreement with Fatah to give up direct rule of Gaza.²³⁴ It may have thought that just like OPD, Israel’s response would be standoff fires only.²³⁵ It began to strike directly at Israel with rockets starting in June 2014. The number of rockets grew to 150 daily.²³⁶ Combined with rumors of large-scale raids via Hamas tunnels, the IDF began OPE.²³⁷

²³⁴ Glenn E. Robinson, “Gaza 2014: Hamas’ Strategic Calculus” *Parameters* 44, no. 4 (Winter 2014-2015), 94-95, accessed December 1, 2016, http://www.strategicstudiesinstitute.army.mil/pubs/Parameters/Issues/Winter_2014-15/Parameters_Winter2014_15_v44n4.pdf.

²³⁵ Avner Golov, ‘Rethinking the Deterrence of Hamas,’ in Kurz and Brom. 89.

²³⁶ Yiftah S. Shapir, “Rocket Warfare in Operation Protective Edge,” in Kurz and Brom, 44.

²³⁷ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 45-46.

On July 8, 2014, the IDF launched OPE against Hamas in Gaza.²³⁸ The operation had three initial objectives: restore peace to southern Israel, restore Israeli deterrence, and damage Hamas.²³⁹ The IDF initially viewed the operation as another Operation Protective Defense. They relied on standoff fires to pressure Hamas into a ceasefire and on Iron Dome for protection from Hamas rocket force.²⁴⁰

The IDF's initial operational approach relied on standoff fires and Iron Dome. During the first ten days of the operation, the IAF used hundreds of tons of ordnance to attack 1,950 targets in Gaza.²⁴¹ It struck at Hamas communication centers and rocket forces.²⁴² Once again, IDF standoff fires did not reduce rocket fires. Hamas in fact expanded rocket fires to central Israel notably striking Ben Gurion Airport.²⁴³ Hamas local commanders apparently were firing according to preset plans.²⁴⁴ On July 10 for example, despite 210 IAF attacks, some 197 rockets launched at Israel.²⁴⁵ However, Iron Dome nullified most of the political effects of Hamas' rockets. Its success rate was supposedly ninety percent.²⁴⁶ The reduction of rocket fires was not even an Israeli objective for OPE. Iron Dome had changed Israel's military calculus, as well as Hamas'.

²³⁸ Mark E. Vinson, "An Israeli Approach to Deterring Terrorism," *Prism* 5, no. 3 (2015): 61, accessed December 6, 2016, http://cco.ndu.edu/Portals/96/Documents/prism/prism_5-3/Prism%20Vol%205%20No%203.pdf.

²³⁹ Amos Yadlin, "The Strategic Balance of Operation Protective Edge: Achieving the Strategic Goal Better, Faster, and at a Lower Cost," in Kurz and Brom, 203.

²⁴⁰ Dekel, "Operation Protective Edge: Strategic and Tactical Asymmetry," 14.

²⁴¹ Popovich, "A Classical Analysis of the 2014 Israeli-Hamas Conflict," 22.

²⁴² Vinson, "An Israeli Approach to Deterring Terrorism," 70.

²⁴³ Siboni, "Operations Cast Lead, Pillar of Defense, and Protective Edge: A Comparative Review," 30.

²⁴⁴ White, "The Combat Performance of Hamas in the Gaza War of 2014," 10.

²⁴⁵ Nerguizian, *Military Balance in a Shattered Levant*, 96.

²⁴⁶ Samaan, *Another Brick in the Wall: The Israeli Experience in Missile Defense*, 31.

Faced with Iron Dome's effectiveness, Hamas sought to use maneuver to redress this imbalance. It conducted a naval commando raid into southern Israel.²⁴⁷ The IDF intercepted the force of frogmen and killed five of them.²⁴⁸ On 17 July 2014, the IDF spoiled an attack by Hamas fighters who emerged near the Sufa Kibbutz.²⁴⁹ The IDF could no longer ignore Hamas new tunnel threats. An Israeli from the border communities confirmed the new threat's recognition, "We used to look up to the sky in fear, but now we are looking down at the ground."²⁵⁰ That evening the IDF moved ten brigades to the border. The ground invasion began the next day.²⁵¹ The IDF had received a new objective for OPE: destroy Hamas' attack tunnels.

