

Reconnaissance in Megacities: Lessons from the Past

A Monograph

by

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Abstract

Reconnaissance in Megacities: Lessons Learned from the Past, by MAJ Steven P. Sevigny, 58 pages.

The study of megacities has been a topic of keen interest in contemporary military literature. Experts appear divided as to whether or not the emerging concept of a megacity will provide a fundamental challenge to US Army urban operations in the future. Defined as massive urban areas with over ten million residents, and conditions of instability, proponents of megacities believe they will present a fundamentally new challenge in the future, for which the Army is unprepared. In contrast, a smaller group of experts refutes this assessment, arguing that megacities are similar in nature to other urban areas, and forces fighting in them can use methods similar to those employed in smaller cities.

Regardless of the exact outcome of this debate, one can reasonably expect megacities to present a key challenge to combat forces in the future—one that all urban areas have historically created—the challenge of conducting reconnaissance to gain understanding of the operating environment. FM 3-06, *Urban Operations*, defines five considerations for conducting urban ISR: early deployment, diversity, integration, flexibility, and focus. By examining case studies of urban ISR in Grozny, Fallujah, and Sadr City, this monograph proves that lessons from ISR efforts in smaller scale urban operations will directly apply to urban ISR in megacities.

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Acronyms

1st MARDIV	1st Marine Division
AQI	Al-Qaeda in Iraq
AO	Area of Operations
ARCIC	Army Capabilities and Integration Center
ATP	Army Techniques Procedures
ATTP	Army, Tactics, Techniques, and Procedures
AWT	Attack Weapons Team
BCT	Brigade Combat Team
CAB	Combined Arms Battalion
CAS	Close Air Support
CCIR	Commander's Critical Information Requirements
CMOC	Civil-Military Operations Center
COC	Combat Operations Center
COG	Center of Gravity
CPA	Coalition Provisional Authority
DARPA	Defense Advanced Research Projects Agency
EFP	Explosively Formed Projectile
FM	Field Manual
GMLRS	guided multiple launch rocket system
HUMINT	Human intelligence
ISF	Iraqi Security Forces
ISR	Intelligence, Surveillance, Reconnaissance
JAM	Jaish Al-Mahdi militia
LRAS	Long Range Advance Scout Surveillance System
LNO	Liaison Officer
MEF	Marine Expeditionary Force

MND-B	Multi-National Division-Baghdad
MRB	Motorized Rifle Brigade
MRR	Motorized Rifle Regiment
NDU	National Defense University
PL	Phase Line
RCT	Regimental Combat Team
SCR	Stryker Cavalry Regiment
SEAL	Sea, Air, Land
SIGINT	Signals Intelligence
STB	Special Troops Battalion
TACP	Tactical Air Control Party
TF	Task Force
TTP	tactics, techniques, and procedures
UAV	Unmanned Aerial Vehicle
UAS	Unmanned Aerial System

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Introduction

The Army's Operating Concept, "Win in a Complex World," describes a threat that is complex and 'unknowable.'¹ Facing an unknowable future threat increases the criticality of achieving greater understanding of potential threats and the operating environment. The megacity stands out as one of the most critical pieces of the operating environment of the future. Megacities have greater than ten million people, and analysis has shown that by 2025 nearly forty of these massive cities will exist.² Examples of current megacities in underdeveloped areas include Lagos (Nigeria), Dhaka (Bangladesh), Mumbai (India), and Sao Paulo (Brazil).³ Furthermore, according to a National Defense University (NDU) study, "megacities will be the strategic key terrain feature in any future crisis that requires US military intervention."⁴ The Army must understand the challenges of megacities given the likely possibility it might find itself operating in one in the relatively near future.

Despite the increasing number of scholarly works about growing urbanization and the future challenges of military operations in megacities, some believe that megacities do not justify a change in the fundamentals of urban warfare. Based on the view that megacities do not fundamentally differ from other large cities, Michael Evans argued that future urban military operations would probably continue to follow existing fundamentals of urban warfare.⁵ Potential

¹ Training and Doctrine Command (TRADOC) Pamphlet 525-3-1, *The U.S. Army Operating Concept: Win in a Complex World, 2020-2040* (Washington, DC: Government Printing Office, 2014), iii.

² Chief of Staff of the Army's Strategic Studies Group, *Megacities and the United States Army: Preparing for a Complex and Unknowable Future* (Arlington, VA: Megacities Concept Team, 2014), 3, accessed January 5, 2016, <http://www.army.mil/e2/c/downloads/351235.pdf>.

³ Paul T. Bartone and Mitchell Armbruster, ed., *Shifting Human Environment: How Trends in Human Geography Will Shape Future Military Operations* (Washington, DC: Center For Technology And National Security Policy, 2015), 9, accessed January 10, 2016, <http://ctnsp.dodlive.mil/files/2015/05/DTP-107.pdf>.

⁴ Ibid., 5.

⁵ Michael Evans, "The Case Against Megacities," *Parameters* 45, no. 1 (Spring 2015):

operations in megacities remain likely to differ only in scale and density from those of the past. Like all cities, megalopolises will continue to confront military professionals with the time-honored challenge of urban warfare.⁶ Evans offered a clear conclusion about megacities: despite its larger size, the fundamentals of urban warfare will probably remain the same for operations conducted in megacities or smaller cities. Based on Evans' analysis the problem could simply come down to a function of scale and scope—and yet, if correct, Evans' assertion leads to the logical conclusion that the sheer size of the megacity makes it even more important for the US Army to get the fundamentals right. The weight of evidence in recent studies, however, indicates that beyond mere effects of scale, army forces are likely to also encounter various dynamics unique to megacities, making the application of those fundamentals different than in the smaller cities where most of the US Army's experience currently lies.

Purpose and Significance

Reconnaissance provides a critical means to understand the operating environment. As described in US Army doctrine, it enables the combined arms team to obtain “information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographical, or geographic characteristics of a particular area.”⁷

Reconnaissance provides the commander an essential understanding of the enemy or operating environment, but the complex and massive scale of challenges in the megacity makes effective reconnaissance a particularly challenging task. Although megacities pose particular challenges to reconnaissance in urban operations, examination of reconnaissance operations in smaller urban

38.

⁶ Evans, “The Case *Against* Megacities,” 38.

⁷ Field Manual (FM) 3-90-2, *Reconnaissance, Security, & Tactical Enabling Tasks, Volume 2* (Washington, DC: Government Printing Office, 2013), 1-1.

areas, such as Grozny, Fallujah, and Sadr City offer significant lessons for how the Army can conduct reconnaissance to achieve understanding necessary for successful future operations.

Methodology

A brief description of the differences between a traditional urban environment and the megacity introduces the topic by revealing the characteristics that give megacities its complex nature. Examination of current urban operations doctrine reveals the degree to which current doctrine addresses the challenges of the megacity, and facilitates understanding of effective reconnaissance in the megacity. This introduction lays the foundation for analysis of capabilities and limitations of existing ISR in the megacity, focusing on a comparison of potential future technological and human-based solutions.

Three historical case studies provide evidence for hypothesis testing: US Army operations in Operation Phantom Fury in Fallujah, 2004, the Battle for Sadr City, 2008, and the Russian campaign in Grozny in 1995. The urban considerations for ISR as defined in FM 3-06, *Urban Operations*—early deployment, diversity, focus, integration, and flexibility—provide the specific means for analysis of air and ground urban reconnaissance effectiveness.⁸ These considerations have particular relevance to the urban environment, and reinforce the fundamentals of reconnaissance from Field Manual (FM) 3-90-2, *Reconnaissance, Security, & Tactical Enabling Tasks, Volume 2*. FM 3-90-2 lists seven fundamentals of reconnaissance: ensure continuous reconnaissance, do not keep reconnaissance assets in reserve, orient on the reconnaissance objective, report information rapidly and accurately, retain freedom of maneuver, gain and maintain enemy contact, and develop the situation rapidly.⁹ The findings from these case studies of smaller urban areas provide evidence of challenges for urban environments. Synthesis

⁸ Field Manual (FM) 3-06, *Urban Operations* (Washington, DC: Government Printing Office, 2013), 5-12.

⁹ FM 3-90-2, 1-2.

of findings across the case studies highlights those factors expected to have the greatest impact on effective reconnaissance. Finally, analysis places the findings within the context of the megacity, illustrating how the specific characteristics of these large cities would amplify the effect of urban environments on reconnaissance.

The conclusion includes implications and recommendations based on the findings from the case study analysis, and the implications for operational planners seeking to use reconnaissance more effectively to understand the megacity. Recommendations incorporate a combination of technological and human-based solutions to conduct reconnaissance more effectively through improved understanding of the unique operating environment of the megacity.

Background

Megacities and Urban Environments

The challenges of urban environments are not new to the United States Army. They will continue to exist within the megacity, and General Charles Krulak's three-block war best describes these challenges:

In one moment in time, our service members will be feeding and clothing displaced refugees—providing humanitarian assistance. In the next moment, they will be holding two warring tribes apart—conducting peacekeeping operations—and finally, they will be fighting a highly lethal mid-intensity battle—all on the same day...all within three city blocks. It will be what we call the “three block war.”¹⁰

The challenges of megacities, as described above, have generated significant discussion recently about the urban environment's possible impact on future Army operations. Rapid trends of urbanization and population growth will almost certainly present significant challenges for future US Army operations since the US Army has historically fought in cities quite frequently, and the world's cities will continue to grow larger in the coming years. The US Army's 2014 study of megacities and its impact illustrated the importance of megacities. The study's findings

¹⁰ FM 3-06, 1-7.

included several key facts and predictions: by 2030, cities will account for sixty percent of the world's GDP; currently half the world's population lives in cities; and daily an estimated 180,000 people across the globe migrate to cities, making the urban environment a key point of convergence for drivers of instability.¹¹ The potential for this instability to lead to conflict in these dense and massive cities could mean the future of Army operations will take place within megacities.

In order to grasp the significance of megacities, one must understand its defining characteristics. The United Nations defines a megacity as a city with more than ten million inhabitants.¹² This definition however, does not adequately distinguish megacities from other large urban areas. Kevin Felix and Frederick Wong have identified two distinguishing factors that provide insight regarding the megacity's significance: explosive population growth and potential volatility. A large urban area with slow or negligible population growth is unlikely to evolve into a megacity. For example, a city like St. Petersburg, which has seen low population growth, is not likely to develop into a megacity. In contrast, the city of Jakarta has seen extremely rapid growth, causing it to grow to megacity proportions.¹³ A large population increases the demand for resources. If those resources do not exist to support the growing population, then it will lead to Felix and Wong's second criteria, potential volatility.

Sprawling metropolises in the developing world with large, impoverished populations, inadequate resources, and poor infrastructure cannot support continued growth caused by mass

¹¹ Chief of Staff of the Army's Strategic Studies Group, *Megacities and the United States Army*, 4.

¹² David Shrunk, "Mega Cities, Ungoverned Areas, and the Challenge of Army Combat Operations in 2030-2040," *Small Wars Journal* (January 23, 2014): 1, accessed August 24, 2015, <http://smallwarsjournal.com/print/15177>.

¹³ Kevin M. Felix and Frederick D. Wong, "The Case for Megacities," *Parameters* 45, no. 1 (Spring 2015): 22.

migration to urban areas.¹⁴ Megacities such as Lagos, Rio de Janeiro, Mumbai, and Dhaka lack the resources and infrastructure to support their current populations; further growth only exacerbates these shortages. As migration to urban areas continues to place unsustainable resource demands on the world's megacities, governments will find it increasingly difficult to provide security and maintain order in those cities. This will lead to growth in the size and number of ungoverned spaces, which exceed the local capacity of law enforcement, public health, education, and other basic services, creating the potential for severe volatility.¹⁵

Megacities, merely as a function of its size, present challenges not found in typical urban areas. FM 3-06 states shaping operations are critical to urban operations, and "isolation of an urban environment is often the most critical component of shaping operations."¹⁶ Furthermore, physical isolation of smaller urban environments, which allow maneuver from the periphery, minimizes risk and disruption to combat operations and support operations. However, the scope and scale of a megacity can make such isolation impossible to accomplish due to the congestion, massive size, population, and other characteristics of a megacity.¹⁷ These tactics may prove useful in urban operations in smaller cities, but they could simply not work within the context of a megacity where operations will take place fully within urban terrain.

While it has not yet faced the immense challenges that seem inevitable when conducting operations in a megacity, the US Army has extensive experience with urban warfare. Given the likelihood of finding itself operating in a megacity at some point in the future, the US Army must take the opportunity in peacetime to learn from its previous experience of urban operations, such as those examined in this monograph. As asserted in various other studies, these historical urban

¹⁴ Bartone and Armbruster, *Shifting Human Environment*, 12.

¹⁵ Shrunk, "Mega Cities, Ungoverned Areas," 8.

¹⁶ FM 3-06, 6-3.

