

CAJ

THE CANADIAN ARMY JOURNAL 21.1

Part 1: Planning and Preparation for Urban Operations

**Fighting in the Concrete Jungle:
Understanding the Challenges of
Urban Warfare**

CAJ

THE CANADIAN ARMY JOURNAL



CANADA'S PROFESSIONAL JOURNAL ON ARMY ISSUES

The *Canadian Army Journal*, a refereed forum of ideas and issues, is the official publication of the Canadian Army. This periodical is dedicated to the expression of mature professional thought on the art and science of land warfare, the dissemination and discussion of doctrinal and training concepts, as well as ideas, concepts, and opinions by all army personnel and those civilians with an interest in such matters. Articles on related subjects such as leadership, ethics, technology, and military history are also invited and presented. The *Canadian Army Journal* is central to the intellectual health of the Canadian Army and the production of valid future concepts, doctrine, and training policies. It serves as a vehicle for the continuing education and professional development of all ranks and personnel in the Canadian Army, as well as members from other environments, government agencies, and academia concerned with the Canadian Army, defence, and security affairs.

DISTRIBUTION AND SUBSCRIPTION

The *Canadian Army Journal* (ISSN 1713-773X) is distributed throughout the Army and to select National Defence Headquarters, Royal Canadian Navy, Royal Canadian Air Force and Directorate of Information Systems Operations addresses.

Copies are also provided to defence-related organizations, allied armies, and members of the public and academia. Inquiries regarding distribution, subscription, and change of address are to be made to thearmyjourn@forces.gc.ca. On the Internet, visit The *Canadian Army Journal* at <https://publications.gc.ca/site/eng/9.505131/publication.html>.

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PRODUCED FOR

Chief of the Army Staff detachment Kingston
(Canadian Army Land Warfare Centre)
PO Box 17000 Stn Forces, Kingston, Ontario,
K7K 7B4, Canada

DESIGN AND PRODUCTION

Army Publishing Office (APO), Kingston, Ontario,
K7K 7B4, Canada

WEBSITE

CADTC Webmaster

COVER PHOTO CREDIT

Canadian Armed Forces Combat Camera

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Email: thearmyjourn@forces.gc.ca

ISSN—1713-773X

NDID—R-GL-007-000/JD-020

Print—Bilingual Tumble

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EDITORIAL

For many years, armies have been preparing for the wars of tomorrow, concentrating on cutting-edge technologies and futuristic battlegrounds. Yet the events in Ukraine and the Gaza Strip have reminded us about the salience of urban combat, a departure from the terrains of the Gulf War or Afghanistan or the ultra-futuristic scenarios we have envisioned.

The unprecedented pace of global urbanization is shaping not only our lifestyles but also the way we fight. Urban combat is not a passing trend but a historical and persistent reality that Western militaries must acknowledge, steering our initiatives to adapt and strengthen our military capabilities and preparedness. Notably, the Canadian military has not had substantial direct large-scale combat operations experience in urban warfare since the Second World War (1939–1945). The present and future of warfare is urban, and consequently there is a pressing need to re-learn how to fight in cities.

The developments in Ukraine and the Gaza Strip have underlined the prevalence of urban warfare and its challenges. These battlegrounds offer crucial lessons that must not be overlooked. As we witness the growing relevance and inevitability of urban warfare, we felt it was imperative to turn our attention to this crucial topic. Recognizing the intricacies of the subject, and due to the overwhelming response from members of the urban operations community who wished to contribute, we decided to dedicate two entire issues to the theme of urban warfare. This issue (21.1) marks the commencement of the two-part series, and we invite you to dig deep and extract relevant learnings. This issue also signifies a remarkable collaboration that brought together the *Canadian Army Journal* (CAJ) team and Major Jayson Geroux, a noted urban operations instructor, scholar and urban warfare historian. Lending his expertise, Major Geroux serves as the Guest Editor for the two urban warfare-themed issues of CAJ.

In the two issues, we have structured the informative and analytical articles according to the phases of military operations, beginning here with subjects that need to be addressed during the crucial planning and preparation phase for the conduct of urban warfare. In the initial article, Second Lieutenant Benjamin Phocas offers a detailed overview of the unique characteristics of urban warfare, explaining the challenges that militaries face when fighting in the concrete jungle. In the following

article, Captain Colin Papuschak argues that the urban battlefield is a complex adaptive system that requires military planners to go beyond the conventional “systems perspective of the operating environment” for effective, intelligent preparation. In the third article, Stuart Lyle analyzes the prospects for wargaming in addressing the limitations of physical training for urban combat.

Subsequently, Sahr Muhammedally delves deep into a crucial yet underexplored area of research, undertaking a thorough analysis of the urban operating environment through the lens of civilian harm mitigation. Exploring another aspect of civilian participation, the following article by Dr. Peter Dobias looks into the practice of using civilians as a counter-mobility capability and how NATO forces can potentially tackle that practice through the use of non-lethal capabilities.

Armed with a sound grasp of the fundamentals, Lieutenant-Colonel (Retired) Louis DiMarco guides readers through the historical evolution of large-scale urban combat operations and their tactics, techniques and procedures. In the last feature article, Dr. Anthony King focuses on the Russo–Ukrainian War (2022–present) and offers valuable insights into the urbanized campaign. He delves into the reasons behind the surge in urban battles and compares observations from the ongoing war with arguments outlined in his book *Urban Warfare in the Twenty-First Century*. This issue concludes with three book reviews by Amos C. Fox, Warrant Officer Peter Vandoremalen and Major Jayson Geroux.

We sincerely hope that you enjoy reading this issue and share in our anticipation of the second issue on the same theme. CAJ 21.2 will focus on a number of developments of military technologies tailored for the urban environment and feature historical case studies that will complement the importance of the above-mentioned articles.

Aditi Malhotra, Ph.D.
Editor-in-Chief

Major Jayson Geroux, CD
Guest Editor



FOREWORD

“A military that is unprepared for urban operations across the broad spectrum is unprepared for tomorrow.”

—Lieutenant-Colonel Ralph Peters

I was delighted to be offered the opportunity to introduce the first of the two editions of the *Canadian Army Journal* focused on urban warfare. In these challenging times, it does not take much effort to find news or reports on urban warfare. Not long ago, there existed a misconception that urban battles were rare events. In fact, they have always been prevalent, and they are now more relevant than ever due to the high concentrations of people living in urban areas, the shrinking sizes of armies and the strategic value of cities. Recent events in Ukraine and the Middle East underscore the importance of military, economic and political infrastructure densely packed into the urban environment.

Urban combat presents simultaneous military problems at the tactical, operational and strategic levels of war. Synchronizing activities in an urban environment imposes greater difficulty, complexity and physical strain on military forces compared to conventional battles in open, rural or semi-rural areas. The complexity of three-dimensional physical terrain—comprising ground, air and underground—hinders freedom of manoeuvre for military operations. In addition, factors such as intelligence gathering; humanitarian considerations due to civilian presence; social scrutiny; and contested logistics increase the demands on military forces during urban warfare.

Recent portrayals of urban warfare have showcased how traditional military tactics intersect with emerging technologies, adding multidimensionality and layers of complexity to the experience for soldiers. On the one hand, the ongoing conflicts and wars are characterized by the pervasive use of uncrewed air vehicles, space capabilities and the introduction of next-generation howitzers. On the other hand, the disruptions in communication have led to a growing reliance on runners in Ukraine, and lessons have been learned about subterranean tunnel warfare.

The Canadian Army has spent years focused on counter-insurgency battlefields in Afghanistan and Iraq. Capability development supported this mindset. Russian aggression in Ukraine once again reminds us of the evolving character of war. We must adjust our approach to managing new and existing capability. Personnel and Leadership; Research and Development; and Operational Research and Analysis (plus Experimentation); Infrastructure, Environment and Organization; Concepts and Doctrine; Information Management and Technology; Equipment and Support; and the ability to Generate and Project (PRICIE-G) must all be updated.

As Operation UNIFIER extends and expands, it highlights Canada’s ongoing commitment to aiding Ukrainian forces with military training and capacity building.

Fighting in Ukraine has confirmed urban warfare trends that are emerging in modern war. Analysis of operations offers a lens through which to examine the pervasive types of warfare Ukraine is facing now and what many other countries like Latvia might face in the future. Given the indispensability of urban warfare in contemporary times, I consider focusing on this theme to be not only relevant but also timely. Operation UNIFIER provides a case study for examining the current manifestation of warfare. What we learn prepares our forces for the challenges they may face in the future.

Colonel Jim W. Smith, CD
Director, Canadian Army Land Warfare Centre



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FIGHTING in the CONCRETE JUNGLE

**UNDERSTANDING THE CHALLENGES
OF URBAN WARFARE**

Second Lieutenant Benjamin Phocas



A recoilless rifle round streaks across a ruined street, burrowing into the side armour of a BTR-80 before detonating in a fireball.¹ A BTR-4 rounds a corner at top speed, churning bullets through a squad of infantry caught in the open, the carnage quickly becoming obscured by smoke and dust kicked up from the rubble.² Soldiers bound one at a time down a stairwell as rounds are impacting in the wall just over their heads.³ These are not scenes from a movie. They are urban combat footage from Ukraine. The ongoing war in Ukraine and the conflict in Gaza, as well as recent battles in cities across the world such as Mosul, Marawi and Shusha, underscore the growing need for military forces to grasp the challenges of urban warfare.