IDF ground forces soon found themselves fighting subterranean warfare against a tougher enemy. One OCL veteran said, "This [was] not the Hamas of [2008], but a far more organized force that has adopted many of the same tactics and weapons seen in the fierce 2006 urban warfare in Lebanon."²⁵² An IDF Brigadier General admitted, "They maneuvered like IDF soldiers."²⁵³ Hamas fighters successfully employed a mix of direct and indirect fires against IDF units. They rigged tunnel entrances with explosives, and used tunnels to maneuver and to surprise IDF soldiers.²⁵⁴ For example, Hamas fighters used the tunnels to conduct a raid on the IDF pillbox near Nahal Oz, and

²⁴⁷ Popovich, "A Classical Analysis of the 2014 Israeli-Hamas Conflict," 22.

²⁴⁸ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 46.

²⁴⁹ Yiftah S. Shapir and Gal Perel, "Subterranean Warfare: A New-Old Challenge," in Kurz and Brom, 53.

²⁵⁰ State of Israel, 2015, *The 2014 Gaza Conflict 7 July – 26 August 2014: Factual and Legal Aspects*, 129, accessed September 1, 2016, <http://mfa.gov.il/ProtectiveEdge/Documents/2014GazaConflictFullReport.pdf>.

²⁵¹ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 47.

²⁵² Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 93.

²⁵³ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 50.

²⁵⁴ White, "The Combat Performance of Hamas in the Gaza War of 2014," 11-12.

killed five soldiers.²⁵⁵ In the words of another IDF soldier, “Though surprise is too strong a word, the ground force had to adjust its tactics to deal with that. It’s more than classical urban operations.”²⁵⁶

Nonetheless, the IDF benefitted from the continued focus on high-intensity conflict. IDF forces still fought at night to their advantage, and still incorporated artillery, helicopters, UAVs, and fixed-wing close-air support (CAS). IDF units fought as combined arms teams with infantry, tanks, armored bulldozers, engineers, and fires to destroy Hamas compounds and positions.²⁵⁷ Increased familiarity between the IAF and ground forces enabled doctrine and procedures for danger close missions much closer than previous conflicts. The adoption of DAP at company level complemented this process and reduced the danger close distance to 250 meters or less.²⁵⁸

The IDF’s acquisition of the Namer and the Trophy APS greatly enabled IDF to prevail on the battlefield against Hamas’s new capabilities. The IDF suffered its greatest loss of life in one event when Hamas attacked a lightly armored M113 APC with RPGs, killing seven Israeli soldiers. Conversely in Sajaya, against fierce Hamas close-quarters attacks, IDF soldiers buttoned up in their Namer APCs, and then called down artillery on themselves and suffered no casualties.²⁵⁹ The Merkava Mk IV tank with the Trophy APS was impenetrable to Hamas new ATGMs and tandem warhead RPGs. Trophy defeated over a dozen ATGM attack during OPE on Merkava Mk IV

²⁵⁵ Shapir and Perel, “Subterranean Warfare: A New-Old Challenge,” 53.

²⁵⁶ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 58.

²⁵⁷ Popovich, “A Classical Analysis of the 2014 Israeli-Hamas Conflict,” 22.

²⁵⁸ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 80-93.

²⁵⁹ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 48, 103.

tanks.²⁶⁰ Hamas destroyed not a single Namer or Merkava.²⁶¹ After a while, Hamas fighters retreated from engagements when Merkava tanks started to arrive.²⁶²

By August 3, 2014, most of the IDF ground forces returned to Israel. In about two weeks, they found and destroyed thirty-two Hamas attack tunnels, fourteen of which reached into Israel.²⁶³ The war returned to its previous state in which both the IDF and Hamas used standoff fires against one another. The IAF began to strike more of Gaza's public and commercial infrastructures. After multiple ceasefires failed, the IAF targeted Hamas senior leaders, including its head of finance.²⁶⁴ On 23 August, it destroyed Al Zafer Tower 4. The building housed Gazan elites, who so far untouched by the war, now quickly pressured Hamas to end the fighting.²⁶⁵ On 26 August, Egypt announced both sides accepted a ceasefire.²⁶⁶

Arguably, IDF operational art in OPE realized the standoff fires approach the IDF envisioned in the SLW given a more comprehensive set of means. Now the IDF had Iron Dome for its operational art. Iron Dome was a deliberate adaptation after Hezbollah's storm of rockets in 2006, and it successfully negated the rockets' political effects. In OPE, militants fired 4,450 rockets and mortars into Israel.²⁶⁷ This killed 14 civilians and wounded 400 civilians.²⁶⁸ In comparison,

²⁶⁰ "Namer infantry fighting vehicle."