¹⁷ Chief of Staff of the Army's Strategic Studies Group, *Megacities and the United States Army*, 8.

operations can provide ample lessons for future operations in a megacity. As an example, Christopher Bowers argued contemporary operations in Sadr City offered a condensed version of what awaits in future megacities, and identified lessons scalable to the division or corps level for a wider megacity.¹⁸ By describing the destitute and overcrowded populations, lack of resources, government control, and potential for violence and instability, Bowers makes a compelling argument for using Sadr City as an example of future operations in a megacity.

In order to operate in this environment, FM 3-06 states that Army leaders conducting urban operations must “understand the urban environment to determine decisive points and precisely mass the effects of combat power to thoroughly engage them.”¹⁹

Unfortunately, the complexity of the urban environment does not lend itself easily to understanding, and this is especially true of megacities. In order to deal with this complexity, ATTP 3-06.11, *Combined Arms Operations in Urban Terrain* emphasizes the necessity of focusing efforts on controlling essential factors of urban areas for mission accomplishment.²⁰ Reconnaissance in the urban environment provides the focus necessary to understand the decisive points and conduct successful operations. However, the Army’s key reconnaissance manual, FM 3-90-2 describes the fundamentals of reconnaissance, but makes no mention of the urban environment.

Defining Urban ISR Considerations

As the Army’s fundamental field manual on reconnaissance, FM 3-90-2 needs more emphasis on reconnaissance in the urban environment. Since FM 3-90-2 does not provide the

¹⁸ Christopher O. Bowers, “Future Megacity Operations--Lessons Learned from Sadr City,” *Military Review*, (May-June 2015): 16.

¹⁹ FM 3-06, 1-2.

²⁰ Army Tactics, Techniques, and Procedures (ATTP) 3-06.11, *Combined Arms Operations in Urban Terrain* (Washington, DC: Government Printing Office, 2011), xx.

necessary level of detail, one must look elsewhere to find guidance for the execution of effective reconnaissance in the urban environment. Fortunately, FM 3-06, *Urban Operations* brings the subject of urban reconnaissance to the forefront: “successful urban operations depend on the successful conduct of urban reconnaissance.”²¹ It also defines the following considerations for ISR in the urban environment: early deployment, diversity, focus, integration, and flexibility.

Early deployment and employment of ISR assets offers the advantage of providing the time necessary to prepare for effective operations in the urban environment. Urban ISR collects an overwhelming amount of data, greatly increasing the time required to analyze this data. As staffs analyze information and use it to increase situational awareness, commanders continuously refine reconnaissance efforts to improve their understanding and visualization. This also includes the time necessary to request and receive limited national, strategic, and operational ISR capabilities. The same considerations apply for tactical reconnaissance from the ground and air, where the challenging terrain requires extensive time to observe and detect enemy and non-combatant dispositions and develop the situation. Time may not always allow for extensive early deployment, but it creates a more effective understanding of the urban environment.²²

A diverse group of ISR assets enables the development of a strong common operational picture in the urban environment. The challenging nature of urban terrain limits or degrades all ISR capabilities to varying levels. With diverse assets, the commander increases the breadth and depth of understanding in the urban environment. Unmanned aerial systems (UAS) can provide persistent surveillance for multiple hours and even days, but without human intelligence (HUMINT) sources such as networks and traditional ground reconnaissance, it can be difficult to determine enemy intent.²³ Diverse capabilities also minimize the ability of enemy forces to

²¹ FM 3-06, 5-9.

²² Ibid., 5-12.

²³ Although the official Army doctrinal term is UAS, remotely piloted vehicle (RPV) is

employ deception techniques and defeat friendly ISR efforts. Through the employment of diverse systems, the commander obtains a more complete picture of the environment and enemy situation.²⁴

Sufficient time and diverse capabilities enable commanders to identify and focus assets on carefully selected decisive points. Through effective analysis of centers of gravity and decisive points, the commander can frame ISR efforts in accordance with the commander's critical information requirements (CCIR). ISR must be focused on these requirements in order maximize the use of potentially limited assets in a highly complex environment. Without sufficient focus, units haphazardly develop a poorly integrated picture that consists of endless lists of data, providing little relevant or critical information.²⁵

The integration of a diverse group of ISR assets at an integrating headquarters provides the synergy necessary to maximize ISR effectiveness. Unit ISR plans must include vertical links between multiple ISR assets and higher headquarters, and they must provide for complementary coverage to avoid both intelligence gaps and unnecessary redundancy. Likewise, horizontal linkages between adjacent units in close proximity must rapidly and effectively share information. Commanders must organize their units effectively and train their staffs to process, analyze, and distribute a large volume of intelligence rapidly to higher, lower, and adjacent units. Without sufficient analysis, intelligence is not effective in creating understanding. For example, ISR efforts should support other staff processes such as targeting—this requires the processing of information into intelligence tailored for use in the targeting process. More often than not,

also commonly used.

²⁴ FM 3-06, 5-12.

²⁵ Ibid.

reconnaissance assets will make first contact with the enemy, and they will therefore act as triggers for future engagements.²⁶

Commanders rapidly respond to changing and unforeseen situations through flexible ISR. The challenging nature of urban ISR means efforts are likely to be unsuccessful, which will require frequent refinements to the ISR plan. Likewise, a developing situation may compel a different asset to change focus and provide a diverse capability in order to answer a CCIR. Flexibility largely depends on the availability of assets. A frequent point of friction, related to integration, arises when subordinate units cannot respond rapidly to a developing situation due to higher echelon control of ISR assets. The complex and challenging urban environment demands flexibility by delegating control of ISR assets to lower echelons, allowing rapid response to unforeseen challenges and opportunities.²⁷

Megacities will provide significant challenges to reconnaissance operations. Without having conducted prior operations in a megacity, the US Army must look to smaller urban operations in order to provide insight to overcome the challenges of megacities. Analysis of the historical case studies of Grozny, Fallujah, and Sadr City through the lens of these doctrinal ISR considerations provides insight regarding the manner in which US Army forces can overcome these various challenges and achieve the necessary understanding and visualization to function effectively in future urban operations—particularly within megacities—through effective reconnaissance efforts.

²⁶ Ibid., 5-13.

²⁷ FM 3-06, 5-14.

Case Studies

Grozny, 1995

Background

The Republic of Chechnya is located in the southwestern corner of Russia, near the Caspian Sea. It consists of approximately 6,500 square miles of territory, measuring up to seventy by one hundred miles.²⁸ In the early 1990s, it had a population of approximately 1.2 million, with the capital city of Grozny having a mixed Russian-Chechen population of approximately 490,000.²⁹ It shares a border with Dagestan to its north, east, south, and Georgia to its southwest. Its diverse terrain features include rolling steppes in the north and the Caucasus Mountains in the south. These mountains provided an effective barrier throughout history against the Arabs, Persians, Turks, and Mongols, resulting in a homogenous Chechen population.³⁰ The same geographic barriers to Chechnya's south were also of critical importance to Russia, with the rugged highlands providing defensible boundaries against historical Middle Eastern enemies.³¹ In addition to this defensible terrain, Russia's interests in Chechnya include access to the nearby Black Sea for warm water ports, as well as control of the energy pipeline from Baku to Novorossiisk, which traverses through Grozny—Russia's main pipeline for the extraction of oil reserves in the Caspian Basin.³²

²⁸ William G. Robertson and Lawrence A. Yates, ed., *Block by Block: The Challenges of Urban Operations* (Fort Leavenworth: Command and General Staff College Press, 2003), 161.

²⁹ Louis A. DiMarco, *Concrete Hell: Urban Warfare from Stalingrad to Iraq* (Oxford: Osprey, 2012), 151.

³⁰ Brett C. Jenkinson, "Tactical Observations From The Grozny Combat Experience" (master's thesis, US Army Command and General Staff College, 2002), 15.

³¹ Christine Jacobson and Josh Wilson, "Chechnya: A Difficult Cornerstone in Russian Security" (Woodside, CA: The School of Russian and Asian Studies), accessed December 10, 2015, <http://www.sras.org/chechnya>.

³² James Hughes, "Chechnya: The Causes of a Protracted Post-Soviet Conflict" (London: LSE Research Online, 2001), accessed December 12, 2015, http://eprints.lse.ac.uk/641/1/Hughes.Chechnya.Civil_Wars.pdf

The lack of geographic barriers facing north has left Chechnya vulnerable to Russian expansionist ambitions throughout its history. As an Islamic tribal, clan-based society, Chechens have warred with their Russian neighbors since the middle of the sixteenth century.³³ In the eighteenth century, Peter the Great's ambitions for warm water ports on the Black Sea and access to trade routes with Iran and British India inevitably led to conflict.³⁴ Peter gained the upper hand, but Chechens resisted Russian rule. In 1818, Russian soldiers erected 'Fortress Grozny' on the site of leveled Chechen villages in order to sever Chechen lines of communication from the mountains to the flatlands.³⁵ Chechen groups rebelled continuously between 1815 and 1860, when their decisive military defeat by Russian forces resulted in the emigration of upwards of 600,000 Muslims—including thousands of Chechens—to avoid Russian rule.³⁶

The German invasion of Russia during WWII presented an opportunity for Chechen liberation. Chechen rebels supported the Nazi invasion, which led to subsequent deportation of Chechen masses to Central Asia, resulting in horrible suffering for the Chechens.³⁷ In 1956, then First Secretary of the Communist Party and future Russian Premier Nikita Khrushchev, as part of his de-Stalinization campaign, granted amnesty to the Chechens, allowing the survivors to return home.³⁸ Although a positive change, the Chechen population grew by 251 percent from 1959 to 1989, threatening to destabilize Chechnya.³⁹

³³ James F. Pike, "Urban Operations in Chechnya: Lessons Learned and Implications for U.S. Urban Doctrine and Training" (master's thesis, US Army War College, 2001), 6.

³⁴ Jenkinson, "Tactical Observations From The Grozny Combat Experience," 16.

³⁵ Dale R. Smith, "Commonalities in Russian Military Operations in Urban Environments" (master's thesis, US Army Command and General Staff College, 2003), 23.

³⁶ Robert Seely, *Russo-Chechen Conflict, 1800-2000: A Deadly Embrace* (London: Frank Cass, 2001), 20.

³⁷ *Ibid.*, 9.

³⁸ Robertson and Yates, *Block by Block*, 161.

³⁹ Jenkinson, "Tactical Observations From The Grozny Combat Experience," 21.

In 1991, the rapid breakup of the Soviet Union presented an opportunity for Chechen nationalists. In August, a small revolution gained momentum when the Amalgamated Congress of the Chechen People invited former Soviet Air Force General Dzhokhar Dudayev to be president. Soon thereafter, Dudayev declared independence on September 6.⁴⁰ Aside from political embarrassment, Chechnya's position as a geostrategic door to the Middle East, and the presence of critical oil and natural gas pipelines, compelled inevitable Russian action to secure their interests.

At the time of the revolution, Russia could not militarily challenge Dudayev, and they withdrew military forces from Chechnya. With the secessionist movement growing stronger, Dudayev overthrew the Chechen Parliament and took sole control of the government.⁴¹ By late 1994, Russia appeared powerless to control Chechnya and other wayward provinces. Consequently, Russia covertly supported a coup to expel Dudayev and install a government favorable to Russia.⁴² It was a humiliating failure, and it eliminated all options short of direct military action to stabilize Chechnya.⁴³

Narrative

After the failed coup, President Boris Yeltsin ordered the military to disarm illegally armed bands and reestablish constitutional law and order in Chechnya.⁴⁴ Russia amassed 24,000 soldiers to defeat approximately 3,000 to 4,000 Chechen fighters.⁴⁵ In the first stage, the Russian

⁴⁰ Smith, "Commonalities in Russian Military Operations," 25; Robertson and Yates, *Block by Block*, 163.

⁴¹ Pike, "Urban Operations in Chechnya," 6.

⁴² Robertson and Yates, *Block by Block*, 163.

⁴³ Smith, "Commonalities in Russian Military Operations," 26.

⁴⁴ Robertson and Yates, *Block by Block*, 164.

⁴⁵ DiMarco, *Concrete Hell*, 156; Jenkinson, "Tactical Observations From The Grozny Combat Experience," 31.

plan involved encircling Grozny and focusing on conducting reconnaissance. The next stage included the assault from north to south to capture key facilities, such as the Presidential Palace.⁴⁶

In planning, Russian analysts or commanders never questioned—or possessed the capacity to question—overly simplistic intelligence estimates, which underestimated Chechen abilities and tenacity.⁴⁷ Although Russian forces had ample time to conduct reconnaissance, the Russians assumed the Chechens would not challenge Russian forces. Stemming from overconfidence and budgetary issues, Russian officials turned off satellites to save money, denying combat forces access to critical intelligence.⁴⁸ Likewise, Russian headquarters were hesitant to provide assets such as the Shmel remotely piloted vehicle to subordinates, which further limited intelligence to maneuver units.⁴⁹ The overall assessment represented the outcome of an egregious failure of Russian intelligence and reconnaissance. In the words of urban guerrilla warfare expert Anthony Joes, “Russian planners did not realize the Chechens had been preparing for months to defend Grozny, that indeed they had tanks, rocket launchers, and antiaircraft units and were ready to put up a furious fight.”⁵⁰

On December 31, 1994, Russian armored columns assaulted Grozny, anticipating a fight lasting no more than five to six days to cleanse the city of Chechen fighters.⁵¹ The uncoordinated assault came from multiple directions, with two brigades not participating due to New Year’s Eve

⁴⁶ Olga Oliker, *Russia's Chechen Wars 1994-2000: Lessons from Urban Combat* (Santa Monica: RAND, 2001), 30.