Source: www.voanews.com

Understanding urban warfare is becoming increasingly important because cities are centres of political, economic, logistical, environmental, military and social power.⁴ Also, there are intertwined trends that demonstrate the growing relevance of urban warfare. First, there is an ongoing global shift towards urbanization, which emphasizes the centrality of ever-growing cities. With the majority of the world's population now living in urban centres and millions more flocking to them every year, conflict too will continue to gravitate to the urban environment.⁵ For instance, as of 2022 Taiwan's population was roughly 80% urbanized.⁶ That number has only increased since then. As tensions rise over the contested territorial claims, a quick look at a satellite image reveals the densely populated urban areas of Taiwan. Any major conflict will likely be fought in the streets as the various actors vie for political control, seated in the heart of Taipei.⁷ This is just one example in a world of rapidly urbanizing areas and regions under threat of conflict. Second, and as argued by Anthony King, the prevalence of urban warfare is increasing due to the notably reduced sizes of contemporary land forces in comparison to historical armies.⁸ As cities expand, armies have become smaller, lethality has increased and precision fires have become more effective, so the fight is shifting from large swaths of rural land to the urban streets.⁹ Third, technological advancements make it favourable for the weaker enemy to operate in urban environments because of the defensive advantage.¹⁰

The prospect of having to engage in high-intensity conflict in such an environment is grim. However, if victory over the enemy is to be achieved, there is no alternative path. Urban warfare remains a demanding form of warfare that cannot be avoided or subordinated and requires a direct and resolute approach. Western armed forces are relatively inexperienced in urban operations with regard to higher operational planning, tactics and sustainment, and potential future opponents may exploit this disparity and lack of familiarity.

In the present context, it is difficult to predict how successful NATO forces would be in an urban battlefield, even if they are able to dominate in terms of professional soldiery, technology and logistics. There is a tactical, operational and strategic knowledge gap in the armed forces when their current tactics are compared to the tactics, techniques and procedures required to operate effectively in the urban environment. Major training centres do not reflect the current operating urban environment; they still mirror the Western European and Middle Eastern countryside that NATO forces have operated in for the past decades.

The joint allied force must grasp the nuances of urban warfare to bridge the existing knowledge and training gap between large-scale combat operations and the urban battlefield. By comprehending the idiosyncrasies

of urban warfare, the forces can be better prepared to engage the enemy during urban operations. Within the complex landscape of contemporary warfare, urban warfare remains relatively less well understood, and at times even subject to misunderstanding. This article aims to delve into the distinctive and demanding challenges posed by urban warfare, not only highlighting the factors that set it apart from other forms of conflict, but also presenting an understanding of the challenges faced by modern militaries.

THE URBAN ENVIRONMENT

Arguably, urban warfare is vastly different from any other form of warfare because the urban environment has been built and developed for decades, even centuries, to accommodate human life and even conflict. This results in a level of complexity that is unparalleled in other operating environments.¹¹ The intricacies of an urban setting create an extremely complicated condition set for soldiers and planners, with an environment that both passively and actively supports and enables both the defender and the attacker, while simultaneously degrading every combined arms element.

The word "urban" is a single catch-all term ascribed to a vast multitude of different areas. A side-by-side comparison of the slums of Mumbai and the stately boulevards of West London would yield few similarities at first glance. Cities exist on a spectrum varying from highly developed cities, such as London and Tokyo, which contain advanced, highly interconnected systems that keep what David Kilcullen calls "the organism" running.¹² These cities are extremely "healthy," with high-functioning infrastructure and systems of flow. On the opposite end of the spectrum are "feral cities."¹³ These types of cities exist without any form of governmental control and in a state of lawlessness where non-state actors hold informal authority over the entire population or parts of it. The following paragraphs explain some of the elements that must be considered in order to understand the urban environment:

Levels – An urban environment has four physical levels: the airspace, the surface, the super-surface and the subsurface (subterranean).¹⁴ The surface level is the easiest to identify, as it encompasses the street-level areas of a city. The term "super-surface" refers to structures that extend above the surface level, ranging from buildings to elevated roadways, mass transit, power lines, water towers and telecommunication structures. In modern cities, buildings include both residential structures and towering skyscrapers that contribute to the iconic skylines we associate with modern urban landscapes. Below the super-surface structure lies the subsurface, comprising tunnels for vehicles and pedestrians, subways, maintenance tunnels, cellars, storage areas, underground clubs and sewers. The vast subterranean networks are often poorly mapped beyond the subways

and sewers, particularly in historical cities with tunnels dating back centuries.¹⁵ Interestingly, despite some major differences, vastly different cities share some similarities, particularly in terms of the levels of urban terrain.

Flows – Within the mentioned four levels, there are flows.¹⁶ Money and commerce flow in and out of the city, food comes in, waste goes out, and humans move between homes, workplaces, grocery stores and leisure activities. These flows occur along a network of major and minor lines of communication. Often, a few major locations bear the brunt of this traffic. Certain single bridges or intersections can become crucially important locations by virtue of their location in relation to the flows.

City Regions – Cities can be further subdivided into sectors, quarters, precincts, boroughs, neighbourhoods and districts. These diverse areas can be characterized by dramatically different physical buildings, infrastructure, demographics, and even economies and governments. Residential areas typically consist of diverse structures – including apartments or single-family homes – housing large populations, especially at night. In contrast, commercial areas experience high levels of human activity and traffic during the business day with minimal occupancy at night. Industrial areas are generally devoid of residential life but contain infrastructure critical for the sustenance of the city.

Within these sectors, more complicated characteristics emerge and are shaped by the demographics of the residents. In different neighbourhoods, particularly where shift work is common, a one-bedroom apartment may accommodate up to twelve people, and most sleep in the middle of the day. In places like New York City's Chinatown, characterized by common shift work and numerous flammable buildings dating back to the 1890s, a single fire incident can result in disproportionately high casualties.¹⁷ Meanwhile, financial districts can be built with more modern, flame-resistant materials, towering hundreds of feet into the sky. The vastly diverse landscapes within the city introduce an additional layer of complexity to the already intricate network of civil services, infrastructure and life-sustaining functions.

The city region may also be influenced by factors such as quality of governance and security, as well as social order. For instance, in some cities, informal power structures often extend beyond official government channels.¹⁸ These informal power structures may act as shadow governments and conflict directly with the legal authorities. Local gangs and organized crime may control certain areas and even attack anyone who enters their “turf” without permission. Conversely, these same informal actors may provide stability in certain neighbourhoods without a formal government presence, whether for personal interest or in support of a combatant force. Informal

power structures can have an immense effect—whether positive or negative—on the sentiment of residents towards occupying forces. Such factors naturally affect the public sentiments and overall dynamics of an area or region, thus shaping the operating environment.


City location – Cities develop in areas that are easily accessible for trade, primarily along major lines of communication.¹⁹ Major waterways in particular have historically been the site of city development.²⁰ As global trade has increased and ports have become ever greater sources of economic wealth, more and more cities have developed in what is known as the littoral zone, the coastal areas along lakes, rivers and oceans.²¹ This is important for two reasons. First, many cities rely primarily on bodies of water for their economies.²² Second, some cities exist in extremely environmentally precarious locations.²³ Flood plains, low ground, swamps and peninsulas are all at risk of flooding in the event of hurricanes, monsoons or tropical storms. Particularly in the Indo-Pacific region, many cities sit on the verge of destruction on dangerously low ground such as Mauritius and the Solomon Islands. Military planners need to take into account not just the potential for high-intensity conflicts in cities, but also the increasing likelihood of being involved in humanitarian missions in densely populated urban areas impacted by flooding.

Although this article focuses on high-intensity conflict, it is important for planners to remember that cities and urban environment may require military involvement in various types of operations.

PHYSICAL TERRAIN

The urban terrain is more than just hills, ridges and valleys. It encompasses vast cityscapes of buildings, tunnels, streets and bridges constructed from millions of tons of concrete, wood and steel. From the smallest hovel in the grimmest slum to the shiniest skyscraper on the hill, these structures limit manoeuvre, create dead space, and provide cover and concealment. Windows provide endless firing positions for snipers, machine gunners and anti-tank teams. Even if these battle positions can be identified, modern building materials drastically reduce the effects of direct fire systems, shielding the enemy from harm. Buildings can be further altered to enable defenders. For instance, in Mosul, ISIS fighters intentionally rubble buildings to turn basements into impenetrable bunkers and to block roads.²⁴ On the other hand, buildings can also fix the defenders' orientation and restrict their line of sight. Context is important in such situations.