²⁶¹ White, "The Combat Performance of Hamas in the Gaza War of 2014," 11.

²⁶² Kim, "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025," 98.

²⁶³ White, "The Combat Performance of Hamas in the Gaza War of 2014," 10.

²⁶⁴ Popovich, "A Classical Analysis of the 2014 Israeli-Hamas Conflict," 22.

²⁶⁵ Dekel, "Operation Protective Edge: Strategic and Tactical Asymmetry," 17.

²⁶⁶ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 54.

²⁶⁷ Cohen and Scheinmann, "The Grim Lessons of "Protective Edge"."

²⁶⁸ Eitan Shamir and Eado Hecht, "Gaza 2014: Israel's Attrition vs Hamas Exhaustion," *Parameters* 44, no. 4 (Winter 2014-2015), 87, accessed December 1, 2016, http://www.strategicstudiesinstitute.army.mil/pubs/Parameters/Issues/Winter_2014-15/Parameters_Winter2014_15_v44n4.pdf.

Hezbollah fired 3,790 rockets in the SLW, which killed 42 and wounded 4,262 civilians.²⁶⁹ The ratio of rockets fired to civilian casualties was approximately 10:1 in OPE. In SLW, this was 1:0.88. Though still harmful to Israeli society, this was significant decrease in the rockets' achieved lethality. The IDF now had a technological *mean* in OPE to negate Hamas' rocket force. It had not even included the reduction of rocket fires as an operational objective. Hamas adapted to the new calculus, however, and began to maneuvered forces into Israel itself via attack tunnels.

This forced IDF operational art to commit to a ground invasion, but its employment of ground forces bore striking similarity to SLW. Unlike OCL's deeper maneuvers to isolate Gaza, the IDF kept its ground forces within two miles of the border fence.²⁷⁰ It was also fighting a Hamas much closer to Hezbollah's fighting capabilities. The IDF lost 64 soldiers in combat²⁷¹ compared to 10 in OCL.²⁷² Nevertheless, the IDF's adaptation after the SLW to build a force capable of combined-arms maneuver enabled it to achieve the destruction of the tunnels at undoubtedly lower cost than in 2006. For example, Hezbollah successfully hit forty-eight tanks, destroyed five in SLW, and killed thirty tank crewmembers in the SLW.²⁷³ Hamas had no such successes in OPE.

With these two *means*, the IDF's standoff fires-based operational art finally succeeded in forcing Hamas to a ceasefire. During the process, Iron Dome afforded the political space to pursue a standoff fires approach. The IDF ground forces effectively countered Hamas's effort to rebalance the scales through attack tunnels. Its airstrike on Al Zafer Tower 4 seemed to be a tipping point. Within two hours, Hamas accepted the ceasefire terms they had earlier rejected. The IDF achieved

²⁶⁹ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 61.

²⁷⁰ Popovich, "A Classical Analysis of the 2014 Israeli-Hamas Conflict," 22.

²⁷¹ Nerguizian, *Military Balance in a Shattered Levant*, 92.

²⁷² Cordesman, *The "Gaza War" A Strategic Analysis*, 57.

²⁷³ Matthews, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*, 64.

its objectives of damaging Hamas, achieved peace for southern Israel, restoring Israeli deterrence. In the seven months after OPE, southern Israel saw its most quiet days since the 1990s.²⁷⁴

Conclusion

IDF adaptations between 2006 and 2014 reflected G.S. Lauer's dialectical never-ending model. Before 2006, the IDF did not anticipate the emergence of hybrid threats but irregular threats. This external discourse resonated with the IDF's internal discourse based on its combat experience in the West Bank in the Second Intifada, the development of SOD, increasing societal casualty aversion, and budget cuts. All seemed to point the IDF towards a future of wielding standoff fires to win limited conflicts with the least political cost.

However, the Second Lebanon War provided the IDF its first contact with a hybrid threat, and quickly shattered its standoff fires only approach. The IDF now adapted against a new presumed antagonist. It pursued the changes across the realms of doctrine, material, and training. Israeli society enabled the adaptations with larger budget allocations. Even the IAF, who once removed TACPs from ground forces before 2006, became a leader in joint training. The IDF's stellar performance in against Hamas's young hybrid treat during Operation Cast Lead in 2008-2009 was the fruit of these adaptations.

