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Employing Armor Against the Islamic State: The Inevitable Urban Combined Arms Fight

*By **Dennis A. Lowe***
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> A: Where is the shooting?
>
> B: Everywhere! In every area.
>
> A: What is it, artillery?
>
> B: Artillery, mortars, tanks—everywhere.
>
> A: Where are you?
>
> B: By the flour mill.
>
> A: Are they attacking the flour mill?
>
> B: Yes, and they are attacking us too. The artillery is destroying us. All of Fallujah is in ruins. Not a house left standing. What can stand? The tanks come down every street with artillery falling ahead of them.
>
> - Intercepted jihadist cell phone conversation, November 12th, 2004.[i]

ISIL cannot be destroyed relying solely on airstrikes, guided missiles and special operations. The Russians made a critical mistake thinking artillery and airstrikes could bend the Chechen's to their will in 1994 and 1999. Military options confined to these capabilities will hinder ISIL in the short term. Ultimately, they will adapt to survive the circumstances imposed by external actors operating without a significant and stable ground presence. As long as ISIL controls territory and shelters among civilian populations in easily fortified urban environments, a combined arms ground force will be required to root them out and establish alternative governance. Essential to a major combined arms effort is the enlightened employment of armor and the mobile, protected firepower it provides.

Lacking the capability to engage a well-trained combined arms force in conventional maneuver warfare, ISIL will seek to level the playing field asymmetrically by choosing to fight in urban environments. Cities mitigate many of the technological and numerical advantages of Western-style conventional forces. Their

topographic and human complexity impedes analysis and therefore effective planning. Such constraints make cities difficult to seize without significant collateral damage. Although ISIL will harass forces outside cities through IED's, ambushes and raids, they will seek victory in the concrete jungle. Unless the world is prepared to adopt an indefinite containment policy against an ISIL pseudo-state in the heart of the Middle East, we will find ourselves waging war in cities against a well prepared foe.

Past urban conflicts provide valuable lessons for a possible fight in ISIL controlled cities. Had U.S. forces used armor in Mogadishu, Somalia in 1993, some of the ground force losses may have been avoided. A crucial component missing in Task Force Ranger were vehicles that could sustain multiple hits from an array of enemy weapon systems and keep moving. This is a recurring need in urban warfare that was neglected to the detriment of the forces involved.

In Chechnya, the failures of Russian armor commanders to effectively employ their forces in Grozny led to disastrous consequences. The hard-won lessons of the Russians serve as an important guide for any force contemplating action in the urban landscape.

The second battle of Fallujah in 2004, however, is an excellent case study in the successful combined arms employment of armor to take and hold urban terrain. Here a range of armored vehicles, centered on the Marine M1A1 Abrams, provided indispensable protection and firepower for the infantry who cleared the city room by room. Moreover the shock effect that this armor brought to bear had both a physically and psychologically crushing impact against the insurgent defenders.

Few sources discuss the role of armor in Syria's civil war and the renewed conflict in Iraq. Both Syrian and Iraqi forces have employed armor but not to decisive effect. The full potential of armor in these contexts has not yet been realized. This paper aims to alleviate the deficit in material covering the usage of armor in these conflicts. I explore how a conventional combined armed force could most effectively employ armor assets against ISIL given what we know about the organization's current and projected practices. Although the recommendations contained herein are intended primarily for U.S. planners, the general principles may be applied to regional allies who employ armor against ISIL in the near future. Finally, this paper is not a call for a major U.S. intervention in the Middle East. Such an opinion is well beyond the scope of my qualifications and professional mandate. This paper is an exploration of possible improvements on armor practices given the real possibility of a renewed ground force commitment in the Middle East. Should the U.S. or regional powers choose this course, armored forces will be vital.

Understanding the Enemy

At a minimum, our point of departure must orient towards an understanding of ISIL and how it fights. Much of the contemporary material discussed in this paper comes from open sources such as news articles, journal publications, and social media outlets. The synthesis of sources provides insight into how this enemy fights and will likely fight, especially against an armored threat.

The primary limitations of this article stem from the lack of publically available intelligence regarding the current Syria and Iraq conflicts. Nevertheless, the introduction of a Western combined-arms formation would present an unprecedented challenge for ISIL. It is a threat they have not yet faced. ISIL, like us, would initially rely on past experiences to inform their course of action and subsequent innovations would arise from circumstances we cannot yet predict. All recommendations are based on likely courses of action developed from lessons learned in similar conflicts.