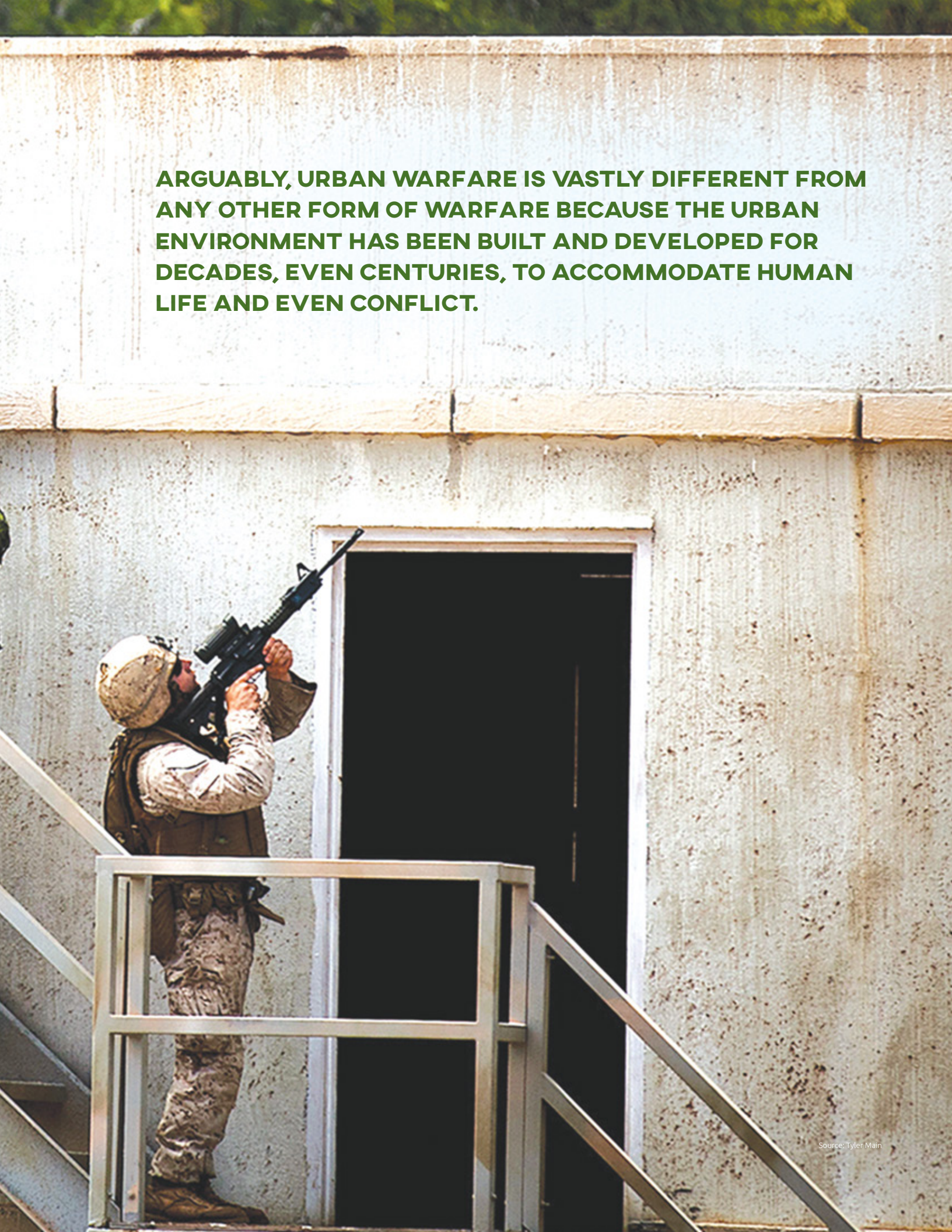
Movement and Manoeuvre – One of the formidable challenges faced by military forces in an urban battlefield is the restricted freedom of movement and manoeuvre. In urban centres there are warrens of roads, some in neat orderly rows, others in a chaotic scribble across the map.



These roads are bounded on both sides by buildings, rivers or other obstacles and naturally canalize and direct the flow of human traffic. This creates natural kill zones for any mounted and dismounted infantry and armour elements attempting to manoeuvre through the area. These narrow roads also serve to compartmentalize forces, creating physical barriers between adjacent units, preventing them from supporting or sometimes even communicating with each other. Individual units can easily become isolated, creating the dangerous potential of defeat in detail as individual elements are annihilated by a well-camouflaged enemy lurking in the shadows of buildings. This compartmentalization happens at multiple echelons, from battalion down to team level, making the need for the strategic corporal ever more pressing.²⁵ Platoon and section leaders must be able to execute complex missions in alignment with the commander's intent and the broader strategic mission, without the ability to communicate with higher commands.²⁶

Armour and infantry have a symbiotic relationship in the urban environment for mutual protection and overwatch, but urban centres become increasingly complicated for armoured force operations. For instance, without adequate support from the infantry, artillery and engineers, armoured forces are extremely vulnerable in this environment because buildings provide perfect overhead positions for anti-tank teams to target the thin top armour of vehicles. Vehicles such as the LAV 6.0 (the Canadian version of the US Army's Stryker) lack the firepower to effectively suppress and destroy hardened targets and lack the armour to stop anti-tank guided missiles, rockets and even bullets larger than 14.5 mm.²⁷ This implies that combined arms manoeuvre will have to rely primarily on tanks, which require a heavier logistical train and lack organic dismounts to support them.

ARGUABLY, URBAN WARFARE IS VASTLY DIFFERENT FROM ANY OTHER FORM OF WARFARE BECAUSE THE URBAN ENVIRONMENT HAS BEEN BUILT AND DEVELOPED FOR DECADES, EVEN CENTURIES, TO ACCOMMODATE HUMAN LIFE AND EVEN CONFLICT.



In an urban battlefield, vehicles and dismounted infantry rely on engineers to conduct mobility and counter-mobility operations to enable their manoeuvre. Some of the tasks include replacing destroyed bridges with temporary ones, breaching and clearing minefields and improvised explosive devices (IED), and employing bulldozers to breach or clear rubble, opening lines of communication. This puts combat engineers at the forefront, significantly increasing the risk to these valuable and limited units. Behind the front lines, construction engineer units are tasked to help rebuild destroyed infrastructure, particularly lines of communication, including roads and bridges that have been damaged, rubble or entirely destroyed.

Fires – The challenges of modern cities, which are continually expanding vertically, pose issues for the supporting components of a combined arms force. Cities with tall buildings in a grid layout create long urban canyons. Often, these canyons are too steep to allow cannon and rocket artillery with shallow trajectories to accurately target entities on the street without risking collateral damage to buildings along the path of the projectile.²⁸ This forces manoeuvre elements to rely primarily on high-angle indirect fire systems such as mortars or expensive precision-guided munitions such as the “Excalibur” round that can fire over buildings into narrow streets without hitting a structure.²⁹ The urban terrain also greatly degrades close air support capabilities. Between tall buildings, the air corridors for close support aircraft are narrow, which creates aerial kill zones for well-placed shoulder-fired anti-air weapons. Low-flying rotary wing assets must navigate urban canyons festooned with cables, wires and other civilian detritus that can easily down a helicopter. Engagement ranges in urban warfare are historically within 50 metres, leaving little room for an Apache gunship helicopter or an 81mm mortar round to be added to the mix.³⁰ Even the visibility of ground forces is significantly limited by buildings, creating an extreme risk for fratricide and collateral damage.

Physical Structures – The physical structures within urban environments and particularly buildings exhibit a wide range. Some are built with the idea of luxury and style characterized by soaring glass windows that become hails of flying shrapnel at the first explosion within five blocks. Other buildings include sturdy municipal and financial centres, built with concrete and steel. Notably, even shoddy brickwork and planks can divert, splinter or entirely stop direct fire weapons systems. Newer, more modern buildings are equipped with advanced security measures designed to defend against criminals, which can become dangerous obstacles or helpful measures in an urban fight. These features may include reinforced metal doors and walls, advanced camera systems, screens and barriers in many buildings. For a competent defender, these can easily be incorporated into the defence of a building. Given their

internal security, such buildings can become strongpoints for a coordinated defence-in-depth. Multiple strategically picked hard targets, bristling with firepower and full of obstacles, can halt an attacker in their tracks. For instance, during the battle of Stalingrad (23 August 1942–02 February 1943) Soviet soldiers held out for more than 60 days within a single strongpoint building.³¹ Internal mouseholes can be carved through walls, facilitating easy movement from room to room, and subterranean tunnels allow for the storage of weapons and ammunition caches, effective resupply and the rotation of exhausted soldiers. The Islamic State used both these tactics extensively during the Battle of Mosul in Iraq (16 October 2016–20 July 2017), relying on tunnels carved between basements to manoeuvre under entire city blocks without being spotted by coalition airborne surveillance systems.³² In the Gaza Strip, Hamas has utilized the subterranean tunnel network for similar purposes.

Subsurface (Subterranean) – The subterranean aspect of urban warfare is an entirely separate head of the hydra worthy of its own books and articles. In fact, the U.S. Army has dedicated a separate doctrinal publication to the subject.³³ Subterranean operations are extremely complex and dangerous. Coordination by radio-frequency communications becomes nearly impossible. Fights are condensed in time and space into the confines of pitch-dark hallways that can quickly fill with toxic gas and overpressure against which modern gas masks offer no protection.³⁴ Underground networks provide vast protected lines of communication that stretch well beyond the limits of cities and connect individual buildings to each other. Tunnels have long been used as a means of subverting prying eyes. The stories of American tunnel rats in the Vietnam War (1959–1975) underline the horrors of subterranean warfare, but on a much smaller scale than that of the violence that takes place in the depths of far more complex modern subterranean networks. With modern uncrewed aerial systems and intelligence, surveillance and reconnaissance platforms, the importance of tunnels expands as enemies try to dodge the NATO intelligence apparatus. With the right knowledge of tunnels, a defender can appear in the exact place where an attacker hoped they would not. It is simply a matter of time and preparation, making it increasingly imperative for Western forces to think like the enemy and navigate the challenges accordingly.