By 2014, the IDF's material adaptation in the form of Iron Dome changed the calculus of war for both Israel and Hamas. The IDF believed it was possible to return to standoff fires alone after Operation Pillar of Defense in 2012. Hence, when budget battles returned, it lowered the priority of ground forces. It did not hollow the ground forces as it did before 2006, but the IDF did slow down the production of the more survivable Merkava Mk IV and Namer APC. It clearly did not anticipate the extent or impact of Hamas' new attack tunnels. Fortunately for the IDF, its

²⁷⁴ Glenn, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, 82.

ground force was still able to fight against Hamas' new capabilities due to its adaptations in doctrine, material, and training.

More importantly, Israeli adaptations provided the means for IDF operational art to succeed against hybrid threats. IDF's innovations before 2006 left it without a conventional ground force in the Second Lebanon War. Hence, IDF operational art had only standoff fires, which proved ineffective against hybrid threats. Afterwards, IDF adaptations rebuild a capable ground force and developed Iron Dome. In OCL, before Iron Dome was operational, IDF operational art complementarily used standoff fires and ground maneuvers to defeat Hamas. After Iron Dome's performance in Operation Pillar of Defense, the IDF believed it was possible to rely to standoff fires alone once again. Hence, IDF operational art in OPE initially relied only on standoff fires and Iron Dome. In turn, Hamas responded with attack tunnels. Once again, the IDF operational art needed ground forces, and used them to neutralize Hamas' adaptation in war. Unlike what happened in the SLW, IDF operational art in both cases had the means to achieve their military and political objectives.

If anything, the IDF experience against hybrid threats reinforced the US Army's current focus on conventional training and combined arms maneuver. The IDF undoubtedly won tactical battles during the SLW, but did not achieved its major operational and strategic objectives. Only after it rebuilt its ground force for conventional war did the IDF regained operational effectiveness in OCL and OPE against hybrid threats. In its 2015 strategy, the IDF said, "In general, the force buildup shall focus on a war scenario and shall be adapted to emergency and routine situations as needed."²⁷⁵ This was the IDF's first priority for force buildup.²⁷⁶

²⁷⁵ "IDF Strategy," Israel Defense Force, November 23, 2015, accessed December 8, 2016, <https://www.idfblog.com/2015/11/23/idf-strategy/>.

²⁷⁶ Ibid.

The IDF experience also underscored the need for the US Army to prepare itself not just for urban but also subterranean warfare. Both environments definitely enabled hybrid threats like Hezbollah and Hamas to evade and mitigate the IDF's superiority in surveillance and precision strike. The case of OPE further showed how a hybrid threat effectively employed tunnels to maneuver. Unsurprisingly, the Islamic State of Iraq and the Levant (ISIL) has built a large network of tunnels for its defense of Mosul.²⁷⁷ IDF definitely learned the value of preparing for tunnel warfare from OPE. It announced in 2015 to train all infantry soldiers in tunnel warfare in at least ten specially built training facilities.²⁷⁸

Lastly, the IDF experience confirmed the need for credible land power. IDF operational art during this period showed firepower and technology alone cannot win wars. Lieutenant General McMaster termed this promise of victory through better technology in surveillance, information, communications, and precision strike capabilities the vampire fallacy.²⁷⁹ This concept embodied the IDF's belief leading up to 2006. In the SLW, Hezbollah taught the IDF the limits of technology and surveillance. In 2014, when the IDF believed the technology of Iron Dome again promised bloodless victory, Hamas adapted and countered with hand-dug attack tunnels. IDF technology proved once again unsuitable to a hybrid threat. Capable land power was a requirement in all three military operations. They showed that Israeli successes or failures hinged upon the availability of a conventional ground force. By 2015, the IDF has learned this lesson.

From its experience since 2006, the IDF once again understands the value of land power. In the 2015 *IDF Strategy*, the IDF states that in a conflict against hybrid threats like Hezbollah and

²⁷⁷ Jared Malsin and Sheikh Amir, "Inside the ISIS Tunnels Around Mosul," *Time*, October 21, 2016, accessed December 8, 2016, <http://time.com/4541647/isis-defensive-tunnels-mosul-iraq/>.