⁴⁷ Oliker, *Russia's Chechen Wars 1994-2000*, 30.

⁴⁸ Norman Lee Cooling, “Shaping The Battlespace To Win The Street Fight” (master’s thesis, United States Marine Corps Command and Staff College, 2000), 112.

⁴⁹ Timothy L. Thomas, “Air Operations in Low Intensity Conflict: The Case of Chechnya,” *Airpower Journal* (Winter 1997): 56.

⁵⁰ Anthony James Joes, *Urban Guerrilla Warfare* (Lexington: University Press of Kentucky, 2007), 139.

⁵¹ Robertson and Yates, *Block by Block*, 169.

celebrations and lack of preparation.⁵² Mr. Timothy Thomas assessed, “reconnaissance was poorly conducted, and Chechen strong points were not uncovered.”⁵³ As a result, General Grachev, commander of Russian forces, sent armored forces into the city with insufficient infantry support, because of poor intelligence and flawed assumptions.⁵⁴ The 131st Motorized Rifle Brigade (MRB), expecting merely to conduct a show of force, moved forward with no organic ground reconnaissance forces deployed, which blinded them to Chechen fighters and defenses. Russian forces used aerial reconnaissance in lieu of risking ground ISR assets, which included the use of remotely piloted vehicles for the first time.⁵⁵ The Chechens avoided enemy contact with the 131st until the unit reached the train station, where the Chechens encircled and attacked the 131st with devastating fire.⁵⁶ The 131st narrowly avoided destruction and withdrew on January 3, 1995.⁵⁷ Chechens ambushed the 81st Motorized Rifle Regiment (MRR) within blocks of the Presidential Palace, retreating after several hours of sustained combat and leaving behind dozens of abandoned and destroyed Russian tanks and personnel carriers.⁵⁸ It was an embarrassing defeat. The 131st MRB lost 20 of 26 tanks and 102 of 120 armored personnel carriers. The 81st MRR lost approximately sixty armored vehicles and several hundred casualties.⁵⁹ As Thomas pointed out, despite all of the casualties incurred Russian forces did not

⁵² Smith, “Commonalities in Russian Military Operations,” 35; Pike, “Urban Operations in Chechnya,” 19.

⁵³ Timothy L. Thomas, “The Battle of Grozny: Deadly Classroom for Urban Combat,” *Parameters* (Summer 1999): 87-102, accessed 11 December 2015, <http://fmso.leavenworth.army.mil/documents/battle.htm>.

⁵⁴ Cooling, “Shaping The Battlespace To Win The Street Fight,” 116.

⁵⁵ Oliker, *Russia's Chechen Wars 1994-2000*, 40; Cooling, “Shaping The Battlespace To Win The Street Fight,” 112.

⁵⁶ Robertson and Yates, *Block by Block*, 170.

⁵⁷ Jenkinson, “Tactical Observations From The Grozny Combat Experience,” 63-4.

⁵⁸ DiMarco, *Concrete Hell*, 158-60.

⁵⁹ *Ibid.*, 161-2.

capture a single prisoner, effectively denying Russian forces any HUMINT, a critical form of intelligence for urban fighting. This problem continued to hamper their operations.⁶⁰

After a bloody repulse, both sides consolidated and reorganized their forces.⁶¹ Russian forces, instead of identifying enemy positions with reconnaissance, resorted to artillery to pound the Chechens into submission. Russians used artillery at a rate of fifteen to twenty shells per minute to minimize risk to their own forces.⁶² Ineffective reconnaissance and poor integration neutralized the strength of Russian artillery and airpower. Proper use of reconnaissance assets would have prevented this and made Russian targeting much more effective. Reconnaissance units, including the specially trained Spetsnaz forces, seized and held important facilities and escorted individual convoys instead of doing their job.⁶³ As a result, Russian pilots “had no reliable data on the disposition of Chechen weapons, forcing crews to operate from maximum possible ranges when employing their armament.”⁶⁴ Likewise, targeting of enemy positions also suffered due to poor coordination with ground troops. Thomas noted targeting was “aggravated by the absence of timely and accurate reconnaissance information.”⁶⁵ Fighting did not get any easier, and both sides agreed to a cease-fire on January 10.

On January 12, Russian forces attacked again, deliberately clearing city blocks towards their original objectives of the railway station and the Presidential Palace. They seized the Palace on January 19, but this did not end Chechen resistance. On February 8, the Russians declared

⁶⁰ Timothy L. Thomas, “The Caucasus Conflict and Russian Security: The Russian Armed Forces Confront Chechnya III. The Battle for Grozny, 1-26 January 1995,” *Journal of Slavic Military Studies* 10, no. 1 (March 1997): 50-108, accessed 5 December 2015, <http://fmso.leavenworth.army.mil/documents/chechpt3.htm>.

⁶¹ Robertson and Yates, *Block by Block*, 174.

⁶² *Ibid.*, 176.

⁶³ Timothy L. Thomas, “The Caucasus Conflict and Russian Security,” 50-108; Cooling, “Shaping The Battlespace To Win The Street Fight,” 111-12.

⁶⁴ Thomas, “Air Operations in Low Intensity Conflict,” 55.

⁶⁵ *Ibid.*, 54.

eighty percent of the city under their control, but localized and ineffective resistance continued until the Chechen defeat on February 23.⁶⁶ Fighting in Grozny began with the expectation of five to six days to clear the city, but it ended up taking Russian military forces fifty-four days to defeat the Chechens and control Grozny.

Analysis

Russian forces neglected reconnaissance due to arrogance and poor enemy estimates. As a result, Russian commanders and soldiers were not prepared to fight a determined enemy in very complex and challenging terrain. Before the commencement of offensive operations, the Russians had ample time to plan their offensive and conduct a deliberate reconnaissance to confirm enemy disposition and intent. FM 3-06 states, in the urban environment, “Commanders should consider that ISR assets will normally take longer to gather data amid the complexity.”⁶⁷ A lengthy reconnaissance of Grozny, by even the most basic means, would have refuted the simplistic Russian assessment, increased their effectiveness, and avoided an embarrassment that garnered worldwide attention.

Reconnaissance efforts were also one dimensional, which severely limited Russian understanding of the enemy situation in complex urban terrain. Diverse ISR capabilities overcome weaknesses of individual systems and provide the pieces of relevant information to identify objectives.⁶⁸ Since the Russians did not expect significant resistance, they did not deploy traditional ground based reconnaissance, and relied on aerial reconnaissance. Furthermore, the lack of HUMINT sources during planning and execution also limited understanding of enemy

⁶⁶ DiMarco, *Concrete Hell*, 163; Robertson and Yates, *Block by Block*, 183.

⁶⁷ FM 3-06, 5-12.

⁶⁸ Ibid.

intent and assessment.⁶⁹ Although HUMINT is challenging in an occupied city like Grozny, it is one of the most valuable sources for information regarding the situation in an urban area.⁷⁰

Likewise, this very one-dimensional reconnaissance effort lacked the integration and synchronization of complementary reconnaissance capabilities required for effective intelligence gathering. As described in FM 3-06, “essential to urban ISR is the link between all of these sources, either directly or through an integrating headquarters.”⁷¹ Since Russian ISR was not synchronized and integrated, “ground reconnaissance efforts in Grozny often occurred too late and with insufficient focus.”⁷² By neglecting ground reconnaissance, Russian forces missed critical intelligence about Chechen disposition and intent, which contributed to their failure in Grozny.

Poor integration between Russian targeting and ISR assets also prevented effective targeting and destruction of enemy forces. Although the Russians used overwhelming firepower in Grozny, it was ineffective because Russian forces did not use reconnaissance to identify and direct fires onto enemy positions. Vertical integration between strategic, operational, and tactical intelligence also suffered, which included the restriction or limited use of strategic and operational intelligence. In accordance with FM 3-06, ISR must be vertically linked, and the vertical links ensure rapid information flow between the levels of command.”⁷³ In Grozny, this did not happen. “Russian intelligence failed to provide and disseminate timely and reliable data from agent sources or technical reconnaissance systems.”⁷⁴ This denial of valuable intelligence assets in a challenging urban environment also meant Russian forces could not be flexible to react

⁶⁹ Thomas, “The Battle of Grozny: Deadly Classroom for Urban Combat.”

⁷⁰ FM 3-06, 5-11.

⁷¹ FM 3-06, 5-13.

⁷² Brian A. Keller, “Intelligence Support to Military Operations on Urban Terrain: Lessons Learned From The Battle of Grozny” (master’s thesis, US Army War College, 2000), 19.

⁷³ FM 3-06, 5-13.

⁷⁴ Thomas, “The Caucasus Conflict and Russian Security.”

to unforeseen circumstances. Commanders were blind to the enemy, and when they faced a different situation than expected, they did not have the necessary intelligence assets to understand the situation and take effective action, resulting in casualties.

The Russian forces possessed adequate intelligence and reconnaissance capabilities, but failed to apply them correctly to understand the urban environment. Russian reconnaissance never validated intelligence estimates, which enabled a lightly armed irregular force to deliver a significant setback to a much superior force. An early and deliberate reconnaissance, using a diverse collection of ISR assets would have easily identified enemy defenses and provided indications of Chechen intent and capability to resist the Russian attack. Use of both ground and air reconnaissance would have provided a more complete common operational picture. Russian withholding of strategic reconnaissance assets also prevented effective integration and focus of ISR efforts on the decisive points of Chechen defenses. Poor consideration of the challenges of urban ISR forced Russian forces to conduct urban operations without essential intelligence to be successful. A proper consideration of urban ISR would have identified these challenges, and possibly enabled a Russian victory, or at a minimum significantly reduced Russian casualties.

Fallujah, 2004

Background

Fallujah occupies twenty-five square kilometers, with approximately 50,000 structures on 2,000 city blocks.⁷⁵ In 2003, population estimates varied between 250,000 and 350,000 residents. Fallujah has always had a tough reputation. Author Francis West noted, “Fallujah is strange, sullen, wild-eyed, badass, just plain mean. Fallujahns don’t like strangers, which includes anyone not homebred.”⁷⁶ Even Saddam Hussein ignored Fallujah’s illegal smuggling activities to ensure

⁷⁵ Timothy S. Williams and Nicholas J. Schlosser, *U.S. Marines in Battle: Fallujah November-December 2004* (Quantico: History Division, United States Marine Corps, 2014), 3.

⁷⁶ Francis J. West, *No True Glory: A Frontline Account of the Battle for Fallujah* (New

the loyalty of the sheikhs of Fallujah. Consequently, Saddam's defeat and the resulting occupation was a direct challenge to many Fallujahns' economic way of life.⁷⁷ The dissolution of the Iraqi Army left many Fallujahns disgraced and unemployed, thus setting the conditions for a growing anti-coalition insurgency.

The rapid defeat of the Iraqi Army did not account for stability operations, and American forces' haphazard efforts and presence in Fallujah did little to improve the increasingly volatile situation. In the summer and fall of 2003, four separate American units fought the growing insurgency by trying to win hearts and minds—but American commanders had little money for economic development and they often responded to small-scale attacks with heavy firepower, creating anti-American resentment among the populace.⁷⁸ The 3rd Brigade, 82nd Airborne Division took an especially aggressive approach in Fallujah. Religious leaders responded by openly advocating violence against the Coalition.⁷⁹ As tensions in Fallujah climbed, American forces withdrew from the city at the request of local government and limited their presence and that of other Coalition forces to a minimum, enabling the insurgency to grow unchecked.

In March, I Marine Expeditionary Force (MEF) took over Anbar province, and 1st Marine Division (1st MARDIV) assumed responsibility for Fallujah. The Marines tried to avoid the previous aggressive approaches, and instead engaged the population with civil projects. Like previous coalition forces, the Marines lacked the resources to conduct a stability campaign effectively, which soon made them a target of growing resentment and violence. The tension peaked on March 31, 2004 when insurgents murdered four Blackwater contractors, burning their

York: Bantam Books, 2005), 13.

⁷⁷ Richard D. Camp, *Operation Phantom Fury: The Assault and Capture of Fallujah, Iraq* (Minneapolis: Zenith Press, 2009), 13-5.

⁷⁸ West, *No True Glory*, introduction.