Communication – At all levels—the surface, subsurface and super-surface—radio frequency communications are degraded in an urban setting. The tons of concrete and steel act as physical barriers for line of sight and satellite communications. Cities are filled with transmitters, receivers and various types of emission-based electronic devices. This will clutter airwaves, creating spoof signals, jamming and other types of issues. Buildings made of reinforced concrete act as Faraday cages, inhibiting radio

communications inside them. With the addition of modern electronic warfare systems, radio communications are further jammed, tracked and degraded.³⁵ Urban canyons can prevent units from using their tactical communication systems to connect with their comrades a few blocks away.³⁶ The situation is further confounded by electromagnetic clutter.³⁷ The confluence of these challenges highlights the need for mission command, empowering junior leaders to take the initiative within the framework of the commander's intent and minimizing the need to be in constant communication with the chain of command and seek regular guidance.

Logistics – High-intensity conflict within a city inevitably leads to the destruction of critical infrastructure, thus impacting logistics. The impact is especially profound in highly developed urban centres where millions rely on a limited number of central water treatment facilities to keep them hydrated, and on external supply routes for sustenance given the lack of food production within the city. In a conflict, artillery, missiles and even direct fire munitions can damage and destroy critical infrastructure very quickly. Modern munitions can crater main supply routes and sever subterranean water pipes, leaving people without access to food and clean water. The urban environment is punishing for soldiers too. Logistical convoys are forced to try to navigate through cities with damaged or blocked roadways. Supplies will frequently have to be transported manually to the forward line of troops using personnel alone, who must haul heavy boxes of ammunition, food and water, potentially for kilometres, up into tall buildings or down into subterranean spaces. Needless to say, such activities take an extreme toll on soldiers' physical endurance. Urban combat is expected to consume four times more ammunition and two-and-a-half times more rations and water than rural combat.³⁸

By the same token, the three-to-six times more casualties expected to be sustained in urban combat cannot be evacuated by ambulance. They need to be carried out on stretchers, again placing the burden on exhausted muscles and forcing combat medics to extend their care long past the traditional golden hour.³⁹ With the dangers of human-portable air-defence systems, narrow flight corridors, and minimal room to land, resupply, and conduct medical evacuations, one cannot rely heavily on helicopters either. Casualties that occur in the underground depths or on high floors of a building must first be moved to street level, while the precious time needed to save their lives is dwindling. Urban terrain drastically increases the risk of casualties succumbing to their wounds even before reaching an ambulance, let alone a forward surgical unit.

In addition, lines of communication between forward lines and division, brigade and battalion sustainment and command echelons will need to be maintained

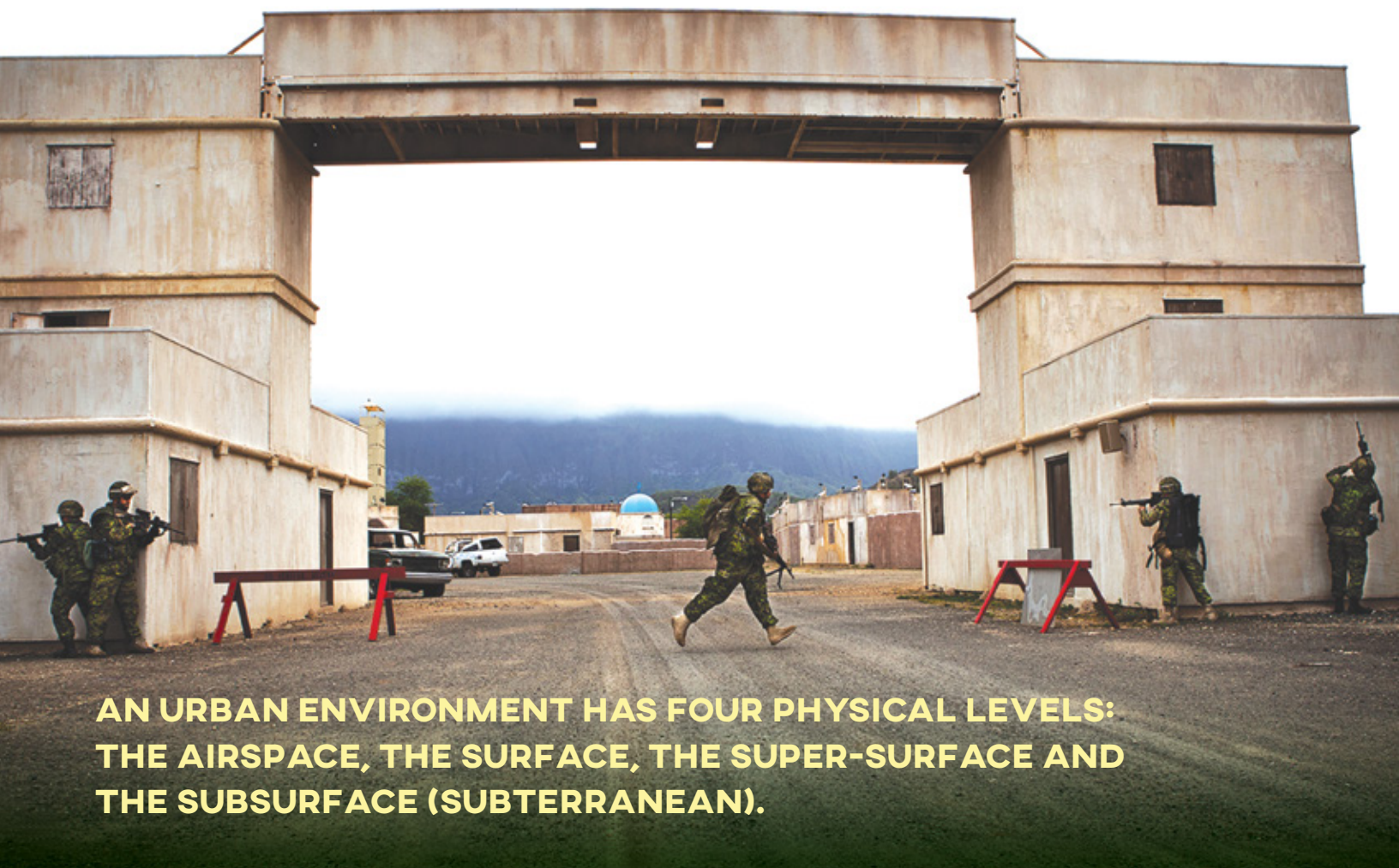
and secured by military police (MP) units. Camps for enemy prisoners of war and internally displaced people will need to be established, and the processing of massive numbers of civilians can potentially overwhelm individual MP units attached to manoeuvre brigades.

Chemical, Biological, Radiological and Nuclear (CBRN) – Urban operations may face subtle yet perilous CBRN threats with lethal consequences. Highly developed cities generally have stable waste disposal systems to prevent the buildup of human waste. Underdeveloped and feral cities often lack them entirely. In the event of high-intensity conflict, existing waste disposal systems are disrupted. Consequently, human waste begins to accumulate in greater quantities as fighting continues.⁴⁰ Trash, bodily fluids and decomposing corpses host dangerous pathogens that can have drastic impacts on combat power. Mortuary affairs units tasked with the disposal of the dead are expected to be overwhelmed by the volume, including many bodies trapped or buried under rubble or in deep fighting positions. There is no provision for the mass cleanup of human waste other than individual-level waste bags which will be discarded and left in the city. Moving up a level, cities with manufacturing and commercial areas tend to host dangerous industrial chemicals. Any leak of these chemicals, by errant fire or deliberate action, can kill or maim anyone who encounters them. Similarly, any radiological or nuclear-powered facility, such as the Zaporizhia Nuclear Plant in Ukraine, is an extremely high-value target that will pose unimaginable risks.⁴¹

HUMAN TERRAIN

The human terrain of a city makes urban warfare increasingly daunting and demanding. Cities are populated by citizens, a term with a Latin root, "civitas," which means "city."⁴² A city exists fundamentally for the people who occupy it, the thousands to millions of people that make up the teeming urban area where they live and work daily. In the event of a high-intensity conflict in a city, the people do not magically disappear as in the video game "Call of Duty."⁴³

Before initiating operations, military forces must make significant efforts to evacuate civilian populations. Traditionally, many people choose to flee—flooding lines of communication and creating gridlock traffic across the city—and roughly 10% or even more refuse to leave and instead remain in their homes or in designated or improvised bomb shelters.⁴⁴ As a result, any offensive operation must account for the massive risk of heavy civilian casualties. Fireplans, close air support and even house-to-house manoeuvre must always take civilian casualties into consideration, and tactics must be adjusted to protect non-combatants amid the lethal storm. In the event of high-intensity urban combat, civilians will



Source: Tyler Main

unfortunately become casualties, regardless of the efforts made by forces to mitigate collateral damage. Strategists and planners must create proactive plans on how to deal with civilians before, during and after the urban battle.