²⁷⁸ Yuval Azulai, "New simulators to train IDF soldiers for tunnel warfare," *Globes*, April 5, 2016, accessed December 8, 2016, <http://www.globes.co.il/en/article-simulators-training-idf-soldiers-for-tunnel-warfare-1001026216>.

²⁷⁹ H.R. McMaster, "Continuity and Change: The Army Operating Concept and Clear Thinking About Future War," *Military Review* 95, no. 2 (March-April 2015):13.

Hamas, “[t]he IDF concept for achieving a military resolution is the **maneuver approach**.”²⁸⁰ This comprises both “**immediate maneuver**, to harm the enemy, conquer territory, reduce the use of fire from the conquered area, seize and destroy military infrastructure, and affect the enemy’s regime survivability” and a “**strategic-fire campaign**, based on aerial freedom of action and high-quality intelligence.”²⁸¹ Undoubtedly, the IDF recognizes once again the continuing need of land power in war. As T.R. Ferenbach wrote in *This Kind of War*, “you may bomb it, atomize it, pulverize it and wipe it clean of life—but if you desire to defend it, protect it and keep it for civilization, you must do this on the ground, the way the Roman legions did, by putting your young men in the mud.”²⁸²

²⁸⁰ “IDF Strategy.”

²⁸¹ *Ibid.*

²⁸² T.R. Ferenbach, *This Kind of War* (E-Rights/E-Reads, Ltd, 1999), 323, accessed December 14, 2016, eBook Collection (EBSCOhost).

Bibliography

Primary Sources

Israel Defense Forces. "Winograd Commission: IDF Response to the Final Report." Jewish Virtual Library, January 30, 2008. Accessed August 29, 2016.
<http://www.jewishvirtuallibrary.org/jsource/History/IDFwinograd.html>.

Hirsch, Gal. *Defensive Shield: An Israeli Special Forces Commander on the Front Line of Counterterrorism*. Translated by Reuven Ben-Shalom. Jerusalem, Israel: Gefen Publishing House, 2016.

Israel Defense Forces. " Hamas Manual Calls for Hiding Bombs in Civilian Homes." Israel Defense Forces, August 25, 2014. Accessed December 13, 2016.
<https://www.idfblog.com/2014/08/25/hamas-manual-calls-for-hiding-bombs-in-civilian-homes/>.

——— "Future IDF Infantry Officers Train for Complex Urban Warfare Scenarios." Israel Defense Forces, September 2, 2013. Accessed November 29, 2016.
<https://www.idfblog.com/2013/09/02/photos-future-idf-infantry-officers-train-complex-urban-warfare-scenarios/>.

——— "IDF Strategy." Israel Defense Forces, November 23, 2015. Accessed December 8, 2016.
<https://www.idfblog.com/2015/11/23/idf-strategy/>.

——— "The War Drill: New Exercise for Artillery Reservists." Israel Defense Forces, January 31, 2012. Accessed November 29, 2016. <https://www.idfblog.com/2012/01/31/artillery-corps-reserve-soldiers-conduct-drill/>.

——— "Master Gunners: The IDF's Tank and Artillery Experts," Israel Defense Force, July 8, 2013. Accessed November 29, 2016. <https://www.idfblog.com/2013/07/08/master-gunners-the-idfs-tank-and-artillery-experts/>.

——— "The IDF's Fuel in the Heat of Battle" Israel Defense Forces, November 11, 2016. Accessed November 29, 2016. <https://www.idfblog.com/2013/11/11/the-idfs-fuel-in-the-heat-of-battle/>.

State of Israel. 2015. *The 2014 Gaza Conflict 7 July – 26 August 2014: Factual and Legal Aspects*. Accessed September 1, 2016.
<http://mfa.gov.il/ProtectiveEdge/Documents/2014GazaConflictFullReport.pdf>

Secondary Sources

Adamsky, Dima. *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the Us, and Israel*. Stanford, Calif.: Stanford University Press, 2010.

Adamsky, Dima, and Kjell Inge Bjerga, eds. *Contemporary Military Innovation: Between Anticipation and Adaption*. Cass Military Studies. London: Routledge, 2012.