LTC Aaron Bazin understands ISIL as a complex adaptive system; an organization that has no centralized hierarchy but rather functions as an aggregate of actors unified by a common cause. In this case Abu Bakr al-Baghdadi's Caliphate and its brand of Jihadist dogma are ISIL's ideological foundations.**[ii]** Although

al-Baghdadi functions as the self-proclaimed Caliph his command of ISIL is decentralized. He disseminates strategic and operational intent while subordinate commanders act on their own initiative in accordance with this higher guidance.**[iii]** This is similar to the network-centric model described by Kilcullen.**[iv]** These networks are an interwoven mesh of militants, supporters (both local and transnational), and leadership cadres that operate without a rigid or linear hierarchy. The leadership in such networks is best understood as actors who serve as nodes of influence within overlapping networks. The elimination of one such node simply gives rise to or augments the power of another without seriously degrading the capability of the whole.

At the tactical level, ISIL employs a "rule-based swarm maneuver system" similar to that of the Somali militants that Kilcullen describes.**[v]** Adapted from General Mohamed Farrah Aidid's tactics in 1993 this system operates according to a simple set of rules: "Maintain an extended line abreast, keep your neighbors just in sight, but no closer, move to the sound of the guns, dismount when you see the enemy, when you come under fire, stop and fire back."**[vi]** It is a self-synchronizing system that requires minimal command and control and is adaptable to almost any situation. ISIL's maneuver warfare, if not deliberately developed from Somali practice, draws upon congruent methodology.

Once ISIL takes control of a population center it seizes local essential resources thus creating a dependency that yields compliance whether or not residents agree with ISIL's political-religious agenda. **[vii]** Ultimately, ISIL's power is dependent on its control of populations and the flow of resources. Therefore control of cities is its primary objective. Retired Colonel Gary Anderson rightly acknowledges that a large, competent combined arms force is the only way to completely defeat ISIL and drive it from its urban strongholds.**[viii]** This means we must look at the potential vulnerabilities that such a force will face in urban terrain.

Likely the primary ISIL anti-armor threats will not be other armored vehicles but small ATGM/AT**[ix]** teams and IED's. They will seek to avoid our conventional maneuver strengths by avoiding direct conflict outside urban areas. Any large scale engagements will occur in cities where ISIL can maximize its strengths as a decentralized fighting force, reducing the gap between their capabilities and ours. Additionally cities provide ISIL with a readily available, technically skilled population capable of leveraging workshops and industrial facilities to craft a number of homemade armaments, communications equipment and explosives.**[x]** Insurgents did exactly this in Fallujah, 2004.**[xi]** Bashar al-Assad's forces have encountered similar "Do it Yourself" warfare techniques in Syria as well. As new innovations in DIY warfare arise on the battlefield testing grounds in Syria and Iraq, they will be disseminated and readily available online for future combatants.

Since ISIL began its conquest of Iraq earlier this year, it has proved adept at employing a number of anti-tank systems such as 9K11 Kornet AGTM's, RPG**[xii]** variants, and the Yugoslavian M70 Osa rocket launcher.**[xiii]** During these engagements militants damaged at least twenty-eight Iraqi M1A1 Abrams tanks, five of which suffered full armor penetration.**[xiv]** Clearly, ISIL understands how to target our tanks' weak spots and accurately employ AT fires against them. Furthermore, ISIL has demonstrated its technical savvy in leveraging cyberspace to disseminate its message abroad in numerous languages, recruit fighters and collect intelligence. If it is capable of producing multi-language content and distributing it to a wide audience then it is capable of scouring open-source repositories for crucial technical and doctrinal data about how we and our allies operate. They will understand how to attack our vulnerabilities better than we may realize.

ISIL AT tactics and weapons systems are similar if not identical to those used by other militant groups fighting in the region. For example, Hezbollah fields a variety of ATGM systems against Israeli Merkava tanks to include: Milan, Metis-M, Sagger AT-3, Spigot AT-4 and Kornet AT-14 systems.**[xv]** Many of

these have seen action in Syria's civil war where ISIL first gained prominence. Additionally, Chinese manufactured Norinco HJ-8 Red Arrows have been widely used against Syrian armor formations.**[xvi]** Numerous militant and rebel groups use these systems and we must assume that ISIL is familiar with their operation. Should the U.S. and allies use armor against ISIL they will likely encounter such weapons.