Likewise, and as witnessed in Ukraine, the defenders too must divert precious resources towards the protection, evacuation and control of the civilian populace.⁴⁵ The Russo–Ukrainian War, the Syrian Civil War and the conflict in Gaza have shown the massive international impact refugees can have. A flood of refugees moving across international borders to escape conflict zones or a humanitarian crisis puts pressure on multiple nations and governments, creating more chaos, more instability and a further crisis for the international community.⁴⁶ For valid reasons, a refugee or humanitarian crisis garners international attention and prompts calls for action, particularly in neighbouring countries not already directly involved in the conflict.⁴⁷ This serves to raise the intensity of the conflict as more external resources become involved, spiralling the conflict into ever greater magnitude.

However, defenders fighting in their native cities are often afforded a unique opportunity: the mobilization of the civilian populace. For instance, in Ukraine the mobilization of civilians may not have provided a deep reserve of combat troops, but it released experienced soldiers from rear echelon duties. This enabled them to engage actively in the fight while newly recruited civilian volunteers assumed mundane tasks that had previously diverted combat-ready troops.⁴⁸ Popular support is a major factor of the human terrain. The effort to “win hearts and minds” is not limited to counter-insurgency, as the civilian population can still play a crucial role in high-intensity conflict.⁴⁹ Civilians may choose sides based on whom they view as the friendly force, whoever best represents their interests or whoever aligns with their political or ideological leanings. This support does not always manifest in the form of large groups of civilian volunteers taking to the streets in guerrilla action as depicted in movies. Their role can be as straightforward as warning a convoy about the presence of an IED on a road or sharing a video that is recording enemy troops in the area. Such acts of support can wreak havoc on an enemy force. To put it differently, whichever side wins the popular support has a distinct advantage in the vast sea of potential human

intelligence.⁵⁰ In extreme cases, where the civilian population takes up arms as part of a popular resistance force, these irregular forces can act as auxiliaries, scouts or partner forces for their chosen side, adding a hybrid layer to the more conventional combat between conventional forces.

While the fight rages on, there will be constant surveillance and recording by civilians in the vicinity. Events in Ukraine confirm that online videos can have outsized impacts.⁵¹ Soldiers on the ground in high-intensity urban conflict remain under the scrutiny of the entire world. Operational security is tested to the limit, and possibly defeated by counter-intelligence forces acting through the cyber domain.⁵² Additionally, throughout the ongoing war in Ukraine, on-the-ground video footage has been used to stir sentiments, drive recruitment and aid shipments, and even used as evidence in war crimes trials.⁵³ How military forces at the lowest echelons conduct themselves can have a global impact, as well as extreme implications for strategic-level conflict, reinforcing the need for the strategic corporal.

From a certain perspective, it might seem that addressing the challenges of civilian refugees is not a responsibility directly relevant to manoeuvre forces. However, as cities experience mass exodus, the supporting branches may become overwhelmed trying to process and provide aid for potentially millions of people. Soldiers of all specialties will be required to conduct humanitarian missions of some variety, whether they involve the infantry units diverted to rescue and evacuate civilians from a combat zone, the military police processing and screening displaced people, medical units providing care to countless injured and ill, or logistics units transporting and distributing tons of humanitarian rations to prevent starvation for millions of displaced persons.

The heavy density of civilians in urban areas also drastically increases the risk of war crimes against civilians. Although most NATO forces are held to an extremely high standard of conduct in accordance with international humanitarian law, there is always the risk that a small group of individuals will take advantage of the situation.⁵⁴ Likewise, the enemy may not always have qualms about brutality towards the civilian population. Sexual assault, murder and torture are likely to occur, with the potential for genocide, ethnic cleansing or crimes against humanity. The continual uncovering of mass graves in occupied Ukraine is indicative of adversarial behaviour towards civilians.⁵⁵

CONCLUSION

The worldwide trend towards urbanization, technological progress, smaller land forces and the efficacy of precision firepower all point to the likelihood of future battles being predominantly urban in nature. The challenges and dangers associated with urban combat operations are extremely daunting and pose a formidable challenge for any military

force, but especially for the Western militaries given their relatively limited experience on the urban battlefield. These shifts in warfare demand greater attention and proactive adaptation by the Canadian Armed Forces and its NATO allies. Because knowledge is the most powerful tool when navigating urban warfare, this article analyzed the complexities of the urban environment—with a particular focus on the physical and human terrain—and highlighted the unique demands it places on the soldiers, sailors and aviators of today and tomorrow. Beyond sheer violence of action, successful military endeavours in urban settings require strategic planning and execution led by knowledgeable, competent leaders. Ignorance of the arduous challenges on the urban battlefield puts the lives of our soldiers, sailors and aviators at risk—an unacceptable price for incompetence. For our militaries to navigate the complexities and win the next urban battle, the first steps must be to recognize the challenge, identify the gaps in current preparations and address them effectively. 🍀

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ENDNOTES

1. The Sun, "Ukrainian Soldier bodycam shows rocket launcher taking out Russian tank," 19 April 2022, <https://www.youtube.com/watch?v=X0q7UMtqsH4>.
2. Retro Foto House, "Ukrainian BTR-4 annihilates Russian infantry with 30mm gun," 24 April 2022, https://www.youtube.com/watch?v=8Smi2OYT_Ng.
3. WarLeaks – Military Blog, "Ukrainian Foreign Legion in Heavy Urban Combat With Russian Spetznaz in Severodonetsk," 17 June 2022, <https://www.youtube.com/watch?v=z115lsQ90Es>.
4. Andres Cadena, Richard Dobbs and Jaana Remes, "The Growing Economic Power of Cities," *The Journal of International Affairs* 65, no. 2 (2012).
5. "68% of the World Population Projected to Live in Urban Areas by 2050, says UN" (United Nations: 16 May 2016), <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>.
6. "Taiwan: Urbanization," *CIA World Factbook*, updated 19 September 2022, <https://www.cia.gov/the-world-factbook/countries/taiwan/>.
7. Lindsay Maizland, "Why China-Taiwan Relations Are So Tense," *The Council on Foreign Relations*, updated 3 August 2022, <https://www.cfr.org/backgrounder/china-taiwan-relations-tension-us-policy-biden>.

8. Anthony King, *Urban Warfare in the Twenty-First Century* (Cambridge: Polity, 2021), 288.
9. Ibid.
10. Mikael Weissmann, "Urban Warfare: Challenges of Military Operations on Tomorrow's Battlefield," in *Advanced Land Warfare: Tactics and Operations*, ed. Mikael Weissmann and Niklas Nilsson (Oxford: Oxford University Press, 2023), 125–151, <https://doi.org/10.1093/oso/9780192857422.003.0007>
11. John Spencer and Jayson Geroux, "Defending the City: An Overview of Defensive Tactics from the Modern History of Urban Warfare," *The Modern War Institute* (14 February 2022), <https://mwi.usma.edu/defending-the-city-an-overview-of-defensive-tactics-from-the-modern-history-of-urban-warfare/>.
12. David Kilcullen, *Out of the Mountains: The Coming Age of the Urban Guerrilla* (Oxford: Oxford University Press, 2013).
13. Richard J. Norton, "Feral Cities," *Naval War College Review* 56, no. 4 (Autumn 2003), <https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=2342&context=nwc-review>.
14. *TC 2-91.4: Intelligence Support to Combat Operations* (Army Publishing Directorate, December 2015), <https://irp.fas.org/doddir/army/tc2-91-4.pdf>.
15. John Spencer, "Discovering Jerusalem's Hidden Urban Warfare Lessons," *The Modern War Institute* (03 September 2021), <https://mwi.usma.edu/discovering-jeruselems-hidden-urban-warfare-lessons/>.
16. Max Galka, "What does New York do with all its trash? One city's waste in numbers," *The Guardian*, 27 October 2016, <https://www.theguardian.com/cities/2016/oct/27/new-york-rubbish-all-that-trash-city-waste-in-numbers>.
17. William "Billy" Carlson, New York City Fire Department (personal communication, 22 June 2022).
18. Kilcullen, *Out of the Mountains*.
19. Joseph Bogan and Aimee Feeney, "Future Cities: Trends and Implications," *Defense Science and Technology (DSTL)* (17 February 2020).
20. Ibid.
21. Liz Creel, "Ripple Effects: Population and Coastal Regions," *Population Reference Bureau*, 25 September 2003, <https://www.prb.org/resources/ripple-effects-population-and-coastal-regions/>.
22. Ibid.
23. R.J. Nicholls, S. Hanson, C. Herweijer, N. Patmore, S. Hallegatte, Jan Corfee-Morlot, Jean Chateau and R. Muir-Wood, "Ranking of the World's Cities Most Exposed to Coastal Flooding Today and in the Future: Executive Summary," Organization for Economic Co-operation and Development, 2007, <https://climate-adapt.eea.europa.eu/en/metadata/publications/ranking-of-the-worlds-cities-to-coastal-flooding/11240357#:~:text=These%20include%20Tokyo%2C%20New%20York,in%20driving%20extreme%20sea%20levels>.
24. John Spencer and Jayson Geroux, "Case Study #2 – Mosul," *The Modern War Institute*, 15 September 2021, <https://mwi.usma.edu/urban-warfare-project-case-study-2-battle-of-mosul/>.
25. Major Lynda Liddy, "The Strategic Corporal," *The Australian Army Journal* 2, no. 2, 139–148. <https://smallwarsjournal.com/documents/liddy.pdf>.
26. Franklin Annis, "Krulak Revisited: The Three-Block War, Strategic Corporals, and the Future Battlefield," *The Modern War Institute*, 3 February 2020, <https://mwi.usma.edu/krulak-revisited-three-block-war-strategic-corporals-future-battlefield/>.
27. "LAV6.0," *General Dynamics: Land Systems – Canada*, <https://www.gdlsCanada.com/products/LAV/LAV-6.0.html>.
28. 1st Lieutenant Christopher R. Boris, "Low-Angle Fires in MOUT," *Field Artillery*, November–December 2001, p. 43, https://tradocfcoeccafcoepfwp.prod.blob.core.usgovcloudapi.net/fires-bulletin-archive/2001/NOV_DEC_2001/NOV_DEC_2001_FULL_EDITION.pdf.
29. "Excalibur Precision 155mm Projectiles," *United States Army Acquisition Support Center*, 2022, <https://asc.army.mil/web/portfolio-item/ammo-excalibur-xm982-m982-and-m982a1-precision-guided-extended-range-projectile/>.
30. *FM 3-06.11: Combined Arms Operations in Urban Terrain* (Headquarters, Department of the Army: 10 June 2011), Ch 1. <https://www.globalsecurity.org/military/library/policy/army/fm/3-06-11/ch1.htm>.
31. Matthew Gaskill, "Pavlov's House: 'Fortress' of Stalingrad," War History Online, 17 June 2018, <https://www.warhistoryonline.com/world-war-ii/pavlovs-house-stalingrad.html>.
32. John Spencer and Jayson Geroux, "Case Study #2 – Mosul" (Modern War Institute, 15 September 2021), <https://mwi.usma.edu/urban-warfare-project-case-study-2-battle-of-mosul/>.
33. *ATP 3-21.51: Subterranean Operations* (Headquarters, Department of the Army: 01 November 2019), https://armypubs.army.mil/ProductMaps/PubForm/Details.aspx?PUB_ID=1008062.