- Azulai, Yuval. "New simulators to train IDF soldiers for tunnel warfare." *Globes*, April 5, 2016. Accessed December 8, 2016. <http://www.globes.co.il/en/article-simulators-training-idf-soldiers-for-tunnel-warfare-1001026216>.
- Ben-David, Alon. "Adapt or die: Israel Defence Force," *Janes Defense Weekly*, May 1, 2008. Accessed December 8, 2016. <https://janes.ihs.com.lumen.cgsccarl.com/Janes/Display/1176979>.
- . "Country Briefing – Israel – Double Jeopardy." *Jane's Defense Weekly*, November 11, 2004. Accessed November 21, 2016. <https://janes.ihs.com.lumen.cgsccarl.com/Janes/Display/1172116>.
- Binnie, Jeremy and Mohammed Najib. "Gaza militants unveil new rockets." *Jane's Defense Weekly*, July 11, 2014. Accessed November 29, 2016. <https://janes.ihs.com.lumen.cgsccarl.com/Janes/Display/1716607>.
- Booth, William. "Here's what really happened in the Gaza war (according to the Israelis)." *Washington Post*, September 3, 2014. Accessed December 6, 2016. https://www.washingtonpost.com/news/worldviews/wp/2014/09/03/heres-what-really-happened-in-the-gaza-war-according-to-the-israelis/?utm_term=.5b8aec7d318d.
- Byman, Daniel and Gad Goldstein. *The Challenge of Gaza: Policy Options and Broader Implications*. Washington, DC: Saban Center for Middle East Policy, Brookings, 2011. Accessed November 30, 2016. <https://www.brookings.edu/research/the-challenge-of-gaza-policy-options-and-broader-implications/>.
- Center for Military History (CMH) Publication 40-6-1, *A History of Innovation: U.S. Army Adaptation in War and Peace*. Edited by Jon T. Hoffman. Washington, DC: Center for Military History, 2009. Accessed December 6, 2016. http://www.history.army.mil/html/books/innovation/History_of_Innovation.pdf.
- Cohen, Raphael and Gabriel Scheinmann. "The Grim Lessons of "Protective Edge"." *The American Interest*, August 31, 2014. Accessed November 30, 2016. <http://www.the-american-interest.com/2014/08/31/the-grim-lessons-of-protective-edge/>.
- Cordesman, Anthony H. *The "Gaza War" A Strategic Analysis*. Washington, DC: Center for Strategic and International Studies, 2009. Accessed October 16, 2016. <https://www.csis.org/analysis/gaza-war>.
- Dekel, Udi. "Operation Protective Edge: Strategic and Tactical Asymmetry." In Kurz and Brom, 13-20.
- Farquhar, Scott, ed. *Back to Basics: A Study of the Second Lebanon War and Operation CAST LEAD*. Fort Leavenworth, KS: Combat Studies Institute Press, 2009.
- Ferenbach, T.R. *This Kind of War*. E-Rights/E-Reads, Ltd, 1999. Accessed December 14, 2016. eBook Collection (EBSCOhost).

- Glenn, Russell W. *Army Research Paper*, Vol. 9, *Short War in a Perpetual Conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*. Russell, A.C.T.: Department of Defence, 2016.
- *All Glory Is Fleeting: Insights from the Second Lebanon War*. Santa Monica, CA: RAND Corporation, 2012. Accessed October 16, 2016.
<http://www.rand.org/pubs/monographs/MG708-1.html>.
- *Glory Restored? The Implications of the 2008-2009 Gaza War in Times of Extended Conflict*. Suffolk, VA: Joint Irregular Warfare Center, 2010. Accessed October 16, 2016.
<http://smallwarsjournal.com/blog/journal/docs-temp/gloryrestored.pdf>.
- Golov, Avner. "Rethinking the Deterrence of Hamas." In Kurz and Brom, 87-91.
- Hirst, David. *Beware of Small States: Lebanon, Battleground of the Middle East*. New York: Nation Books, 2010.
- Jane's. "Israel > Armed Forces," *Jane's Sentinel Security Assessment – Eastern Mediterranean*, November 23, 2016. Accessed November 30, 2016.
<https://janes.ihs.com.lumen.cgscarl.com/EasternMediterranean/Display/1303357>
- Johnson, David E. *Hard Fighting: Israel in Lebanon and Gaza*. Santa Monica, CA: RAND, 2011.
- *Occasional Paper*, Vol. OP-285-A, *Military Capabilities for Hybrid War: Insights from the Israel Defense Forces in Lebanon and Gaza*. Santa Monica, CA: RAND, 2010.
- *The Challenges of the "Now" and Their Implications for the U.S. Army*. Santa Monica, CA: RAND Corporation, 2016). Accessed November 21, 2016.
<http://www.rand.org/pubs/perspectives/PE184.html>.
- Marrero, Abe F. "The Tactics of Operation CAST LEAD." In Farquhar, 83-102.
- Military Periscope. "Army." Military Periscope. Last modified September 1, 2015. Accessed October 31, 2016.
<https://www.militaryperiscope.com.lumen.cgscarl.com/nations/mideast/israel/army/index.html>.
- "Merkava Mark 4 main battle tank." Military Periscope. Last modified October 1, 2014. Accessed 16 Nov 2016,
<https://www.militaryperiscope.com.lumen.cgscarl.com/weapons/gcv/tanks/w0005608.html>.
- "Namer infantry fighting vehicle." Military Periscope. Last modified November 1, 2016. Accessed November 29, 2016.
<https://www.militaryperiscope.com.lumen.cgscarl.com/weapons/gcv/apc/w0007331.html>.
- "Trophy active protection system (APS)." Military Periscope. Last modified August 1, 2010. Accessed November 29, 2016.
<https://www.militaryperiscope.com.lumen.cgscarl.com/weapons/artguns/cmbtveh/w0006949.html>.