Although many of the aforementioned AT assets have maximum ranges up to 3-4 kilometers, many militants choose to engage targets at much closer ranges in order to increase the likelihood of a catastrophic kill.**[xvii]** Videos posted online show Syrian rebel groups operating in small teams from high ground such as rooftops and hills in urban and peri-urban environments. In one example an Islamic Front ATGM team is set up on either a rooftop or an upper story. A hole knocked in the wall serves as the ATGM firing port, concealing the system in shadows while the wall provides small-arms cover for the team. Throughout the engagement, the team communicates via radio to what is likely an OP**[xviii]** or another ambush element.**[xix]** This is one instance of the type of urban fighting that will likely occur should ground forces move against ISIL controlled cities. In this kind of fighting, small teams move through "rat holes" knocked between rooms and buildings, enabling movement through the urban battlefield without crossing open streets and intersections. The U.S. encountered similar tactics in Iraq's urban battlefields.**[xx]** It is essential that the lessons from those fights are remembered.

Another example of AT employment shows a Syrian Army T-72**[xxi]** engaging an RPG team that fires from the darkness of a partially destroyed school building. Potentially lower level training is indicated here because the team engages the tank's frontal armor and main weapon systems instead of targeting weaker spots from safer positions. In this engagement the Syrians employ infantry dismounts on adjacent rooftops to likely spot targets for the tanks and provide close-in security.**[xxii]** Similar tank-infantry coordination met with success in Chechnya and Iraq.

The Syrian rebels also have employed recoilless rifles, IED's, and dismount grenade attacks against regime armor.**[xxiii]** ISIL can be expected to operate in a similar manner against an armored threat. In Iraq, ISIL used dismount teams to place explosive charges directly on Iraqi Abrams that lacked infantry support in close terrain.**[xxiv]** Additionally, ISIL's predecessor ISI used RKG-3 anti-tank grenades against coalition forces in Iraq.**[xxv]** RKG-3's are useful in densely populated areas due to their compact size. They are easily concealed on one's person and may be thrown from a crowd, making retaliation difficult if not impossible without serious civilian casualties.

Overall, we can be sure that armor, whether U.S. or allied, will be a prime target for ISIL should a combined-arms force be sent against them. Tanks are the quintessential embodiment of military might. The destruction of tanks, especially American tanks hold immense propaganda value for ISIL.**[xxvi]** Although ISIL does not have the capabilities to defeat a Western-style combined arms force that employs heavy formations, it does have the capability to wage an effective war of attrition, especially in the urban environment, using small, semi-autonomous AT teams in conjunction with remote observers, C2**[xxvii]** nodes and highly mobile infantry squads. The rest of this article will discuss recommendations on the employment of armor against ISIL given lessons learned from both previous conflicts and the current fight.

Preparation

> *"If the fundamental principles of combat are identical for all arms of service, their application is strongly conditioned by the technical means that are available."**[xxviii]***
>
> *- General der Panzertruppen Lutz*

Whoever understands the city best and how to array capabilities within it will hold a significant advantage. Often this advantage goes to the defender. In Chechnya, the Russians did not conduct thorough IPB**[xxix]** and this led to needless casualties.**[xxx]** The Chechens on the other hand meticulously prepared an urban defense, utilizing the city's planners to develop their defensive scheme.**[xxxi]** Without adequate urban IPB, the commitment of a large ground force in a city will be extremely risky. Fallujah, 2004 provides an excellent case study in which good IPB led to the successful employment of armor in urban terrain. IPB, however, is beyond the scope of this article.**[xxxii]** It suffices to note that the success of armor in any terrain is as much the result of good planning as the intrinsic capabilities of the platform.

Training is the second prerequisite for successful armor employment in cities. The Russians suffered heavily in both Chechen wars because they sent hastily cobbled together crews to the front lines in order to augment under strength armor units.**[xxxiii]** In the early days of armor, Heinz Guderian noted a truth that still holds today:

> "Tank service builds small unit cohesion in a quite remarkable way; there can be no distinctions—officers, NCOs and men alike share the same testing conditions of combat, and everyone must play his part to the full. Armored equipment is expensive and rather complicated, which calls for a fairly large establishment of long-service soldiers."**[xxxiv]**

The cohesion and training required of a successful armor unit takes time and good leadership to achieve. The risk posed to under strength U.S. armor units is similar to that of the Russians in Chechnya. In order to mitigate this, it would be beneficial to combine already proficient but under-strength units into fewer full-strength formations, keeping individual crews together as much as possible.