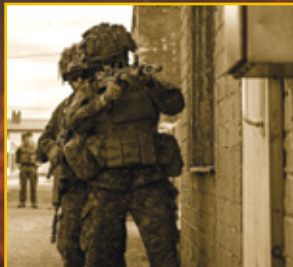
34. G.H. Kamimori, L.A. Reilly, C.R. LaValle and U.B. Olaghere Da Silva, "Occupational Overpressure Exposure of Breachers and Military Personnel," *Shock Waves*, 27 (2017), 837–847, <https://link.springer.com/article/10.1007/s00193-017-0738-4>.
35. Lock Wai Lek and David Jenn, *Effects of Radio Wave Propagation in Urbanized Areas on UAV-GCS Command and Control* (Pennsylvania State University, 2003), <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.597.417&rep=rep1&type=pdf>.
36. Ibid.
37. Samuel Cranny-Evans, "Fields of Silence and Broken Cycles: Russia's Electronic Warfare," *Global Defense Technology* 133 (18 March 2022).
38. Major Jayson Geroux, Canadian Armed Forces (personal correspondence).
39. *ATP 4-02.2 Medical Evacuation* (Headquarters, Department of the Army: July 2019), Chapters 2–22; Lt. Col. Brian Beldowicz, Maj. Michael Bellamy and Maj. Robert Modlin, "Death Ignores the Golden Hour," *Army University Press*, March–April 2020, <https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/March-April-2020/Beldowicz-Golden-Hour/#:~:text=The%20first%20hour%20after%20the,resources%20supporting%20areas%20of%20operation>.
40. "Leftover Mines, Dead Bodies Still Haunt Mosul Residents Years after War with ISIS," *PBS News Hour*, 22 June 2021, <https://www.pbs.org/newshour/show/leftover-mines-dead-bodies-still-haunt-mosul-residents-years-after-war-with-isis>.
41. Victor Jack and Sergei Kuznetsov, "How Real is the Danger from Ukraine's Zaporizhzhia Nuclear Plant?" *Politico*, 10 August 2022, <https://www.politico.eu/article/how-real-is-the-danger-from-ukraines-zaporizhzhia-nuclear-power-plant/>.
42. "Civitas," *Merriam-Webster.com Dictionary*, <https://www.merriam-webster.com/dictionary/civitas>.
43. *Call of Duty: Modern Warfare 2* (Infinity Ward: 10 November 2009).
44. Major Jayson Geroux, Canadian Armed Forces (personal correspondence).
45. Natalia Zinets, "Ukraine Struggles to Evacuate Civilians from Devastated Eastern City," *Reuters News*, 14 June 2022, <https://www.reuters.com/world/europe/russian-forces-cut-off-last-routes-out-eastern-ukraine-city-2022-06-13/>.
46. "Refugee Crisis in Europe," *United Nations High Commissioner for Refugees*, <https://www.unrefugees.org/emergencies/refugee-crisis-in-europe/>.
47. Patricia Cohen, "Refugee Crisis Will Test a European Economy Under Pressure," *The New York Times*, 16 March 2022, <https://www.nytimes.com/2022/03/16/business/economy/ukraine-refugee-crisis-europe-economy.html#:~:text=Resettling%20the%20refugees%20fleeing%20Ukraine,people%20would%20reshape%20Europe's%20economy>.
48. Adam Taylor, "As Russians Advance on Kyiv, Ordinary Civilians Heed Calls to Fight for Ukraine However They Can," *The Washington Post*, 25 February 2022, <https://www.washingtonpost.com/world/2022/02/25/ukraine-civilians-weapons-molotov/>.
49. Paul Fishstein, "Winning Hearts and Minds in Uruzgan Province," *Feinstein International Center*, Tufts University, August 2012, <https://fic.tufts.edu/wp-content/uploads/Uruzgan-Report.pdf>.
50. *FM 2-22.3 Human Intelligence Collector Operations* (Headquarters, Department of the Army: September 2006) <https://irp.fas.org/doddir/army/fm2-22-3.pdf>.
51. Yousur Al-Hlou, Masha Froliak, Evan Hill, Malachy Browne and David Botti, "New Evidence Shows How Russian Soldiers Executed Men in Bucha," *The New York Times*, 19 May 2022, <https://www.nytimes.com/2022/05/19/world/europe/russia-bucha-ukraine-executions.html>.
52. Jack Hardy, "British Volunteer Fighters May Have Triggered Deadly Strike on Ukrainian Base After Their Phones Were Detected," *The Telegraph*, 19 March 2022, <https://www.telegraph.co.uk/world-news/2022/03/19/british-volunteer-fighters-may-have-triggered-deadly-strike/>.
53. Guardian News, "Ukrainian Woman Offers Seeds to Russian Soldiers So 'Sunflowers Grow When They Die,'" 25 February 2022, <https://www.youtube.com/watch?v=L17Bi7zBJHI>; Yousur Al-Hlou et. al., "New Evidence," *The New York Times*, 19 May 2022, <https://www.nytimes.com/2022/05/19/world/europe/russia-bucha-ukraine-executions.html>.
54. "What Is International Humanitarian Law?" Advisory Service on International Humanitarian Law, International Committee of the Red Cross, July 2004, https://www.icrc.org/en/doc/assets/files/other/what_is_ihl.pdf.
55. Andrew Kramer and Marc Santora, "At Mass Grave Site in Ukraine's Northeast, a Sign of Occupation's Toll," *The New York Times*, 16 September 2022, <https://www.nytimes.com/2022/09/16/world/europe/ukraine-graves-russia.html>.



INTELLIGENCE PREPARATION OF THE URBAN ENVIRONMENT:

ADOPTING A COMPLEX ADAPTIVE SYSTEMS APPROACH

Captain Colin Papuschak



INTRODUCTION

Military operations in urban environments present unique challenges that demand a comprehensive understanding of their interconnected components. As a result of the density, dynamism and interconnectedness of data points, the core components of the urban environment—human terrain, physical terrain and infrastructure—interact in seemingly unpredictable ways that often frustrate military forces. Peacekeeping operations in Port-au-Prince and Mogadishu, counter-insurgency operations in Fallujah and Marawi and major combat operations in Bakhmut and Sievierodonetsk are poignant examples of urban environments that posed enormous challenges to all combatants. In the 2015 *Canada's Future Army* series, the Canadian Army Land Warfare Centre (CALWC) conceived that rapid urbanization compounds poverty and insecurity of health care, water and energy, especially in developing regions, increasing tensions and the prospect for armed conflict.¹ *Close Engagement: Land Power in an Age of Uncertainty* reinforced this concern, stating that “not only are urban operations expected to become more frequent, but they may well pose the highest degree of challenge owing to their human, environment, geographic and physical complexities.”²

Source: Combat Camera

To navigate this complex landscape, intelligence preparation takes on paramount importance. More than any other environment, urban operations demand intelligence with greater targeting precision to discriminate between adversarial actors and innocent civilians and to reduce collateral damage. This is partly due to the sheer density of urban populations and the tactics employed by some adversaries to use civilian populations as camouflage and concealment. However, the ability to deliver greater targeting precision is exasperated by the complexity of the urban environment.

The urban environment must be analyzed as a complex adaptive system with an approach responsive to the demands of a given campaign theme. While CFJP 2-1.1 *Intelligence Preparation of the Operational Environment* promotes taking a “systems perspective” of the operating environment, this article contends that this perspective must be taken a step further in urban environments, moving beyond a general systems theory to complexity theory for deeper understanding.