⁷⁹ Vincent L. Foulk, *The Battle for Fallujah: Occupation, Resistance and Stalemate in the War in Iraq* (Jefferson: McFarland & Company, 2007), 14.

bodies and hanging them from a bridge.⁸⁰ This incident received international attention, and it compelled Coalition forces in Iraq to retaliate.⁸¹ In April 2004, I MEF began Operation Vigilant Resolve to locate those responsible for the murders. Intense urban combat resulted in many civilian deaths, which attracted negative media attention and led Coalition headquarters to suspend offensive operations after six days.⁸² The Iraqi Fallujah Brigade assumed responsibility for security in Fallujah as part of an agreement to minimize the violence by removing non-Iraqi Coalition forces from the city. Abu Musab al-Zarqawi, the leader of Al-Qaeda in Iraq, exploited the situation by using Fallujah as a base of operations to launch terror attacks against Baghdad, foreigners, coalition forces, and Iraqi Shiites. By the end of the summer, the failure of the Iraqi Fallujah Brigade to stabilize the situation led to total lawlessness in Fallujah. The Coalition's operational approach shifted from stability-focused efforts to a deliberate clearing operation aimed at defeating the insurgency and restoring government control.⁸³

Narrative

Coalition headquarters set Operation Phantom Fury (Al-Fajr) for late 2004, and ordered I MEF and 1st MARDIV to destroy anti-Iraqi forces in Fallujah in order to establish legitimate Iraqi government control. In the first phase, the Coalition focused on setting conditions for success during the upcoming assault. During this shaping phase, 1st MARDIV made exceptional use of ISR to understand the terrain and enemy situation in Fallujah. The Marines used every conceivable asset, including Special Forces, HUMINT, unmanned aerial systems, and satellites to

⁸⁰ Foulk, *The Battle for Fallujah*, 22. Blackwater USA was an American private security contractor with an unknown number of personnel in Fallujah 2004. Officially, they protected food shipments and other non-combatant services, but their unofficial role in security is subject to much controversy. At this time, they were operating in Fallujah on a routine basis.

⁸¹ Williams and Schlosser, *U.S. Marines in Battle: Fallujah*, 2.

⁸² Kenneth W. Estes, *U.S. Marines in Iraq, 2004-2005: Into the Fray* (Quantico: History Division, United States Marine Corps, 2011), 2.

⁸³ Williams and Schlosser, *U.S. Marines in Battle: Fallujah*, 3-4.

create a clear picture of the situation.⁸⁴ The Marines also used SIGINT (signals intelligence) as a critical component of their reconnaissance effort. Major General Natonski commented, “whenever we did any of our kinetic shaping . . . it was always important to make sure that 2d Radio Battalion [SIGINT] was collecting” to identify the presence and general location of command cells.⁸⁵ SIGINT was effective, but could not provide a complete picture, since it could not completely penetrate the old Byzantine section of the city.⁸⁶ Due to enemy occupation of Fallujah, the Marines relied heavily on UASs, both organic and attached, gathering intelligence around the clock to identify insurgent fighting positions, weapons caches, and other intelligence.⁸⁷ Colonel Knapp, the 1st MARDIV chief of staff commented, “we had a great picture of the enemy as we got ready for Fallujah II . . . the big difference was we had lots of time to shape the enemy.”⁸⁸ 1st MARDIV intelligence efforts revealed an enemy willingness to fight in depth along Route 10, as well as the location of enemy strongholds in the Jolan, Sook, and Muallimeen Districts.⁸⁹

Recognizing the severity of the enemy situation, 1st MARDIV requested additional forces for the assault and organized into several groups. Regimental Combat Team 1 (RCT-1) included 3/5 Marines, 3/1 Marines, and the Army’s 2nd Squadron, 7th Cavalry (Task Force (TF)

⁸⁴ Kendall D. Gott, ed., *Eyewitness to War, Volume I: The US Army in Operation Al Fajr* (Fort Leavenworth: Combat Studies Institute Press, 2006), 8.

⁸⁵ Major General Natonski, interview by Lieutenant Colonel John R. Way, March 16, 2005, Camp Pendleton, CA, in *Al-Anbar Awakening, Volume I, American Perspectives U.S. Marines and Counterinsurgency in Iraq 2004-2009*, ed. Timothy S. McWilliams and Kurtis P. Wheeler, (Quantico: Marine Corps University Press), accessed January 10, 2016, [http://www.hqmc.marines.mil/Portals/61/Docs/Al-AnbarAwakeningVolI\[1\].pdf](http://www.hqmc.marines.mil/Portals/61/Docs/Al-AnbarAwakeningVolI[1].pdf).

⁸⁶ Interview of Major General Natonski, Commander 1st MARDIV and his Command and Staff, by United States Marine Corps Center for Lessons Learned, Camp Pendleton, CA, December 9, 2005, 11.

⁸⁷ Williams and Schlosser, *U.S. Marines in Battle: Fallujah*, 6.

⁸⁸ Natonski, interview, December 9, 2005.

⁸⁹ Estes, *U.S. Marines in Iraq, 2004-2005*, 59.

2-7 CAV). Regimental Combat Team 7 (RCT-7) consisted of 1/8 Marines, 1/3 Marines, and the US Army's 2nd Battalion, 2nd Infantry (TF 2-2). The 2nd Brigade Combat Team (2nd Brigade, 1st Cavalry Division) was the blocking force to Fallujah's south and east. Last, the Coalition plan included Iraqi Security Forces (ISF) selected because of their regional alignment outside of Anbar province to avoid the tension of Iraqi soldiers fighting amongst their own tribes.⁹⁰

The Army and Marine units integrated effectively, but they experienced significant challenges with intelligence sharing because they used a sizable number of different systems on a crowded and chaotic battlefield. TF 2-7 cited dissimilar systems as a cause of delays in intelligence distribution, which became quite slow and cumbersome at times.⁹¹ As an example, the Marines used a chat-based server to exchange intelligence, which was foreign to the Army. Captain Natalie Friel, the assistant intelligence officer for TF 2-2, stated "I think they (Marines) were getting better information because they all had these Microsoft chat things down to a lower level . . . I felt like they were getting a more up to date feed as far as spot reports."⁹² Despite this, 1st MARDIV overcame this friction and ensured consistent integration by providing lower echelons access to real-time intelligence. A video feed from Scan Eagle, Dragon Eye (USMC), and Shadow (US Army) flowed directly to their combat operations centers (COC), down to the battalion level. According to Colonel Knapp, "the feed made all the difference in the world."⁹³

As the operation commenced, 1st MARDIV isolated Fallujah prior to the main assault to deny insurgent exit and reinforcement of the city. On November 5, 2nd BCT isolated Fallujah from the south and east, and conducted limited offensive operations to disrupt insurgent activity.

⁹⁰ Williams and Schlosser, *U.S. Marines in Battle: Fallujah*, 8.

⁹¹ Matt. M. Matthews, *Operation AL FAJR: A Study in Army and Marine Corps Joint Operations* (Fort Leavenworth: Combat Studies Institute), 78.

⁹² Kendall D. Gott, ed., *Eyewitness to War, Volume II: The US Army in Operation Al Fajr*, (Fort Leavenworth: Combat Studies Institute Press, 2006), 66.

⁹³ Natonski, interview, December 9, 2005.

Traditional mounted scouts disrupted insurgent forces and engaged enemy positions.⁹⁴ 1st MARDIV also employed snipers to conduct passive surveillance and reconnaissance by fire in southern Fallujah as a part of shaping operations before the assault, identifying multiple enemy positions.⁹⁵

The assault began on the night of November 7, 2004 with the 3rd LAR and 36th Commando Battalion's seizure of the hospital.⁹⁶ Marine intelligence identified the hospital on the southwest of Fallujah as a key insurgent command and control node.⁹⁷ On the north side of Fallujah, RCT-7, followed by RCT-1 breached enemy defenses to begin its assault. RCT-1, the 1st MARDIV main effort, attacked rapidly north to south along the west side of the city, seizing the Jolan Heights. Thorough intelligence identified the Jolan District as the spiritual center and most crucial position in the city.⁹⁸ RCT-7 attacked to the east of RCT-1 from north to south, protecting RCT-1's east flank and seizing several key objectives. Despite some delays, the penetration went faster than expected. The shaping operations and months of ISR provided a remarkably accurate picture of the enemy situation in Fallujah.⁹⁹

Once the assault began, the integration and flexibility of 1st MARDIV ISR played a critical role in the success of the operation. 1st MARDIV ISR supported targeting, ground maneuver forces, and rapidly adjusted to the demands of a chaotic battlefield. Major Hesterman, RCT-7 aviation officer stated, "UAVs were essential in identifying hostile action or proving hostile intent so that the target could be engaged. A majority of our shaping targets that we hit

⁹⁴ Gott, *Eyewitness to War, Volume II*, 233.

⁹⁵ Camp, *Operation Phantom Fury*, 146.

⁹⁶ Richard S. Lowry, *New Dawn: The Battles for Fallujah* (New York: Savas Beatie, 2010), 106.

⁹⁷ John R. Ballard, *Fighting for Fallujah: A New Dawn for Iraq* (Westport: Praeger Security International, 2006), 50.

⁹⁸ Williams and Schlosser, *U.S. Marines in Battle: Fallujah*, 9.

⁹⁹ Camp, *Operation Phantom Fury*, 192, 158.

were based on Scan Eagle, Pioneer, and Dragon Eye.”¹⁰⁰ 1st MARDIV also engaged enemy targets with indirect fire using scouts in Humvees equipped with the precise LRAS (long-range advanced scout surveillance system).¹⁰¹ The omnipresence of Marine ISR had a powerful effect on the insurgents. Author Richard Lowry wrote, “If they revealed their positions they would be destroyed; if they went out in the open with a weapon or moved outside in large groups, they would be immediately detected.”¹⁰²

The relative ease with which the 1st MARDIV ISR assets made the transitions between gathering intelligence, supporting maneuver forces, and targeting the enemy highlights the flexibility of the ISR efforts in Fallujah. Captain Coley Tyler, the fire support officer for 2-7 CAV, described the fluid nature of the situation: when someone needed air support, “you never had to wait for it . . . and then you went through the process of talking them onto the target, doing reconnaissance, whatever you needed them to do.”¹⁰³

By the end of November 10, both RCTs met their initial objectives and assaulted to Phase Line Fran, running east to west across central Fallujah. At this point, bypassed enemy insurgents attacked Marines behind their front lines and disrupted operations. Captured prisoners revealed the existence and location of a previously missed extensive tunnel network, which allowed insurgents to reenter cleared houses and engage Marines.¹⁰⁴ The 1st MARDIV commander, Major General Natonski, directed two battalions to clear its sectors north, while the RCTs continued the assault south.¹⁰⁵ Simultaneously, Major General Natonski ordered reconstruction and stability

¹⁰⁰ Ibid., 146.

¹⁰¹ Gott, *Eyewitness to War, Volume I*, 224.

¹⁰² Lowry, *New Dawn: The Battles for Fallujah*, 128.

¹⁰³ Gott, *Eyewitness to War, Volume II*, 145.

¹⁰⁴ Ibid., 64.

¹⁰⁵ Williams and Schlosser, *U.S. Marines in Battle: Fallujah*, 39, 48.

operations to begin under the 4th Civil Affairs Group, commanded by Colonel John R. Ballard, well before Fallujah was secure.

I can remember going in with Colonel [John R.] Ballard probably around the 11th of November. We were still getting shot at, and I said, 'John, you are going to set up your CMOC [Civil Military Operations Center] over there in the government center?' And we walked over there, and I said, 'I want you in there tomorrow.' They were moving in as the fighting was going on.¹⁰⁶

The rapid initiation of stability operations was critical because it gained further access to HUMINT.¹⁰⁷ By the end of November 12, RCT 1 and 7 completed its assault to the southern edge of Fallujah. After reaching the outskirts of the city, these units turned north and cleared any bypassed insurgents.¹⁰⁸

Analysis

1st MARDIV deployed its ISR early and continuously, taking advantage of the time available to collect and analyze a large volume of intelligence. As described in FM 3-06, "commanders should consider that ISR assets will normally take longer to gather data amid the complexity [of the urban environment]."¹⁰⁹ 1st MARDIV conducted satellite and aerial surveillance for months prior to the assault, identifying obstacles, fighting positions, strong points, and most importantly enemy intent. As the assault date got closer, the Marines employed a wide range of ISR assets and capabilities to gain incredible understanding of the enemy situation and urban terrain, which greatly enhanced their chances of success in the upcoming assault.

In addition to deploying ISR early, 1st MARDIV deployed a very diverse set of capabilities to gain understanding in Fallujah. According to FM 3-06, diverse capabilities each

¹⁰⁶ Major General Natonski, interview by Lieutenant Colonel John R. Way, 94.

¹⁰⁷ Ballard, *Fighting for Fallujah*, 71.

¹⁰⁸ Camp, *Operation Phantom Fury*, 269.