- Kim, Michael. "Facing Uncertainty: The Role of the M1 Abrams Tank in the U.S. Army of 2015-2025." Monograph. Ft. Leavenworth, KS: US Army Command and General Staff College, 2015.
- Kurz, Anat and Schlomo Brom, ed. *The Lessons of Protective Edge*. Tel Aviv: Institute for National Security Studies, 2014. Accessed October 31, 2016.
http://www.inss.org.il/uploadImages/systemFiles/ZukEtanENG_final.pdf.
- Lambeth, Benjamin. "Forging Jointness Under Fire: Air-Ground Integration in Israel's Lebanon and Gaza Wars." *Joint Forces Quarterly* 66, (July 2012): 48-53.
- "Israel's War in Gaza: A Paradigm of Effective Military Learning and Adaptation," *International Security* 37, no. 2 (Fall 2012): 81-118.
- "Learning from Lebanon, Airpower and Strategy in Israel's 2006 War against Hezbollah." *Naval War College Review*, no. 3 (Summer 2012): 83-104.
- Landau, Emily and Azriel Bermant. "Iron Dome Protection: Missile Defense in Israel's Security Concept." In Kurz and Brom, 37-42.
- Lauer, G. Stephen. "The Tao of Doctrine: Contesting an Art of Operations." *Joint Forces Quarterly* 82, (July 2016): 118-124. Accessed September 5, 2016.
http://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-82/jfq-82_118-124_Lauer.pdf.
- Levy, Yagil. "How Casualty Sensitivity Affects Civilian Control: The Israeli Experience," *International Studies Perspectives* 12 (2011): 68-88.
- Malsin, Jared and Sheikh Amir. "Inside the ISIS Tunnels Around Mosul." *Time*, October 21, 2016. Accessed December 8, 2016. <http://time.com/4541647/isis-defensive-tunnels-mosul-iraq/>.
- McMaster, H.R. "Continuity and Change: The Army Operating Concept and Clear Thinking About Future War," *Military Review* 95, no. 2 (March-April 2015): 6-20.
- Matthews, Matt. *Long War Series Occasional Paper*, Vol. 26, *We Were Caught Unprepared: the 2006 Hezbollah-Israeli War*. Fort Leavenworth, KS: US Army Combined Arms Center, Combat Studies Institute Press, 2008.
- "Hard Lessons Learned A Comparison of the 2006 Hezbollah-Israeli War and Operation CAST LEAD: A Historical Overview." In Farquhar, 5-44.
- Mellies, Penny L. " Hamas and Hezbollah: A Comparison of Tactics." In Farquhar, 45-82.
- Murray, Williamson. *Military Adaptation in War: With Fear of Change*. New York: Cambridge University Press, 2011.
- Nerguizian, Aram. *Military Balance in a Shattered Levant*. Washington, DC: Center for Strategic and International Studies, 2015. Accessed October 17, 2016.
<https://www.csis.org/analysis/military-balance-shattered-levant>.