UNDERSTANDING THE URBAN ENVIRONMENT

Many attempts have been made to better understand the nature of urban environments, often turning to metaphors and natural sciences to make sense of their deep complexities.³ Cities have often been described as “complex adaptive systems,” and this article advocates including this concept in the intelligence preparation of the urban environment.⁴ Complex adaptive systems are *complex* with a dynamic network of interactions. However, the behaviour of the ensemble may not be predictable according to the conduct of the individual components.⁵ They are *adaptive*, which implies that the individual and collective behaviour mutate and self-organize, thus corresponding to a change-initiating micro-event or collection of events.⁶

This is not the first effort to employ complexity theory and complex adaptive systems for intelligence preparation of the operating environment. Tom Pike, Eddie Brown, and Piotr Zagorowski have developed and advocated for a “Complex Intelligence Preparation of the Battlefield (IPB).”⁷ They employ fitness landscapes and agent-based modelling to better understand how the choices available to actors within the social–political–economic system (or fitness landscape) are constrained by the system and how each actor employs their fitness functions (or competitive advantage) when interacting with their social–political–economic landscape. Complex IPB also restructures the traditional four-step IPB process into a seven-step process. There is merit in this proposal, but if Pike’s contribution of “Complex IPB” is regarded as disruptive to well-established military planning processes, this article represents a more evolutionary approach to integrating complex adaptive systems into the existing process of intelligence preparation of the operating environment.

COMPLEXITY THEORY AND COMPLEX ADAPTIVE SYSTEMS

There is a notable difference between the “systems perspective” proposed in CFJP 2-1.1 and the complexity theory from which the idea of complex adaptive systems is derived. CFJP 2-1.1 describes a system as “an interconnected or interrelated network, group, or chain of functionally, physically, and/or behaviorally related interdependent elements that form a functional whole.”⁸ While not explicitly stated, this description leans heavily on general systems theory, a reductionist framework that focuses on understanding systems by breaking them down into their individual parts and studying how these parts interact with each other.⁹ Where CFJP 2-1.1 does describe systems as “complex,” it still does so in terms of general systems theory.¹⁰

Like general systems theory, reductionist frameworks are regarded by some as inadequate due to the complexities of the modern world. Complexity theory “expands on the reductionist framework by not only understanding the parts that contribute to the whole but by understanding how each part interacts with all other parts and emerges into a new entity, thus having a more comprehensive and complete understanding of the whole.”¹¹ In other words, complexity theory considers the emergent properties of a system that arise from the interactions between its parts and offers *complex adaptive systems* as a means for understanding systems like these.¹² This approach is better suited for understanding systems like stock markets, ecosystems, and cities that exhibit unpredictable behaviour and cannot be fully understood by studying their individual parts in isolation.

Complex adaptive systems generally refer to dynamic, open systems that can self-organize their configuration by exchanging information, energy, and other resources within their environment can transform these resources. Organic interactions within and between systems occur as the system’s components learn to adapt, making the system very dynamic.¹³ Complex adaptive systems tend to transform into new stable states—a characteristic known as emergence—and any description of the system cannot be objective, complete or permanent.¹⁴

Haiti’s tumultuous capital city, Port-au-Prince, offers a ready example of the urban environment as a complex adaptive system. The city faces unique and serious problems—an estimated 80% of the city is under the control of gangs that have grown significantly stronger in recent years by establishing alliances with other armed groups, creating some seven major gang coalitions and approximately 200 affiliated groups, according to a recent United Nations report.¹⁵ Increasingly, there are fears of an emerging civil war during an enduring political crisis since the assassination of President Jovenel Moïse in 2021.¹⁶ In the sections below, Port-au-Prince will serve



Source: Combat Camera

as a case study for understanding the characteristics of complex adaptive systems that are relevant to intelligence preparation of the urban environment.

Emergence

Emergence refers to the arising of new properties or characteristics in a system that cannot be reduced to the sum of its parts. It is a phenomenon where new patterns, structures or behaviours arise from the interactions between the components of a complex system. These interactions are self-organizing with no external direction leading them. These emergent properties are often unpredictable and cannot be understood by simply analyzing the system's individual components. Instead, they result from the collective behaviour of the system as a whole.¹⁷

The concepts of emergence and self-organization are evident in the case of Port-au-Prince.¹⁸ There has long been a relationship between Haiti's political elite and the country's non-state armed actors. The seeds of this equation emerged as early as 1959 when President Dr. François "Papa Doc" Duvalier, deeply mistrustful of the military due to an attempted coup the year prior, organized a private militia known as *Tontons Macoutes* ("Boogeymen"), which maintained order by terrorizing the populace and political opponents. The *Tontons Macoutes* reportedly murdered between 30,000 and 60,000 Haitians. Countless more were sexually and physically assaulted and tortured with their violent excesses outliving the Duvalier dynasty's demise in 1986.¹⁹

After being removed by a military coup in 1991, then-President Jean-Bertrand Aristide returned to power in 1994, disbanded the military and began arming his political supporters in the slums of Port-au-Prince. Haiti's political and economic elite frequently turned to street gangs to intimidate their opponents, offering them financial support, weapons and protection from law enforcement in return for their loyalty. But these relationships appear to have ruptured after the 2021 assassination of Haitian President Jovenel Moïse, the erstwhile benefactor of the infamous G9 family of gangs led by Jimmy "Barbecue" Chérizier.²⁰

Chérizier was not content to find a new political sponsor after Moïse's death. He preferred to upend the established order by attempting to assert dominance over the political elite and rival gangs. He carved out yet more territory and eventually controlled Port-au-Prince's port facilities that were used to extort politicians by throttling port activity.²¹ By controlling the port facilities, Chérizier's G9 no longer relies on previous patron-client relationships with the political elite. A new stable state is emerging with new relationships, and Chérizier is attempting to position himself as the leader of a revolutionary movement.²² This example illustrates the self-organization of the system's components in the absence of external direction and the emergence of new patterns of behaviour amongst these components, leading to a new stable state or equilibrium.

The gang activity in Haiti cannot be generalized so simply. Complex adaptive systems are not analyzed assuming linear causality or even multiple causality. They employ a connectionist perspective wherein the interactions among and between elements are viewed along with the system's adaptiveness to environmental forces.²³

Adaptiveness

Adaptiveness refers to a system's ability to change its behaviour or structure in response to changes in its environment or internal conditions. This allows a system to cope with uncertainty, complexity and unpredictability and to evolve into new states or configurations. Adaptiveness is also related to learning, as a system can use feedback and information from its interactions to modify its actions and expectations.

Recently, in Port-au-Prince, vigilante attacks by residents targeting suspected gang members have grown into a movement named *Bwa Kale*, Haitian Creole for "peeled wood," a crude metaphor for phallus, insinuating merciless male dominance. Increasingly frequent vigilante attacks suggest internal adaptation within the system in response to the dangerous uncertainty posed by gang violence.²⁴ That noted, Haiti has a long history of vigilantism, and it would be misleading to characterize the current *Bwa Kale* movement as something new. In contrast to previous movements, it is unique in terms of the environmental conditions that led to its emergence.

As Haiti's political crisis continues with no legitimate legislative or executive leadership and no prospect for democratic elections, the actors within the system are adapting to a new political landscape where gangs are the de facto authority in much of the country. The state's security apparatus, embodied in the Police Nationale d'Haiti, itself beset with corruption, is one of many armed actors and arguably not the strongest.²⁵ It would be misguided to characterize this system as "ungoverned," as is sometimes the tendency when describing "feral" cities and failed states (more on this terminology below). Even where the central government is incapable of providing public goods, local governance is provided through a complex mix of informal structures provided by gangs, vigilante groups and other local and international civil society actors providing social services and security.²⁶

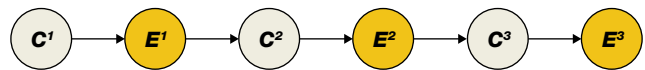
The Port-au-Prince urban system has adapted to the ongoing political, social and economic crises that have gripped the nation. One can reasonably anticipate that any foreign military intervention in the city would result in new adaptations, whether a peace support operation or a non-combatant evacuation operation. This is largely because the system's components react to the intervention of a new agent and the behaviour of the system adapts. However, because of the nonlinear nature of complex adaptive systems, it would be challenging to predict the exact contours of these adaptations leading to the next characteristic of complex adaptive systems.

Nonlinearity

Nonlinear dynamics is a branch of mathematics that studies systems whose behaviour is not directly proportional to the input.²⁷ Small changes in the initial conditions can result in large and often unpredictable changes in the system's behaviour. Nonlinear systems are often complex and can exhibit a wide range of behaviours, including chaos, bifurcations and multiple stable states.

The decision of some Port-au-Prince residents in April 2023 to attack and execute suspected gang members on their own appears to be setting in motion greater momentum of vigilantism in the city. While it is difficult to predict the evolution of the *Bwa Kale* movement and its effects, a small change in the system represented by the April attack may yield large changes in the system's future behaviour. Some regional experts are already concerned that the movement may expand into criminal economies.²⁸

One potential way of mapping nonlinear dynamics in urban environments is to study second- and third-order effects. As Michael Miller observes, "While we may not be able to predict the cause-effect behaviour of inter-related complex systems with precise certainty, we can try to understand the nature of the elements that will interact."²⁹ Mathematical models and simulations can help solve problems of causality in complex adaptive systems, but applying these models to intelligence preparation and operational planning can be problematic. Often there is just not enough time to establish proper conditions and define the variables. Miller proposes a systematic methodology for mapping cause-effect chains (Figure 1).