¹⁰⁹ FM 3-06, 5-12.

contribute pieces of relevant information, and no single ISR capability can single-handedly penetrate the complex urban environment.¹¹⁰ Aerial ISR, such as satellites, UASs, and rotary wing aviation, were very helpful, but they could not provide a complete picture of the enemy situation. This required the use of other ISR means, such as ground reconnaissance, Special Forces, SIGINT, and HUMINT. Marine efforts to gain HUMINT were of particular significance, since “human intelligence will be one of the most valuable sources for information regarding the situation inside an urban area.”¹¹¹

The integration of these ISR assets posed certain challenges to the 1st MARDIV. FM 3-06 indicates, “Essential to urban ISR is the link between all of these sources, either directly or through an integrating headquarters.”¹¹² The different units and systems in Operation Phantom Fury created additional friction due to different systems and tactics, techniques, and procedures (TTPs). Despite these issues, 1st MARDIV effectively linked its ISR and overcame these struggles. FM 3-06 states, units must vertically link ISR in order to ensure rapid information flow.¹¹³ 1st MARDIV overcame its systems issues, and eventually ensured access to real time intelligence through UAS feeds to the battalion level. With intelligence disseminated rapidly to lower echelons, Marine and Army units were able to react quickly and stay ahead of the insurgents.

1st MARDIV also integrated its ISR and targeting processes. According to FM 3-06, units integrate ISR operations into the planning system, especially the targeting process.¹¹⁴ Marine UAS were often the first elements to make enemy contact, and they were extremely

¹¹⁰ Ibid.

¹¹¹ FM 3-06, 5-11.

¹¹² Ibid., 5-13.

¹¹³ Ibid.

¹¹⁴ Ibid.

effective at identifying and destroying insurgent position. Likewise, the Marines also used ground reconnaissance in the form of mounted scouts operating with the LRAS to identify and engage insurgent positions with remarkable precision. This fluid integration resulted in the destruction of over 300 enemy positions in Fallujah.¹¹⁵

Effective urban operations also require flexible ISR. As noted in FM 3-06, ISR in the urban environment must meet unforeseen challenges and opportunities.¹¹⁶ The consistently high tempo of intelligence and shaping operations required flexible ISR to achieve success. Repeatedly, 1st MARDIV conducted shaping operations to collect intelligence, enabling quick planning and execution of follow-on operations to take advantage of fleeting opportunities.¹¹⁷ Likewise, the ability of ISR assets to shift from rapidly targeting the enemy to conducting reconnaissance with relative ease highlights the flexibility of Marine ISR to react in a complex battlefield.

In conclusion, the hard fighting in Fallujah provided many lessons for conducting reconnaissance in an urban environment or megacity. Through extensive and lengthy shaping operations, the Marines developed detailed understanding of the urban environment and the enemy. 1st MARDIV created an accurate picture of the operating environment with air and ground reconnaissance. During the fighting, 1st MARDIV effectively integrated these assets to identify and destroy insurgent positions before they engaged Coalition forces. 1st MARDIV delegated ISR access to lower echelons to optimize its use during operations. 1st MARDIV clearly took the considerations of urban ISR into account during operations in Fallujah, and it played a major role in its successful assault.

¹¹⁵ Michael Evans, *City Without Joy: Urban Military Operations into The 21st Century* Australian Defence College Occasional Series (Canberra: Department of Defense, October 2007), 17.

¹¹⁶ FM 3-06, 5-14.

¹¹⁷ Natonski, interview, December 9, 2005.

Sadr City, 2008

Background

Sadr City is a twenty-six square kilometer residential district in northeast Baghdad, with a population of approximately 2.4 million residents. Densely populated, it is typical for a 900-square-foot home to occupy between ten and thirty people.¹¹⁸ The predominantly Shia district is also considered one of the largest slums on earth.¹¹⁹

The creation of Sadr City dates back to 1958 when Colonel Qasim overthrew the monarchy and rebuilt the existing migrant Shia settlement in Baghdad. His subsequent assassination and the rise of the Baath Party and Saddam Hussein ushered in decades of oppression for the Shia underclass.¹²⁰ Against this background, Mohammed Sadiq al-Sadr, father of Muqtada al-Sadr, spoke out against the regime and organized charitable operations for the Shia. Author Nicholas Krohley argued that, for the Shia poor, his efforts were often “the only source of material and spiritual comfort in a time of endemic poverty, hunger, and disease.”¹²¹ Al-Sadr’s growing support and vocal criticism of the regime ultimately contributed to the assassination of him and his two eldest sons in 1999.¹²²

Following Hussein’s fall in 2003, Shia optimism quickly turned to frustration as the Coalition failed to enact effective governance. Al-Sadr quickly mobilized his supporters and provided a framework for governance, taking over basic services such as trash collection, traffic

¹¹⁸ Michael Knights, “No-Go-No-More: The Battle for Sadr City,” *Jane’s Intelligence Review* 20, no. 7 (12 June 2008): 1; Boone Cutler, *Voodoo in Sadr City: The Rise of Shiaism in Iraq* (Bloomington: Authorhouse, 2010), 51.

¹¹⁹ Bowers, “Future Megacity Operations,” 9.

¹²⁰ Nicholas Krohley, *The Death of the Mehdi Army: The Rise, Fall, and Revival of Iraq’s Most Powerful Militia* (New York: Oxford University Press, 2015), 25, 37.

¹²¹ *Ibid.*, 52.

¹²² Anthony H. Cordesman and Jose Ramos, *Sadr and the Mahdi Army: Evolution, Capabilities, and a New Direction* (Washington, DC: Center for Strategic & International Studies, 2008), 6.

policing, and running schools and clinics.¹²³ Bowers argued that support for al-Sadr was unquestioned, with one citizen claiming, “even if you paved my street in gold, I’d still follow Muqtada al-Sadr.”¹²⁴ Al-Sadr also directed his fervent following to use violence against coalition forces.¹²⁵ Subsequently, the CPA (Coalition Provisional Authority) closed al-Sadr’s newspaper and branded him an outlaw.¹²⁶ On April 4, 2004, the Jaish-al Mahdi militia (JAM) launched counterattacks throughout Iraq, with a fierce battle in Sadr City that killed seven and wounded 52 soldiers.¹²⁷ Coalition pressure quickly overwhelmed Sadr’s forces, eliminating Sadr’s gains and forcing a cease-fire in June 2004.¹²⁸ Sadr City remained a contested area for years, but in October 2007, Prime Minister Maliki declared Sadr City off limits to Coalition forces, allowing JAM to gain strength in Baghdad.¹²⁹

In late winter 2007, the surge successfully reduced the Sunni insurgency, which allowed a Coalition shift in focus to al-Sadr’s militias. Until spring 2008, surge forces bypassed Sadr City because Al-Qaeda in Iraq (AQI) was the main threat, expected resistance was high, and there were significant political ramifications.¹³⁰ Finally, with the Sunni insurgency reduced and a pressing need to take action against rogue Shia elements, Maliki launched Operation Charge of

¹²³ Knights, “No-Go-No-More,” 2.

¹²⁴ Bowers, “Future Megacity Operations,” 12.

¹²⁵ Krohley, *The Death of the Mehdi Army*, 65.

¹²⁶ Donald P. Wright and Timothy R. Reese, *On Point II: The United States Army in Operation Iraqi Freedom, May 2003-January 2005*, 39.

¹²⁷ John C. Moore, “Sadr City: The Armor Pure Assault in Urban Terrain,” *Armor Magazine*, (November-December 2004): 31.

¹²⁸ Wright and Reese, *On Point II*, 41.

¹²⁹ Bowers, “Future Megacity Operations,” 13.

¹³⁰ Marissa Cochrane, “Summer 2007 - Summer 2008: Special Groups Regenerate” (The Institute For The Study of War, [Theweeklystandard.com](http://theweeklystandard.com), (August 29, 2008): 4, accessed December 11, 2015, <http://www.understandingwar.org/report/special-groups-regenerate>.

the Knights to seize Basra from JAM control.¹³¹ Maliki's victory had strategic implications because it gained him support among the Sunnis and Kurds for taking action against al-Sadr.¹³²

In retaliation for the Basra offensive, JAM bombarded the Green Zone and overran Iraqi Police positions in Sadr City.¹³³ In March, Coalition forces reported 172 indirect fire attacks, nearly all of which took place after March 25.¹³⁴ Geoffrey Ensby argued that Maliki authorized strike operations throughout Sadr City, but he still restricted ground maneuver north of al-Quds Street in Sadr City "for fears of upsetting the populace and turning the tide of the battle in the direction of the Sadrists."¹³⁵

Narrative

3rd Brigade Combat Team, 4th Infantry Division (3/4 BCT) was responsible for eliminating the rocket threat and restoring government control in Sadr City. Its task organization included 1st Battalion, 68th Armored Regiment (1-68 Combined Arms Battalion, or CAB), 1st Squadron, 2nd Stryker Cavalry Regiment (1-2 SCR), and eventually 1st Battalion, 6th Infantry Regiment (1-6 INF). 1-2 SCR was responsible for all of Sadr City and 1-68 CAB controlled the outlying areas of Baghdad northwest of Sadr City. 3/4 BCT ordered 1-2 SCR to conduct the decisive operation to clear JAM from the Ishbiliyah and Habbibiyah districts and control enemy rocket launch sites.

¹³¹ Cordesman and Ramos, *Sadr and the Mahdi Army*, 20.

¹³² *Ibid.*, 9.

¹³³ Peter R. Mansoor, *Surge: My Journey with General David Petraeus and the Remaking of the Iraq War*, (New Haven: Yale University Press, 2013), 244.

¹³⁴ Knights, "No-Go-No-More," 3.

¹³⁵ Geoffrey Ensby, "The Final Fight: The 2008 Battle of Sadr City" (honors project, Bryant University, 2010), 34, accessed September 24, 2015, http://digitalcommons.bryant.edu/honors_history/8/.

3/4 BCT interdicted rocket attacks north of al-Quds Street, facilitated by armed and unarmed aerial ISR. Maliki's restriction of maneuver forces north of al-Quds Street forced this decision, stemming from an October 2007 raid with dozens of civilian casualties.¹³⁶ 3/4 BCT's analysis revealed that north of al-Quds street, JAM 107mm rockets could not range the Green Zone, except within the area below the red arc (see Figure 1). As a result, 3/4 BCT focused its aerial ISR on this narrow area, which greatly enhanced its effectiveness.¹³⁷



Figure 1: Range of 107mm rocket

Source: David E. Johnson, M Wade Markel, and Brian Shannon, *The 2008 Battle of Sadr City: Reimagining Urban Combat* (Santa Monica: RAND, 2013), 49.

In addition to focusing aerial ISR efforts, 3/4 BCT received unprecedented amounts of ISR capabilities (see Figure 2). More significantly, MND-B (Multi-National Division-Baghdad)

¹³⁶ Mansoor, *Surge: My Journey with General David Petraeus*, 244.

¹³⁷ David E. Johnson, M. Wade Markel, and Brian Shannon, *The 2008 Battle of Sadr City: Reimagining Urban Combat* (Santa Monica: RAND, 2013), 58.

placed these resources under brigade-level control. General David Petraeus described the significance of this decision:

Supporting this one brigade, 24/7, were 2 Predators (armed with Hellfire missiles), Shadow and Raven UAVs, aerostat blimps with optics, Raid towers, 3 air weapons teams (of 2 AH64 Apaches each), and 2 additional UAVs with special capabilities. Also in support was Close Air Support (CAS), and the national, strategic intelligence platforms depicted at the top of the slide. We gave the brigade more ISR than any unit in history.¹³⁸

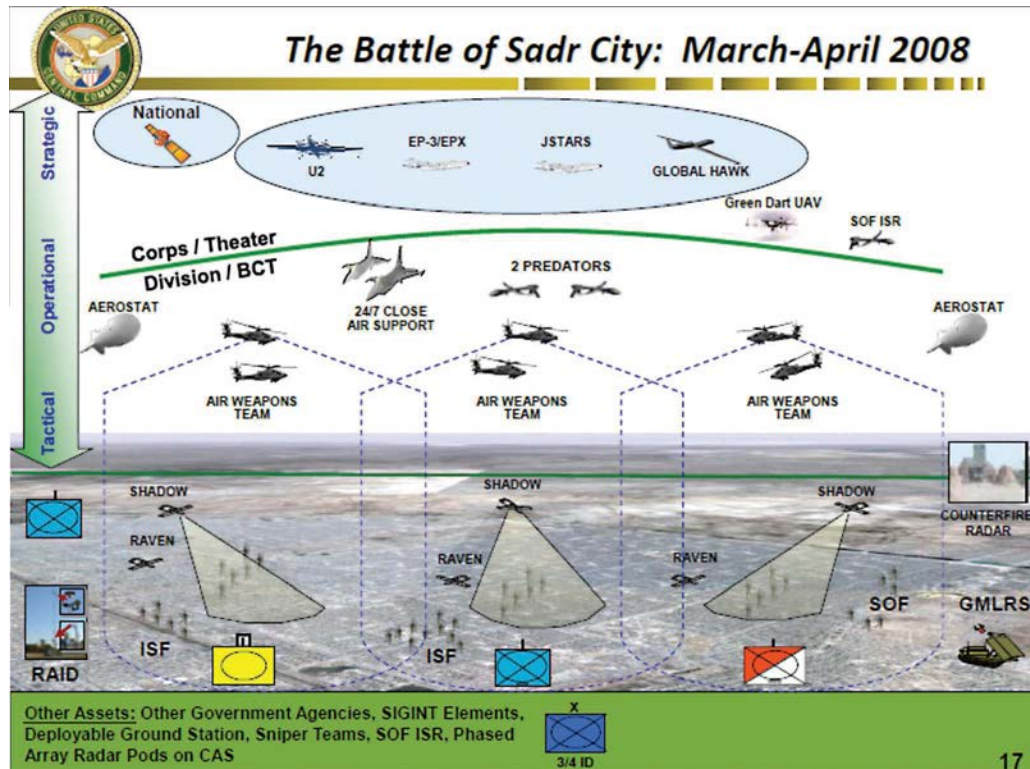


Figure 2: ISR in Sadr City

Source: David E. Johnson, M. Wade Markel, and Brian Shannon, *The 2008 Battle of Sadr City: Reimagining Urban Combat* (Santa Monica: RAND, 2013), 55.