Additionally, armor units should focus on both joint and combined arms training to adequately prepare for the requirements of an urban fight. The following discussion explores areas that armor units preparing to fight in cities should consider incorporating into their training and planning.

Nomad Method

In 1999 a Russian company in 136th Brigade developed an effective tactical innovation for the employment of their small fleet of T-72BM's against Chechen rebels operating in the countryside. An individual T-72BM worked independently from the rest of its company as a raiding tank. Nicknamed the "Nomad Tank," it drove "covertly, but at high speed into the area indicated. The tank would move independently, without accompanying infantry. Moving off-road along mountain ravines, the tank remained unnoticeable to observers until it reached a suitable firing position, where the crew would fire four to five rounds at the target indicated and then disappear back into the ravines."**[xxxv]** A similar method would work well in Iraq and Syria when combined with SOF**[xxxvi]** coordination or aerial observation. A further innovation would be to utilize tank-APC teams for the same purpose. The addition of an APC**[xxxvii]** such as a Stryker, LAV**[xxxviii]** or Bradley would enable greater tactical flexibility for diverse mission sets. Infantry dismounts open the possibility of raiding compounds, taking prisoners and gathering intelligence. Operating at night (something Russian conventional forces in Chechnya rarely did due poor training and broken optics) the Nomad method would further enhance shock effect. Designed for use outside cities, the Nomad method would target ISIL's logistics, communications and resource domination, weakening its power over local populations. Moving unpredictably at night, away from major roads and trails, the Nomad method would avoid IED ambushes and be difficult to counter given the enemy's current capabilities.

This method has applications in the built environment as well. Kilcullen states that “the ability to quickly aggregate and disaggregate (mass and disperse) forces and fires is the critical aspect of organizing for urban combat.”**[xxxix]** Nomad is the modular embodiment of this concept. U.S. Marines used a version of the Nomad method in April, 2004 leading up to their autumn assault on Fallujah. An M1A1 tank section was called to reinforce a Marine infantry patrol in heavy contact.**[xl]** At nightfall, after relieving pressure on the embattled Marines, the tank section penetrated deep into the city, destroying targets of opportunity while an AC-130 gunship provided over-watch and aerial fires. The tank-gunship team wreaked havoc on Fallujah’s streets until the tanks had to return to their assembly area to refuel and upload ammunition. Had there been an effective (protected) means to re-arm and refuel forward, the only limiting factor would have been the endurance of the crews. Moreover, prior combat air control training for individual tank commanders would have further enhanced the team’s communication and effectiveness.

The Urban Fight

The underlying principles for the successful employment of armor have not changed since the inception of the arm in WWI. Guderian notes: “We may summarize the requirements for a decisive tank attack by the concepts of: suitable terrain, surprise and mass attack in the necessary breadth and depth.”**[xli]** Urban terrain is suitable insofar as it is properly analyzed through IPB and allows for adequate support. Some types of urban terrain may be unsuitable for armor. For example, canal cities or those built in precarious locations such as some Brazilian favelas and Afghan towns. The key point here is that urban characteristics do not make terrain inherently unsuitable for armor. It is the interaction of natural and human factors that coalesce in any given city which determines armored viability. Guderian’s remaining principles are similar to the American doctrinal concept of SCAT (surprise, concentration, audacity and tempo); the fundamentals of the offense. The specific application of SCAT will vary depending on analysis of the urban environment.

Urban terrain often favors the well prepared defender. The multi-dimensionality of urban warfare makes it the most complex type of terrain, offering increased tactical opportunities for those prepared to exploit them. Often these opportunities present themselves to light infantry while mounted forces struggle with a diversity of limitations.

After the defense of the Flesquières salient in WWI, Guderian noted that “infantry are perfectly capable of holding a great variety of locations against armored attack, provided that those places are properly evaluated and exploited; conversely unsupported armor cannot always be guaranteed to wipe out defending infantry.”**[xlii]** Insurgents exploited Fallujah’s terrain, attempting to limit vehicle mobility by blocking streets with Jersey barriers, HESCOs, and earthen berms. They covered these obstacles with direct and indirect fires as well as complex webs of IEDs, including entire explosively laden buildings.