- Popovich, Elad. "A Classical Analysis of the 2014 Israeli-Hamas Conflict." *CTC Sentinel*, November/December 2014. Accessed November 30, 2016. <https://www.ctc.usma.edu/posts/novemberdecember-2014>.
- Quinn, Matthew F. "Assessing Israeli Military Effectiveness." Master's Thesis. Monterrey, CA: Naval Postgraduate School, 2014.
- Robinson, Glenn E. "Gaza 2014: Hamas' Strategic Calculus." *Parameters* 44, no. 4 (Winter 2014-2015):91-103. Accessed December 1, 2016. http://www.strategicstudiesinstitute.army.mil/pubs/Parameters/Issues/Winter_2014-15/Parameters_Winter2014_15_v44n4.pdf.
- Rodman, David. *Sword and Shield of Zion: The Israeli Air Force in the Arab Israeli Conflict, 1948-2012*. Brighton, US: Sussex Academic Press, 2013.
- Samaan, Jean-Loup. *Another Brick in the Wall: The Israeli Experience in Missile Defense*. Carlisle, PA: Strategic Studies Institute, US Army War College, 2015.
- Schweitzer, Yoram. "Defining the Victor in the Fight against an Army of "Terrorilla"." In Kurz and Brom, 21-26.
- Shamir, Eitan and Eado Hecht. "Gaza 2014: Israel's Attrition vs Hamas Exhaustion." *Parameters* 44, no. 4 (Winter 2014-2015): 81-90. Accessed December 1, 2016. http://www.strategicstudiesinstitute.army.mil/pubs/Parameters/Issues/Winter_2014-15/Parameters_Winter2014_15_v44n4.pdf.
- Shapir, Yiftah S. "Rocket Warfare in Operation Protective Edge." In Kurz and Brom, 43-50.
- Shapir, Yiftah S. and Gal Perel. "Subterranean Warfare: A New-Old Challenge." In Kurz and Brom, 51-58.
- Sharp, Jeremy M. *Israel's Iron Dome Anti-rocket System: U.S. Assistance and Coproduction*. CRS Reports & Analysis IN 10158. Washington, DC: Congressional Research Service, September 30, 2014. Accessed December 1, 2016. <https://fas.org/sgp/crs/mideast/IN10158.pdf>.
- Siboni, Gabi. "Operations Cast Lead, Pillar of Defense, and Protective Edge: A Comparative Review." In Kurz and Brom, 27-36.
- Simpson, Emile. *War from the Ground Up: Twenty-First Century Combat as Politics*. Crises in World Politics. New York: Columbia University Press, 2012.
- Tira, Ron. "The Limitations of Standoff Firepower-Based Operations: On Standoff Warfare, Maneuver, and Decision." Institute for National Security Studies, March 2007. Accessed December 1, 2016. [http://www.inss.org.il/uploadimages/Import/\(FILE\)1188302040.pdf](http://www.inss.org.il/uploadimages/Import/(FILE)1188302040.pdf).
- Vinson, Mark E. "An Israeli Approach to Deterring Terrorism." *Prism* 5, no. 3 (2015): 61-75. Accessed December 6, 2016. http://cco.ndu.edu/Portals/96/Documents/prism/prism_5-3/Prism%20Vol%205%20No%203.pdf.

- Watkins, Nicole J. and Alena M. James. "Digging Into Israel: The Sophisticated Tunneling Network of Hamas." *Journal of Strategic Security* 9, no. 1 (2016): 84-103.
- White, Jeffrey. "The Combat Performance of Hamas in the Gaza War of 2014." *CTC Sentinel*, September 2014. Accessed November 30, 2016.
<https://www.ctc.usma.edu/posts/september-2014>.
- Yadlin, Amos. "The Strategic Balance of Operation Protective Edge: Achieving the Strategic Goal Better, Faster, and at a Lower Cost." In Kurz and Brom, 199-211.
- Zanotti, Jim et al. *Israel and Hamas: Conflict in Gaza (2008-2009)*. CRS Report R40101. Washington, DC: Library of Congress, Congressional Research Service, February 19, 2009.

Doctrinal Publications

- Army Doctrinal Publications (ADP) 1-0, *The Army*. Washington, DC: Government Printing Office, 2012.
- Army Doctrinal Publications (ADP) 3-0, *Unified Land Operations*. Washington, DC: Government Printing Office, 2016.
- Training Circular (TC) 7-100, *Hybrid Threat*. Washington, DC: Government Printing Office, 2010.
- Training and Doctrine Command (TRADOC) 525-3-1, *The U.S. Army Operating Concept: Win in a Complex World*. Washington, DC: Government Printing Office, 2014.