¹³⁸ Timothy M. McGraw, "Army Aviation Addressing Battlefield Anomalies in Real Time With The Teaming And Collaboration of Manned and Unmanned Aircraft" (master's thesis, Naval Postgraduate School, 2009), 20.

The brigade also received extensive support from special operations forces, counter-fire radar, and additional sniper support.¹³⁹ With control of so much ISR, 3/4 BCT had the freedom to delegate control of these assets, and increase flexibility and lethality. TF 1-2 SCR received control of some deep strikes, and subsequently delegated further control of attack weapons teams (AWTs) and armed UAS to the company commanders.¹⁴⁰ This maximized the distribution of information, and optimized the ability of company commanders to see and understand the urban environment. According to John Blom of the Combat Studies Institute, “This mix of direct control, pooled assets, and tasked vehicles (DS [direct support] Predator) were critical to the ensuing operation.”¹⁴¹

Having received significant augmentation, 3/4 BCT integrated and synchronized UAS and other aerial ISR, which provided maximum flexibility in the performance of two critical tasks: supporting maneuver forces and interdicting rocket teams.

The BCT’s UAV fleet (augmented) complemented manned aerial reconnaissance and ground reconnaissance missions. During the planning phase of a mission, UAVs provided critical intelligence information regarding the battlespace. As units prepared to engage the enemy, the TOC could give them specific details in real-time, such as the location of insurgents, even before they made contact.¹⁴²

During the battle, units requested UAS support twenty-four to forty-eight hours in advance, but units adjusted missions as the immediate situation developed.¹⁴³ When the BCT experienced enemy rocket attacks, instead of merely attacking the rocket team, Predator UAS and other unmanned or manned assets followed insurgents for up to ten hours in a complex urban

¹³⁹ Bowers, “Future Megacity Operations,” 16.

¹⁴⁰ Johnson, Markel, and Shannon, *The 2008 Battle of Sadr City*, 50-1.

¹⁴¹ Blom, John David, *Unmanned Aerial Systems: A Historical Perspective* (Fort Leavenworth: Combat Studies Institute Press, 2010), 128.

¹⁴² *Ibid.*, 130.

¹⁴³ *Ibid.*, 118.

environment, continuing to gain valuable intelligence before launching a strike.¹⁴⁴ The successful integration of persistent ISR, technical intelligence, and responsive precision strike capabilities (afforded by attack helicopters, fixed wing CAS, UAS, and Guided Multiple Launch Rocket System (GMLRS)) led to the destruction of seventy-seven rocket and mortar teams during the fighting in Sadr City.¹⁴⁵

Although these ISR assets contributed a great deal to overall mission success, they presented 3/4 BCT with significant challenges caused by the overwhelming volume of information they produced. The 3/4 BCT staff struggled to analyze such a large volume of information. In order to solve this problem, 3/4 BCT received LNOs (liaison officers) from the 12th Combat Aviation Brigade to manage the AWTs, an Air Force Tactical Control Party (TACP) for CAS, and assistance from stateside Air Force analysts to manage fixed wing and unmanned assets.¹⁴⁶ Even with this augmentation, the staff continuously reorganized to monitor the numerous real-time intelligence feeds. At one point, the commander of 3/4 BCT tasked his special troops battalion (STB) commander, an intelligence officer by trade, to monitor a UAS screen.¹⁴⁷

Although aerial ISR was very effective at interdiction north of al-Quds Street, to the south 3/4 BCT faced significant challenges. Due to fierce JAM resistance and insufficient combat power to hold ground, the brigade could not stop the rocket attacks.¹⁴⁸ Likewise, enemy mortar

¹⁴⁴ CBS News, “The Battle of Sadr City” (video), October 12, 2008, 8:30, accessed October 16, 2015, <http://www.cbsnews.com/videos/the-battle-of-sadr-city/>; McGraw, “Army Aviation Addressing Battlefield Anomalies,” 20.

¹⁴⁵ Johnson, Markel, and Shannon, *The 2008 Battle of Sadr City*, 106; McGraw, “Army Aviation Addressing Battlefield Anomalies,” 20.

¹⁴⁶ Johnson, Markel, and Shannon, *The 2008 Battle of Sadr City*, 53-54.

¹⁴⁷ *Ibid.*, 54. The STB commander, as an intelligence officer, had the training to monitor the UAS feed, but this did not fall within the normal duties of an STB commander in combat.

¹⁴⁸ *Ibid.*, 59-60.

teams were experts at launching a volley and then escaping within minutes. To stop the attacks, ground forces had to seize control of the launch sites.¹⁴⁹ To overcome these challenges, 3/4 BCT received additional forces and re-organized the area of operations (AO). TF 1-68 CAB shifted its AO into Ur (northwest of Sadr City) and Habbibiyah, and 1-2 SCR took responsibility for Ishbilyah. These changes focused both air and ground reconnaissance on decisive terrain in Sadr City, which was critical to understanding the enemy situation and achieving success. The assault began March 29 and despite fierce fighting, 3/4 BCT seized all rocket launch sites by day's end.¹⁵⁰

At this point, 3/4 BCT occupied the launch sites south of Phase Line Gold (PL Gold, located along al-Quds Street), and it was interdicting launch sites north of PL Gold with the assistance of aerial ISR. To free up Coalition forces and assert government control of Sadr City, the BCT called on Iraqi Security Forces (ISF) to secure PL Gold. The ISF were to assault through and hold PL Gold, establishing a position from which to conduct future operations north of PL Gold and into Sadr City. On April 5, 2008, two Iraqi Army brigades attacked to achieve this objective. The ISF struggled to clear obstacles, but with Coalition engineer support, they established a tenuous hold on PL Gold. Ishbilyah and Habbibiyah were secure, but fierce JAM counter-attacks threatened the ISF defensive positions. The Coalition could not commit any additional forces, but somehow needed to find a permanent solution to consolidate its gains in Sadr City.¹⁵¹

In response to this dilemma, 3/4 BCT constructed a concrete wall along PL Gold to isolate JAM from the vital economic center of Sadr City. On April 8, 2008, construction of the wall began along PL Gold, a major thoroughfare that separates Ishbilyah and Habbibiyah with

¹⁴⁹ Mansoor, *Surge: My Journey with General David Petraeus*, 244.

¹⁵⁰ Johnson, Markel, and Shannon, *The 2008 Battle of Sadr City*, 61-3.

¹⁵¹ *Ibid.*, 64-7.

the Jamila market to the south from the heart of Sadr City to the north.¹⁵² Coalition soldiers built the wall using twelve-foot tall concrete sections, while under near constant fire and explosively formed projectile (EFP) attacks from JAM militia. The threat of isolation from the wall forced JAM to fight at a location of 3/4 BCT's choosing, and made defeat inevitable. With walls already in place along the western and southern edge of Habbibiyah and Ishbilyah, coalition forces isolated JAM upon completing a supporting wall to the east of Sadr City.¹⁵³ Construction of this wall also allowed 3/4 BCT to intensify reconstruction and stability operations, resulting in a flood of reliable HUMINT from citizens please with the improved situation.¹⁵⁴ Simultaneously, 3/4 BCT continued to conduct relentless combat operations, routinely patrolling sixteen to twenty-four hours a day, with information operations that overmatched JAM's capability.¹⁵⁵

With the wall completed in May, indirect fire attacks dropped sharply. Coalition and ISF held the southern third of Sadr City, and JAM continued to suffer losses from UAS and attack helicopters.¹⁵⁶ On May 11, the government of Iraq and al-Sadr signed a negotiated cease-fire.¹⁵⁷ Al-Sadr and JAM were defeated, and the government of Iraq proved capable of carrying out its will, earning the esteem of the population.¹⁵⁸ On May 21, ISF advanced unopposed into Sadr City receiving flowers, copies of the Koran, and even support from Sadrist officials.¹⁵⁹ The security situation in Sadr City improved rapidly. By June, the Jamiliyah market was operational again, and

¹⁵² Cordesman and Ramos, *Sadr and the Mahdi Army*, 20.

¹⁵³ Johnson, Markel, and Shannon, *The 2008 Battle of Sadr City*, 76.

¹⁵⁴ *Ibid.*, 93-4.

¹⁵⁵ *Ibid.*, 4.

¹⁵⁶ Cochrane, "Summer 2007 - Summer 2008: Special Groups Regenerate," 15.

¹⁵⁷ Knights, "No-Go-No-More," 5.

¹⁵⁸ Ensby, "The Final Fight: The 2008 Battle of Sadr City," 59.

¹⁵⁹ Ernesto Londono and Sudarsan Raghavan, "Iraqi Troops Welcomed in Sadr City," *Washington Post*, May 22, 2008, accessed September 24, 2015, <http://www.washingtonpost.com/wp-dyn/content/article/2008/05/21/AR2008052103056.html>.

in August, it reached peak capacity.¹⁶⁰ The situation remained far from perfect, but Sadr City was stable and under Government of Iraq control.

Analysis

The 2008 fighting in Sadr City provides excellent examples of effective employment of ISR in a complex urban environment to provide understanding, which led to a successful outcome of combat operations. The allocation of additional ISR to 3/4 BCT served as a critical first step for the brigade's success by providing the flexibility necessary to conduct operations. As described in FM 3-06, ISR must be flexible in order to meet unforeseen circumstances due to the challenges of the urban environment.¹⁶¹ Further, FM 3-06 notes that, "higher headquarters should be proactive in augmenting units conducting urban operations with additional ISR assets." Without such a large volume of ISR capability committed to Sadr City, 3/4 BCT would likely not have experienced such success.

Ultimately, it was not the volume of resources, but the level of decentralization and control that proved most effective. "Decentralization of ISR assets allowed . . . commanders to gain and maintain contact with the enemy. ISR evolved along with the fight. The robust ISR currently available at the brigade level provides commanders with an unprecedented level of situational awareness."¹⁶² The flexibility of ISR and delegation of control over the assets to brigade level enabled incredible responsiveness to the enemy situation. Delegating the level of control to the BCT proved decisive because merely allocating resources to a subordinate headquarters leaves the option open to reallocate them elsewhere with little or no notice. Since 3/4 BCT did not have to worry about losing control of its ISR assets, it could employ them with

¹⁶⁰ Johnson, Markel, and Shannon, *The 2008 Battle of Sadr City*, 91.

¹⁶¹ FM 3-06, 5-14.

¹⁶² Raymond T. Odierno, Nichol E. Brooks, and Frances P. Mastracchio, "ISR Evolution in the Iraqi Theater," *Joint Forces Quarterly* 50, (October 2008): 52.

maximum utility and effectiveness. In addition, under this arrangement 3/4 BCT could maximize the benefit of the additional ISR assets by delegating control to even lower levels, which enhanced their capabilities and integration even further.

The extremely diverse nature of ISR assets in Sadr City provided 3/4 BCT a critical advantage in understanding the enemy and developing the situation, particularly in the neutralization of enemy rocket teams. 3/4 BCT relied on aerial ISR north of al-Quds Street, and it employed a wide range of assets to accomplish this mission. Although aerial ISR can be of limited use in dense urban environments, it brought decisive advantages to the counter-rocket fight. Blom wrote, “The persistent stare of the Predator allowed the Army to develop a better understanding of the enemy’s tactics.”¹⁶³ If not for the enhanced capabilities of aerial ISR, 3/4 BCT would have not been as successful at finding and interdicting enemy rocket teams.

Despite UAS effectiveness, the urban environment also required traditional reconnaissance efforts. FM 3-06 indicates commanders must employ diverse capabilities in the urban environment to gain an accurate common operational picture.¹⁶⁴ 3/4 BCT employed organic and Navy Sea, Air, Land (SEAL) snipers in a surveillance role, which gathered critical intelligence through passive surveillance.¹⁶⁵ Near constant patrolling, information operations, and even stability and reconstruction operations all contributed valuable intelligence throughout the fighting in Sadr City. It is clear that no one asset or capability could provide the understanding necessary for successful operations in Sadr City.