The defenders turned private dwellings into bunkers and fortified seemingly ordinary structures, creating kill zones hidden inside buildings that would have to be cleared by infantry.**[xliii]** Compounding challenges for U.S. forces, the insurgents returned to infest previously cleared buildings and neighborhoods if these locations were not permanently occupied or monitored.**[xliv]** Similar Chechen tactics required lightly armed, semi-autonomous teams, each bearing a man-portable AT system and crew served weapon, to negotiate the urban battlefield with greater agility than their foes.**[xlv]** In both Fallujah and Grozny control of space often went to whoever happened to occupy it at the moment.

The Chechen defenders of Grozny ambushed Russian armor columns in the streets, shooting from upper stories and basements where main guns could not engage.**[xlvi]** A dilemma in urban combat is overcoming the advantage conferred to the defender against light skinned vehicles and infantry given the difficulty of employing purely armored and mechanized forces which have the requisite protection to

withstand the enemy fires. Kilcullen differentiates between two types of protection on the battlefield: indirect and direct. “Direct protection is the ability to survive a hit; indirect protection is the ability to avoid being hit in the first place… what’s mostly needed in a populated urban environment is direct protection. **[xlvii]** He points to the battle of Mogadishu mentioned earlier as an instructive case. The planners of Fallujah also recognized the importance of an armored spearhead. As Lowry points out, “The lead vehicles needed to be able to take a hit because they were going to draw intense fire.”**[xlviii]**

There are several ways a heavy force may overcome the defender’s advantage on its own terms. One is taking a proactive approach to altering urban terrain. Cities provide some of the most malleable terrain in warfare, enabling a wide latitude of possibility that spans the limits of a given commander’s creativity. Urban defenders are not the only ones able to modify to urban environment to their advantage. Armored forces have the protection and capabilities required to convert the urban fabric to the advantage the attacker. Marines in Fallujah used armored D9 bulldozers to clear obstacles, collapse building and make new passageways.

Combined with robust engineer capabilities, infantry-armor teams seized and kept the initiative by changing the urban landscape to their advantage, severely disrupting the enemy defensive plan in the process. In the second Chechen War (1999-2000) the Russians employed infantry-tank teams using armor to support the forward advance of infantry “storm” detachments.**[xlix]** Russian fratricide rates, however, were high in both Chechen wars. In order to mitigate this, the Marines in Fallujah kept armor in the lead with infantry covering rooftops and building interiors on the tanks’ flanks and rear.**[l]** The Marines found success using tanks and infantry in wide streets, AAVs**[li]** and LAVs in narrower streets and gun trucks in the smallest alleys. All moved using the Same-Axis-Same -Speed technique developed in WWII.**[lii]** In this way they achieved SCAT and contributed to low fratricide rates.

An additional consideration for armored urban warfare is the integration of armored platforms beyond the Tank-APC duality. While tanks and APC’s provide critical capabilities in the urban environment, their level of armor protection and mobility has creative applications across every war fighting function.**[liii]** Examples that have already been tried with success are armored engineer assets such as the D9 used in Fallujah. In Chechnya the Russians used armored anti-aircraft platforms to engage targets that tanks and APCs could not. U.S. forces already have the CROWS**[liv]** on many vehicles which enables similar urban targeting.

A further innovation was the Buratino, a multiple rocket launcher system mounted on a T-72 tank chassis. **[lv]** This weapon system utilized thermobaric (fuel-air) munitions to eradicate targets inside buildings and other enclosed spaces. The Buratino essentially combined the armored protection of a tank, the fires of rocket artillery and the thermobaric munitions concept of the smaller, man-portable RPO-A Schmel system. Such combinations of capabilities suited to urban warfare are extensive. While a Buratino type platform would likely run counter to a U.S. strategy seeking to minimize collateral damage, thermobaric warheads could be integrated in existing weapon systems to great effect. Examples might include the Mk 19 grenade launcher, M320 grenade launcher**[lvi]** and 120mm tank main gun.

Several expedient innovations for the U.S. army exist in the sustainment realm. The Field Artillery Ammunition Support Vehicle (FAASV) is an armored 155mm ammunition carrier utilized by Paladin platoons. This vehicle could be augmented with explosive reactive armor, a CROWS and modified to carry Abrams and Bradley ammunition. This would be an effective step towards overcoming the problem of protected resupply on the front lines. Similar armament modifications are conceivable for existing fuel vehicles. Alternatively, the dismount compartments of surplus APCs and up-armored trucks could be converted to carry fuel, albeit less than current light-skinned fuelers. Nevertheless, fuel capacity is a worthwhile trade-off for increased protection and mobility in urban terrain.