Although 3/4 BCT employed a wide range of diverse capabilities to conduct reconnaissance, it focused those capabilities to achieve optimal effects. FM 3-06 indicates, “The

¹⁶³ Blom, *Unmanned Aerial Systems*, 130.

¹⁶⁴ FM 3-06, 5-12.

¹⁶⁵ Mansoor, *Surge: My Journey with General David Petraeus*, 245; Johnson, Markel, and Shannon, *The 2008 Battle of Sadr City*, 109.

size and complexity of the urban environment require that the ISR effort center strictly on decisive points or centers of gravity (COG).”¹⁶⁶ 3/4 BCT’s focusing of aerial ISR to a limited area was critical to its success in aerial interdiction of rocket attacks. Historians of the battle have also argued that, “Aerial strike and ISR were successful because they only had to control a portion of the area of operations, the area within 107mm rocket range of the Green Zone but beyond Route Gold.”¹⁶⁷ Due to proper focus on decisive points, 3/4 BCT achieved success in a complex environment. Likewise, when 3/4 BCT doubled its combat power in the contested Ishbiliyah and Habbibiyah districts, it focused its ground ISR efforts south of al-Quds Street to seize and hold enemy launch sites.

In addition to focusing its diverse capabilities appropriately, 3/4 BCT ISR had to attend to the critical issue of integration. The BCT staff excelled at the integration of these assets to create synergy and understanding. Air and ground efforts were mutually supportive and complementary. Likewise, 3/4 BCT vertically linked its ISR to achieve success. FM 3-06 indicates, “Vertical links ensure that ISR operations among the various levels of command are complementary and that the information flow between these levels is rapid.”¹⁶⁸ Rather than the assets themselves, Mansoor observed that the decisive factor was the distribution of intelligence to the lowest level: “A variety of high-tech instruments were employed to fight the enemy, but the key was improved intelligence that flowed to the units and leaders directly in the fight.”¹⁶⁹ 3/4 BCT integrated these assets and linked them to tactical units on the ground in innovative and synergistic ways that maximized their effects.¹⁷⁰

¹⁶⁶ FM 3-06, 5-13.

¹⁶⁷ Johnson, Markel, and Shannon, *The 2008 Battle of Sadr City*, 108.

¹⁶⁸ FM 3-06, 5-13.

¹⁶⁹ Mansoor, *Surge: My Journey with General David Petraeus*, 245.

¹⁷⁰ Bowers, “Future Megacity Operations,” 14.

Despite their usefulness, the sheer volume of resources and quantity of information created challenges for the staff as it analyzed intelligence. MND-B provided an unprecedented amount of intelligence assets, but it did not match this with adequate staff augmentation to analyze the information these assets collected. 3/4 BCT ultimately assumed risk by focusing its analytic capability on tracking rocket teams in real time, which reduced its ability to analyze the enemy's motives, intentions, and vulnerabilities.¹⁷¹

Finally, 3/4 BCT excelled at linking intelligence to targeting. This proved essential because reconnaissance and surveillance assets often make enemy contact first, and trigger decisions to apply fires onto the enemy.¹⁷² The flexible nature and persistent capabilities of UAS and other aerial means make them naturally suited for targeting. 3/4 BCT carefully refined TTPs (tactics, techniques, and procedures) for finding enemy rocket teams. Counter-fire radar detected rocket launches, which directed UAS to identify and track the team, continue to gather intelligence, and engage the enemy at an opportune moment.

3/4 BCT conducted highly successful reconnaissance operations in an urban environment during the Battle of Sadr City, which arguably provides some of the best examples of potential future urban operations in a megacity. According to FM 3-06, the only consideration that MND-B did not account for was early deployment. Due to the rapid development of the crisis in Sadr City, time did not exist for 3/4 BCT or MND-B to deploy ISR and develop the situation. Despite this challenge, 3/4 BCT employed a reconnaissance effort that created situational understanding for its commander, and allowed the defeat of JAM and empowerment of the Government of Iraq. Most critical to 3/4 BCT's success was the integration of a large volume of diverse ISR capability in order to destroy enemy rocket teams and defeat JAM. Although contemporary sources most often hail the achievements of UAS, no single capability was responsible for success. Ultimately,

¹⁷¹ Johnson, Markel, and Shannon, *The 2008 Battle of Sadr City*, 54-55, 101.

¹⁷² FM 3-06, 5-13.

3/4 BCT's success in Sadr City resulted from the integration of all kinds of reconnaissance, especially air and ground.

Cross Case Analysis

Analysis of the case studies indicate that the considerations of urban ISR, as defined by FM 3-06, are essential for understanding the urban environment and conducting successful urban ISR. Further, FM 3-06's principles address all aspects of urban environments, but the manual falls short in addressing the additional challenges of a megacity. FM 3-06 uses the term megalopolis, defining it as a city of over ten million people, consisting of a unification of several smaller urban areas, with physical and social complexity.¹⁷³ While this definition highlights broad characteristics that make these large cities unique, it does not sufficiently address the additional challenges that a megalopolis or megacity presents to those attempting to gain understanding through ISR. The megacity concept team refutes the idea that many existing doctrinal principles of urban warfare apply to megacities; in fact, it has referred to them as a "fundamental challenge to the Army's doctrine."¹⁷⁴ By defining megacities through massive size, complexity, and multiple drivers of instability, the megacities concept team assesses the challenge of megacities to exceed the Army's current capability and concept of urban operations. Comparison of the size of historical urban operations with modern megacities makes the challenges of achieving understanding through reconnaissance a daunting task. Despite this, one can find ample lessons in the history of US Army operations in smaller urban areas to make these intellectual challenges more manageable. Bowers argues that although not a megacity, Sadr City—with its dense population, slum conditions, minimal governmental influence, and diverse socioeconomic

¹⁷³ FM 3-06, 2-14.

¹⁷⁴ Chief of Staff of the Army's Strategic Studies Group, *Megacities and the United States Army*, 11.

groups—provides a case study of potential future operations in megacities.¹⁷⁵ Analysis of combat operations in smaller urban areas such as Grozny and Fallujah can, like Sadr City, provide solutions that when applied on a grander scale, could make the complexity of a megacity more manageable.

Early Deployment

The early deployment of ISR in historical urban fighting is a critical factor in urban reconnaissance. However, it is unlikely that even lengthy reconnaissance periods will be sufficient in megacities. Understanding of megacities will require exponentially more assets and more time. FM 3-06 defines early deployment of ISR within the bounds of existing or imminent hostilities. It indicates that commanders should request ISR assets early and begin ISR operations as soon as possible.¹⁷⁶ The lengthy and very well resourced deployment of ISR assets in Fallujah is a good example of this type of early deployment. However, the megacities concept team has argued that megacities will require concerted and continuous intelligence and focus.¹⁷⁷ This type of ISR effort exceeds the tactical ISR described in FM 3-06, and those described in the case studies. The scope and scale of megacities will likely render reconnaissance ineffective in fully developing the situation and understanding the operational environment for weeks or even months.

In contrast, Sadr City provided an example of successful urban fighting without a lengthy deployment of ISR. Unlike Fallujah, 3/4 BCT did not have the opportunity to conduct extensive ISR and shaping operations before the fighting began. 3/4 BCT and MND-B offset this challenge through the deployment of an overwhelming number of diverse and technologically advanced

¹⁷⁵ Bowers, “Future Megacity Operations,” 10.

¹⁷⁶ FM 3-06, 5-12.

¹⁷⁷ Chief of Staff of the Army’s Strategic Studies Group, *Megacities and the United States Army*, 9.

resources, all placed under BCT control. Although the size and scale of a megacity would dwarf such an ISR effort, it indicates that the technological advantages provided by modern ISR assets can help overcome many of the challenges posed by urban terrain, even in megacities.

Diversity

In Sadr City and Fallujah, commanders successfully employed a diverse range of complementary ISR capabilities, which created effective understanding of the urban environment. In Grozny, Russian reliance on passive aerial observation failed to provide sufficient intelligence, and Russian neglect of ground reconnaissance led to disaster. The capabilities of modern aerial reconnaissance, such as UAS, undoubtedly provided significant advantages from Grozny to Sadr City in understanding the enemy and terrain. Despite this, aerial reconnaissance could not identify and eliminate all enemy activity in any case study; mission success also required ground-based, traditional reconnaissance such as patrols, scouts, snipers, and SOF. There may come a day when technological sensors can fully overcome these intelligence gaps in an urban environment, but that day is not here yet.

HUMINT was the biggest challenge for gathering intelligence in all three cases, and it will likely remain just as challenging and critical for megacities. In the case studies, the attacker faced challenges accessing HUMINT due to political restrictions, differences in language and culture, or enemy occupation of the city. In Fallujah and Sadr City, Coalition forces overcame these challenges through prisoner interrogation, stability operations, medical support, and civil affairs efforts. These same methods will likely be just as crucial in megacities. Additionally, megacities may present opportunities that do not exist in smaller cities. In all three cases, the attacker faced a relatively homogenous enemy with a common purpose and goal, which reduces complexity and HUMINT opportunities. In megacities, it is likely there will be much greater access to HUMINT sources and networks. As an example, US Army strategist William Adamson points out that police forces will provide another valuable source of HUMINT. “Police forces

provide ‘ground truth’ through their local knowledge and human intelligence through their informants.”¹⁷⁸ In a city of approximately 250,000 to 350,000, such as Fallujah, it is feasible for the enemy to have control and influence over local police forces. In a megacity, it will be just as difficult for both friendly and enemy forces to exert such influence, which will inevitably create opportunities for intelligence professionals.

Focus

Focus of ISR will more than likely become the most critical factor in successful ISR in megacities. FM 3-06 indicates, “The size and complexity of the urban environment require that the ISR effort center strictly on decisive points or centers of gravity.”¹⁷⁹ In Fallujah, 1st MARDIV executed a broad and lengthy ISR effort, successfully identifying hundreds of defensive positions. Sadr City provides a better example of focus, where good analysis, the enemy situation, and the political situation allowed the focus of reconnaissance assets on a limited piece of urban terrain to great success—in particular the focus and isolation of the Jamila market from JAM fighters. Furthermore, Russian operations in Grozny reveal how a lack of focus in reconnaissance can lead to disastrous results even in much smaller urban areas. While operations in megacities will benefit from analysis of centers of gravity, decisive points, and critical vulnerabilities, the complexity and high degree of inter-connectedness of megacities will make such features hard to identify. The massive size of megacities, combined with a potentially resource constrained future environment will pose significant challenges to US forces seeking to focus on decisive points, making accurate analysis even more critical to success. By focusing limited ISR in a complex urban environment, such as with Sadr City, the US Army can increase

¹⁷⁸ William G. Adamson, “Megacities and the U.S. Army,” *Parameters* 45, no. 1 (Spring 2015): 50.

¹⁷⁹ FM 3-06, 5-13.

its ability to direct combat power to seize key terrain, and gain a decisive advantage in the megacity.

Integration

These case studies illustrate that although a diverse collection of ISR is essential to penetrate and develop understanding in the urban environment, effective integration is the decisive factor in maximizing ISR effectiveness. Whether the size of the urban area is tens of thousands or tens of millions, successful integration of ISR will remain critical in the megacity. FM 3-06 indicates an effective headquarters synchronizes complementary ISR to form a complete common operating picture.¹⁸⁰ In Grozny, Russian intelligence capability existed, but it was not controlled or synchronized through a single coordinating headquarters. Fallujah provided a better example, in which 1st MARDIV overcame additional friction from joint operations to conduct urban ISR. The best example of an integrating headquarters, 3/4 BCT in Sadr City, controlled an unprecedented volume of ISR in urban operations. On this subject, Russell Glenn has argued that the use of additional ISR and advanced collection techniques in complex urban areas open the sluice gates of a large dam, releasing a torrent of additional intelligence.¹⁸¹ Although 3/4 BCT was successful, its command post was undermanned to process the additional intelligence. This reinforces past studies of urban operations like Russell Glenn's, which found that "potential solutions at the headquarters include increasing the manning strength of intelligence staff sections."¹⁸² In megacities, absent considerable efforts to resource staffs and focus reconnaissance, units conducting reconnaissance in megacities will see similar results.

¹⁸⁰ FM 3-06, 5-13.

¹⁸¹ Russell W. Glenn, *Heavy Matter: Urban Operations' Density of Challenges* (Santa Monica: RAND, 2000), 31.

¹⁸² Russell W. Glenn, *Honing the Keys to the City: Refining the United States Marine Corps Reconnaissance Force for Urban Ground Combat Operations* (Santa Monica, RAND: 2003), 62-3.