Additionally, the M88 recovery vehicle already possesses substantial armor. The addition of reactive armor and a CROWS would further enhance its survivability in urban terrain. The Russians commented on the need for such protected sustainment capabilities during their operations in Chechnya.**[lvii]** Furthermore, the historical precedence for armored sustainment dates to WWI when modified supply tanks brought munitions, equipment and other supplies to the front lines.**[lviii]** Given the immense sustainment requirements of urban combat, especially in ammunition and fuel classes, these recommendations are worth serious consideration.

Finally, any urban operation will likely have to contend with non-combatants on the battlefield. Unless a successful non-combatant evacuation and subsequent cordon is achieved as in Fallujah, 2004, unintended civilian casualties will become propaganda fodder for insurgents. Ultimately, domestic and international support for any major war effort hinge on perceptions of the justice of the cause. Media coverage of civilian deaths is a surefire way to erode this support.

Armored vehicles play a unique role in this aspect of the urban fight. Their protection enables crews to take additional time to positively identify targets or decide not to engage at all. Vehicle optics further increase the crew's ability to distinguish between friends, foes and non-combatants. The integration of remotely operated weapons enables crews to employ lethal and precise small arms fires against threats where volume of fire was once used for the same purpose.

A variety of non-lethal systems are available and widely used in cities by police forces. Some of these could be integrated with existing combat vehicles to provide commanders with a broader array of engagement options. One example would be the use of crowd-control agents to disperse civilians caught in dangerous situations. Many other non-lethal combinations, whether chemical, sonic, optical or electronic, could be used towards the same end. Of course armor and infantry teams would have to develop tactics for the employment of non-lethal agents when mitigate effects on nearby friendly dismounts. The flexibility offered by non-lethal systems, however, outweighs the burdens of additional training. Additional research is necessary for this and the other recommendations offered. If the topics mentioned are compelling enough to spark further investigation then this paper will have achieved its primary objective.

Conclusion

The record of past urban fights provides an informed guideline for future operations in cities. In the short to medium term, the Army will have to adapt using its existing organizational structures and equipment. In the long term the Army needs a unit dedicated specifically to urban warfare much like the 10th Mountain and 82nd Airborne Divisions were originally formed to master unique military competencies. This will preserve lessons learned in a living organization, preparing the Army for future urban conflicts better than books and papers ever will.

Warfare is a crucible of adaptability that culls those who fail to innovate. We must recognize that any enemy will adapt to the limitations imposed on it by airstrikes and raids. Although the West and its allies can destroy ISIL's conventional capabilities using such means, it cannot loosen their grip on the populations that inhabit occupied territories without the significant commitment of ground forces. In light of this quandary, the recommendations in this article are intended to provoke further reflection and discussion. Their application is contingent upon a thoughtful approach to ground conditions and the given mission's political objectives.

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End Notes

[i] Richard S. Lowry. *New dawn: the battles for Fallujah*, 172.

[ii] Aaron Bazin. "Defeating ISIS and Their Complex Way of War."

[iii] Gary Anderson. "Abu Bakr al-Baghdadi and the Theory and Practice of Jihad

[iv] David Kilcullen. *Out of the Mountains: the Coming Age of the Urban Guerrilla*, 226.

[v] David Kilcullen. *Out of the Mountains: the Coming Age of the Urban Guerrilla*, 84.

[vi] Ibid.

[vii] Michael Stevens. “Islamic State: Where does jihadist group get its support?”

[viii] Gary Anderson. "The Coming War with the Caliphate."

[ix] Anti-tank Guided Missile/Anti Tank

[x] David Kilcullen. *Out of the Mountains: the Coming Age of the Urban Guerrilla*, 226.

[xi] Richard S. Lowry. *New dawn: the battles for Fallujah*, 6.

[xii] Rocket Propelled Grenade. Often a man-portable, shoulder fired weapon.

[xiii] Jeremy Binnie. "Iraqi Abrams losses revealed."

[xiv] Ibid.

[xv] Andrew McGregor. "Hezbollah's Creative Tactical Use of Anti-Tank Weaponry."

[xvi] "Syrian rebels use HJ-8 "Red Arrow" ATGM to destroy SAA T-62." YouTube.

[xvii] Andrew McGregor. "Hezbollah's Creative Tactical Use of Anti-Tank Weaponry."