Another key factor of successful integration was the rapid and effective distribution of intelligence to lower units. The linkages between strategic or operational level reconnaissance assets and warfighters can often be lengthy. Early uses of aerial reconnaissance in World War II revealed this problem, as described by historian Roy Flannagan: “It is necessary also to distribute quickly to advanced units any helpful aerial photographs that have been taken by request of the division, corps, or army commander.”¹⁸³ Furthermore, in 2001, a United States Marine Corps study identified the need to revise reporting procedures for rapid dissemination of intelligence gathered from flights, local units, and headquarters.¹⁸⁴ Sadr City and Fallujah highlight the effectiveness of modern ISR in reducing these challenges. By providing real-time intelligence feeds in lower echelon command posts and delegating control of ISR as low as the company level, commanders maximized access to critical intelligence. Despite this progress, to address completely the challenges of megacities, it is likely more progress is necessary. Lieutenant General H. R. McMaster, Futures Director of the Army Capabilities and Integration Center (ARCIC), wants to provide infantry squads “access to aviation and air support and full motion video along with the ability to overwhelm the enemy during chance contact.”¹⁸⁵ This would enhance flexibility and targeting as a part of decentralized operations. However, analysis of Sadr City and other case studies show that it could potentially overwhelm junior leaders with a flood of additional information, who are already in a challenging environment.

In addition to distributing intelligence, units integrate the ISR process with other staff processes such as targeting. In Grozny, ineffective reconnaissance resulted in Russian forces

¹⁸³ Roy C. Flannagan, “The Air-Cavalry Team In Reconnaissance,” in *Modern Reconnaissance* (Harrisburg: The Military Service Publishing Company, 1944), 227.

¹⁸⁴ Glenn, *Honing the Keys to the City*, 35-6.

¹⁸⁵ Paul McLeary, “US Army Sees ‘Megacities’ As the Future Battlefield,” *Defense News*, August 30, 2014, accessed 28 November 2015, <http://www.defensenews.com/article/20140830/DEFREG02/308300027/US-Army-Sees-Megacities-Future-Battlefield>.

lacking the necessary intelligence to conduct effective targeting. The use of massive firepower to pacify Grozny did not compensate for this; rather, it created more insurgents than it eliminated. In Fallujah, 1st MARDIV minimized this problem by evacuating civilians before the use of overwhelming firepower destroyed much of the city. In megacities, neither approach will be effective or feasible. Sadr City provided a textbook example of effective targeting in which ISR and precision weapons destroyed the enemy and minimized collateral damage. General Petraeus commented on the changes from Fallujah to Sadr City in urban combat: the Battle of Sadr City shows “how far combat has evolved from the slugfest that was the Battle for Fallujah.”¹⁸⁶ It is likely that future operations in megacities will demand even further improvements to precision targeting, which will rely heavily on ISR capabilities that can reliably discriminate targets from noncombatants. The contrast between Sadr City and Fallujah or Grozny is striking because it provides a potential foreshadowing of effective urban operations in the megacity, where isolation or evacuation is not possible, and friendly forces must minimize collateral damage.

Flexibility

The flexibility of ISR assets and intelligence professionals plays a key role in combat forces’ ability to respond rapidly to unforeseen circumstances and an elusive enemy. A comparison of Grozny to Fallujah and Sadr City shows the importance of flexibility. As Glenn wrote, “The tasks encompass a requirement to adapt quickly and, ideally, to interfere with an adversary’s ability to adapt, for rapid adaptation seems to be a characteristic of urban operations; the organization that does it effectively and in a timely manner gains a considerable advantage.”¹⁸⁷ Without flexible reconnaissance, this adaptation will not take place. In Grozny, Russian forces faced an unexpected situation because of ineffective reconnaissance, which

¹⁸⁶ McGraw, “Army Aviation Addressing Battlefield Anomalies in Real Time,” 20.

¹⁸⁷ Russell W. Glenn, *Managing Complexity During Military Urban Operations: Visualizing the Elephant* (Santa Monica: RAND, 2004), ix.

prevented a coordinated and decisive response. In Fallujah and Sadr City, air and ground reconnaissance displayed incredible flexibility to react to adaptive enemy forces and engage them whenever they appeared. Likewise, higher headquarters provided the resources necessary to support this flexibility, and intelligence distribution to lower echelons enabled commanders to retain the initiative. Unfortunately, this level of flexibility has largely been the exception in US Army operations over the past ten to fifteen years. Colonel Jeffrey Kapperman noted that higher headquarters usually do not allocate joint UAS to divisions or brigades, and when they do, the subordinate headquarters has no command relationship over those assets, which frequently results in higher headquarters cutting support at inopportune times.¹⁸⁸ In Sadr City and Fallujah, commanders received the unhesitating support of their higher headquarters, which provided the assets necessary to achieve success. Future operations in megacities will require a similarly seamless integration and flexibility between tactical, operational, and strategic headquarters.

Conclusion

Conclusion

The massive challenges of large-scale urban operations, such as the megacity, make effective reconnaissance essential, but challenging to achieve situational understanding. In contemporary times, the US Army lacks historical examples of combat in megacities from which to draw lessons learned. However, there are significant examples of smaller scale urban operations, such as Grozny, Fallujah, and Sadr City, which provide ample lessons for future combat in megacities. Using the considerations of urban ISR, as defined in Field Manual 3-06, *Urban Operations*, analysis of smaller scale urban ISR operations provide lessons that will apply in megacities, much as they have historically in large cities over the past few decades.

¹⁸⁸ Jeffrey Kappenman, "Army Unmanned Aircraft Systems: Decisive in Battle," *Joint Forces Quarterly* 49, (2nd Quarter 2008): 20.

The most essential considerations of urban ISR, as defined by FM 3-06 are integration and focus. Integration will be essential for ISR in the megacity due to the challenging operating environment. Integration goes beyond employing a diverse array of ISR assets, but rather synchronizing complementary capabilities—a requirement that proves extremely challenging in the complex urban operating environment. The integration of every conceivable ISR asset to provide a complete common operating picture will be essential to cover gaps in intelligence and achieve the necessary understanding to succeed in the megacity. The command post, as shown by Sadr City, plays a critical role here by designing an ISR plan that maximizes capabilities, and ensures sufficient linkages to other staff processes such as targeting, which adds even more value to reconnaissance in urban areas. Furthermore, commanders will not be able to simplify the battlefield by evacuating residents, such as Fallujah, thus simplifying the problem. Commanders and their staffs will have to focus their ISR on decisive points in order to achieve maximum results because the megacity will not permit wasted ISR effort.

Although integration and flexibility are the most critical considerations of urban ISR in the megacity, the other considerations of early deployment, diversity, and flexibility will also play an important role in megacities. The early deployment of ISR assets will be critical, but it must go beyond the time required in cases such as Fallujah, and as defined by FM 3-06. The early deployment of ISR will be necessary well in advance of imminent hostilities, in order to gain the understanding necessary for megacities. This will require significant coordination with our allies, as well as an inter-governmental approach to understanding the operating environment of the megacity during Phase 0 operations. Diversity of ISR will also play an important role because the challenging nature of urban terrain limits specific ISR capabilities. This was especially true in Grozny, where a lack of HUMINT to determine enemy disposition and intent created severe limitations in the effectiveness of Russian forces. The megacity will require every type of ISR capability to achieve success. Last, flexibility of ISR will be necessary to react to unforeseen

circumstances, which combat forces should expect in a complex operating environment such as the megacity. When facing an adaptive and resourceful enemy, it will be important for ISR to remain flexible as the adversary tries to defeat, disrupt, or avoid friendly ISR capabilities.

Analysis of the case studies through the considerations of urban ISR provides various essential insights regarding future operations in megacities. They illustrate the necessity of overcoming the challenges posed by the complex physical terrain of the urban environment, and the seemingly endless opportunities that technology can offer to minimize these challenges. Although divisions currently exist among experts on megacities regarding their impact on future combat operations, the challenges posed by all urban areas—which one can expect to increase based on the sheer size of megacities—leads to various implications for the US Army.

Implications

The analysis of smaller urban areas in relation to megacities highlights the challenges that the United States Army will face in the future. Urban areas will undoubtedly remain challenging, regardless of their size. Much of the recent literature on megacities paints a very grim picture, describing an operating environment that is fundamentally new, or will defy current methods for operating in urban areas. These authors frequently identify the size and complexity of megacities as the reason that they create such unique and daunting challenges for military forces; yet, a smaller but growing body of literature presents a far less grim future. Mark Lomedico and Elizabeth Bartels have argued that, “the difficulty of managing urban problems is not meaningfully reduced by operating in a smaller city, if that city is still hyper-connected, edgeless, and exhibiting fractured control.”¹⁸⁹ This serves as a reminder that complexity does not result

¹⁸⁹ Mark Lomedico and Elizabeth M. Bartels, “City As a System Analytical Framework: A Structured Analytical Approach to Understanding and Acting in Urban Environments,” *Small Wars Journal*, (August 4, 2015), accessed December 13, 2015, <http://smallwarsjournal.com/print/26087>.

purely from size, although this remains an important factor to consider when conducting reconnaissance and military operations with limited resources. Regardless, understanding in the megacity will largely develop through ISR in Phase 0, and this understanding will enhance operational and tactical ISR in the event of future conflict in megacities.

Recommendations

Regardless of whether the megacity will constitute a fundamentally new operating environment, the Army must continue to move forward in understanding the complex problem of the megacity. The Army can do this by engaging with megacity populations to facilitate intelligence gathering prior to anticipated hostilities while building long-term relationships, continuing research on technology-based solutions to enhance greater understanding, and accounting for the limits of technology and importance of human capacity when conducting reconnaissance in a megacity. Pursuing these goals while remaining agile and adaptable as an institution will enable the US Army to cope with the reality of the megacity when the time comes, using proven ISR considerations in new ways optimized to these large cities' characteristics.

In order to understand the megacity, the US Army must go beyond tactical ISR. Even a very early and deliberate deployment of tactical ISR months ahead of time will not generate sufficient understanding to drive military operations. Intelligence organizations and assets must maintain the focus of their collection effort on Phase 0, well before anticipated hostilities. Prioritizing early collection will drive interaction and partnerships with local governments and host nation forces. These partnerships will provide opportunities for gathering intelligence before hostilities, while building relationships that will provide an excellent base of intelligence to support future operations.

The effectiveness of aerial ISR such as UAS and satellite imagery in Sadr City and Fallujah shows the incredible potential for aerial ISR in urban areas. The US Army must continue to develop technological solutions, which will maintain a technological edge over our adversaries

and the urban environment. Technological based solutions for ISR continue to improve effectiveness in urban areas. Examples such as DARPA's (Defense Advanced Research Projects Agency) 'Combat Zones that See' program is just one of many examples for developing better awareness and understanding. In this program, hundreds of computerized CCTV screens will be installed across occupied cities, which will "produce video understanding algorithms embedded in surveillance systems for automatically monitoring video feeds to generate, for the first time, the reconnaissance, surveillance, and targeting information needed to provide close-in, continuous, always-on support for military operations in urban terrain."¹⁹⁰ Echoing the struggles of Sadr City however, technology must also aid in processing this information, otherwise the best sensors will be useless. Gerald Monas and Timothy Moy have written, "planners will benefit little from these sensor packages if they are not accompanied by improved techniques for processing the large amounts of data."¹⁹¹

Finally, despite the allure of the idea that technology will provide an easy and casualty-free solution to urban combat, the US Army must avoid committing all of its energy to the development of technological solutions. This underlines the importance of diverse ISR in the urban area, including methods that focus on the human element of intelligence gathering and analysis. The Army Operating Concept emphasizes the development of unmanned surveillance technology to provide robust capabilities in the future, and examples such as Fallujah and Sadr City provide ample evidence to support this need. However, this trend towards technological solutions is dangerous because it can create a false hope for risk elimination in urban operations. While technology has much to offer, the Army must seek practical solutions, accepting the

¹⁹⁰ Stephen Graham, "Interrupting the Algorithmic Gaze? Urban Warfare and US Military Technology," in *Geopolitics and Visual Culture: Representation, Performance, Observant Practice*, ed. F. MacDonald (Tauris: forthcoming), 11-2, accessed January 21, 2016, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.124.2684&rep=rep1&type=pdf>.

¹⁹¹ Michael C. Desch, ed. *Soldiers in Cities: Military Operations On Urban Terrain* (Carlisle: Strategic Studies Institute, US Army War College, 2001), 134.

necessity of significant numbers of ground reconnaissance personnel to understand the operating environment of the megacity. Current initiatives, like those supported by Lieutenant General McMaster to empower the infantry squad with enhanced firepower and access to better ISR, must remain central in developing ISR solutions for enhancing understanding in urban environments.

As the Army's Operating Concept indicates, the future of military operations is unknowable. In order to prepare for an unknowable threat, the Army must rapidly develop understanding of the operational environment as threats emerge. This does not mean we cannot successfully anticipate challenges. Megacities are a probable challenge for the United States Army as it prepares for future operations in a complex world. As a result, the United States Army must take the appropriate steps now in order to develop the capabilities necessary to thrive in this challenging environment.

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