[xviii] Observation Post

[xix] "Islamic Front destroy regime tank with ATGM." LiveLeak.com.

[xx] Richard S. Lowry. *New dawn: the battles for Fallujah*, 20.

[xxi] A Soviet era main battle tank that still serves in militaries around the world.

[xxii] "Deadly Duel: Syrian Tank vs RPG Jihadists." LiveLeak.com.

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[xxv] "RKG-3 Anti-tank Grenade thrown at Humvee." LiveLeak.com.

[xxvi] Andrew McGregor. "Hezbollah's Creative Tactical Use of Anti-Tank Weaponry."

[xxvii] Command and Control

[xxviii] Heinz Guderian. *Achtung-Panzer!: the development of tank warfare,* 19.

[xxix] Intelligence Preparation of the Battlefield. The processes of analyzing pertinent data about the battlefield and turning that data into actionable planning considerations.

[xxx] Olga Oliker. *Russia's Chechen wars 1994-2000: Lessons from Urban Combat*, xi, 9.

[xxxi] Olga Oliker. *Russia's Chechen wars 1994-2000: Lessons from Urban Combat,* 19.

[xxxii] *Street Smart: Intelligence Preparation of the Battlefield for Urban Operations* by Jamison Jo Medby and Russell W. Glenn is an excellent resource for planners seeking a greater appreciation for the nuances of the built environment.

[xxxiii] Adam Geibel. "Some Russian Tankers' Experiences In the Second Chechen War ," 27.

[xxxiv] Heinz Guderian. *Achtung-Panzer!: the development of tank warfare*, 176.

[xxxv] Adam Geibel. "Some Russian Tankers' Experiences In the Second Chechen War." 25.

[xxxvi] Special Operations Forces

[xxxvii] Armored Personnel Carrier

[xxxviii] Light Armored Vehicle. A personnel carrier used predominantly by the United States Marine Corps

[xxxix] David Kilcullen. *Out of the Mountains: the Coming Age of the Urban Guerrilla*, 283.

[xl] Richard S. Lowry. *New dawn: the battles for Fallujah*, 10-14.

[xli] Heinz Guderian. *Achtung-Panzer!: the development of tank warfare*, 181.

[xlii] Heinz Guderian. *Achtung-Panzer!: the development of tank warfare*, 83.

[xliii] Richard S. Lowry. *New dawn: the battles for Fallujah*, 61.

[xliv] Richard S. Lowry. *New dawn: the battles for Fallujah*, 218.

[xlv] Olga Oliker. *Russia's Chechen wars 1994-2000: Lessons from Urban Combat*, 17.

[xlvi] Olga Oliker. *Russia's Chechen wars 1994-2000: Lessons from Urban Combat*, 13.

[xlvii] David Kilcullen. *Out of the Mountains: the Coming Age of the Urban Guerrilla*, 289.

[xlviii] Richard S. Lowry. *New dawn: the battles for Fallujah*, 45.

[xlix] Olga Oliker. *Russia's Chechen wars 1994-2000: Lessons from Urban Combat*, 45.

[l] Richard S. Lowry. *New dawn: the battles for Fallujah*, 11.

[li] Amphibious Assault Vehicle

[lii] Ibid, 73-74.

[liii] Army Warfighting Functions: Intelligence, Command and Control, Movement and Maneuver, Sustainment, Protection, and Fire Support.

[liv] Common Remotely Operated Weapon Station. Allows vehicle crews to fire a variety of weapons remotely utilizing both thermal and daylight optics.

[lv] Lester W. Grau and Timothy Smith. "A 'Crushing' Victory: Fuel-Air Explosives and Grozny 2000." Foreign Military Studies Office Publications.

[lvi] The experimental 40mm XM1060 round already exists for this weapon and has seen service in Afghanistan.

[lvii] Adam Geibel. "Some Russian Tankers' Experiences In the Second Chechen War ," 26.

[lviii] Heinz Guderian. *Achtung-Panzer!: the development of tank warfare*, 111.

About the Author

Dennis A. Lowe

First Lieutenant Dennis Lowe currently serves as an Armor platoon leader in the 1-66 AR BN. He graduated from the United States Military Academy in 2012 with a Bachelor of Science degree in International Relations. The views expressed are the author's own and do not reflect those of the Department of Defense or United States Army. Please reference footnotes for clarification of acronyms and doctrinal terms.

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