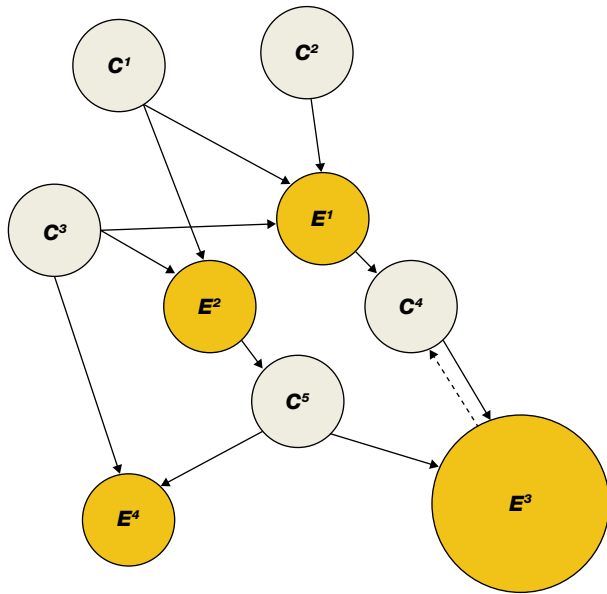


Cause¹ yields Effect¹
Effect¹ becomes Cause² yields Effect²
Effect² becomes Cause³ yields Effect³

Figure 1: Cause-Effect Chain.

This linear model is simple enough to employ in time-constrained situations like major combat operations to support branch and contingency planning and can be expanded where the campaign theme requires deeper analysis. As noted above, complex adaptive systems are not analyzed assuming linear causality or even multiple causalities. Still, for intelligence preparation and operational planning, linear causality is a necessary first step in the analysis. Afterwards, an expanded cause-effect chain might begin to look something like a cause-effect web (Figure 2), where feedback loops and disproportionality characterize causal relationships:

Several probabilistic causation models can be employed to represent causal relationships in a system and make predictions about the behaviour of a system.³⁰ Given the time and expertise required to run these models, they are more suitable for peace support and counter-insurgency operations with a robust intelligence enterprise.



Cause¹, Cause², and Cause³ yield Effect¹
Cause¹ and Cause³ yield Effect²
Effect¹ becomes Cause⁴
Effect² becomes Cause⁵
Cause⁴ and Cause⁵ yields Effect³
Effect³ is disproportionate to Cause⁴ and Cause⁵
Effect³ has a bi-direction feedback loop with Cause⁴

Figure 2: Cause-Effect Web.

Often described as action-reaction cycles, nonlinearity and feedback loops characterize all human interactions. The rising *Bwa Kale* movement in Port-au-Prince is caused by citizen frustration with gang violence and the police’s inability or unwillingness to address it effectively. An outcome of executing suspected gang members is the immediate drop in reported kidnappings and killings attributed to gangs in some communities.³¹ A second outcome, not yet present but possible under the right conditions, is increased gang retribution. A feedback loop would emerge when gangs react to attacks by targeting members of the *Bwa Kale* movement, which will affect how the vigilante movement responds in the future. This kind of bi-directionality can potentially create a self-reinforcing feedback loop, where causal interactions reinforce and perpetuate a certain trajectory—in this case, continued violence between gangs and vigilante groups.³²

COMPONENTS OF THE URBAN ENVIRONMENT

The urban environment is often understood as a triad of human terrain, physical terrain and infrastructure. Complexity theory lends itself to analyzing human terrain and infrastructure. Despite the crucial importance of understanding the physical terrain of an urban environment, complexity theory does not offer a pathway for improving analysis, despite shortfalls in the doctrinal approach to urban terrain analysis.³³ The application of complexity theory to the analysis of the information and cyber domains is more likely to render a better analysis. However, these domains are geographically agnostic and not necessarily unique to the urban environment. Despite being an inviting avenue for future research, this discussion would be too broad and detailed for this article. The following sections will discuss the employment of complex adaptive systems for understanding an urban environment’s human terrain and infrastructure.

Human Terrain

A unique feature of urban environments is the density and diversity of human terrain that results in complex interconnections within the city itself and beyond (i.e. diaspora communities). Not only are residents part of the human terrain, but also foreign non-governmental organizations and intergovernmental organizations. A crucial task for the intelligence function is to discriminate between hostile actors and innocent civilians on the battlefield.

The ASCOPE-PMESII³⁴ matrix is commonly employed as a method of human terrain analysis for counter-insurgency and peace support operations. However, as the pendulum has swung toward preparation for major combat operations, this tool is no longer taught in detail in officer or non-commissioned member (NCM) training.³⁵ That noted, the deductions derived from an ASCOPE-PMESII matrix are of substantial military value in urban environments. Still, as depicted in CFJP 2-1.1, the ASCOPE-PMESII matrix has critical shortfalls that must be addressed to be employed effectively.

The ASCOPE-PMESII matrix was developed by the United States Marine Corps (USMC) during the counter-insurgency campaigns in Iraq and Afghanistan to support civil affairs. The matrix is the coversheet of an often-overlooked estimate process. Doctrine writers in the Canadian Armed Forces declined to integrate this estimate process fully, instead opting to include an expanded PMESII to the ASCOPE map (Figure 3).³⁶ If ASCOPE-PMESII was still taught in detail in officer and NCM training, this might not be a concern, but the result is a sub-optimal tool that encourages cataloguing information into discrete categories that fail to determine their interconnectedness rather than enable a systems approach.³⁷

PMESII POLITICAL TO ASCOPE MAP					
Areas	Structures	Capabilities	Organizations	People	Events
Enclaves	Courts - Court houses - Mobile courts - Traditional / tribal courts	Public Administration: - Civil authority, practices, and rights - Political systems - Political stability - Political traditions - Standards and effectiveness	Major political parties: - Formal - Informal	United Nations / NGO representatives	Elections
Municipalities	Government buildings	Executive: - Administration - Policies - Powers - Organization	NGOs	Political leaders	Council meetings
Provinces	Provincial / district buildings	Legislation: - Administration - Policies - Powers - Organization	Host Government	Governors	Speeches (significant)
Districts	Meeting halls	Judicial/legal: - Administration - Capacity - Policies - Civil and criminal codes - Powers - Organization - Law enforcement	Insurgent group affiliations	Councils	Security and military training sessions
Political / voting districts	Polling sites	Alternative justice / dispute / grievance resolution	Court system	Elders	Significant trials
National Boundaries	Multi-use buildings	Local leadership degrees of legitimacy	Covert political power	Community leaders	Distribution of power
Shadow government influence areas			Partnerships: - Foreign - Corporate	Paramilitary members	Political motivation
				Judges/prosecutors	Treaties
				Tribal leaders and roles: - Male - Female	National/cultural will
				Diaspora leaders	

Figure 3: PMESII Political to ASCOPE Map, as depicted in CFJP 2-1.1 *Intelligence Preparation of the Operating Environment*.

If utilized as an estimate (Figure 4) in conjunction with network analysis, the data points identified in the matrix become factors for analysis in the estimate and nodes within a network. The analyst moves beyond simply cataloging and mapping salient factors of the urban environment to assessing their interconnectedness and impact on operations.

Returning to Port-au-Prince helps illustrate another important point about human terrain in the urban environment. Heretofore this article has painted a picture

of a city blighted with chaotic criminal violence, a “feral” city without order. But this is not the whole story, and it leads to an inaccurate and distinctly negative view of the city’s inhabitants. This narrative also fails to consider that people often turn to gang membership to fulfill genuine security, and social and financial, needs.³⁸ Intelligence preparation in urban environments must understand individual and group interests, the cultural, economic and security drivers of those interests, and how individuals and groups perceive their interests in relation to others.

POLITICAL			
	Factor	Consideration	Deduction
A (Areas)	Boundaries for political party X and political party Y affiliations are within FF AO.	There is tension and often violence between supporters of political parties X and Y that spills over into the areas controlled by political party X. When spillover occurs, it is usually at intersection of streets Q and R.	Probable Named Area of Interest at intersection of streets Q and R.
S (Structures)	Supreme court is within AO.	Court is located within the political affiliation area of political party X. Cross-party affiliation line incursions by the supporters of political party Y often converge on the supreme court.	FF attempts to stop supporters of political party Y from crossing the boundary to reach the supreme court will probably result in damaged relations, but will prevent outbreaks of violence between X and Y supporters. Appropriate messaging can mitigate damaged relations.
C (Capabilities)	Legal dispute resolution	Legal dispute resolution is not widely trusted and is viewed by supporters of political party Y as being skewed in favour of political party X.	Disjointed legal conflict resolution will likely continue to exacerbate political tension until reforms are made.
O (Organizations)	Political party Y	See <i>Interest Assessment</i> for political party Y.	Political party Y's primary interests/grievances cannot be resolved by FF, but resolution of secondary interests within the AO may create goodwill.
P (People)	Leader X1, political party X	See <i>Biographic Profile</i> for Leader X1.	Leader X1 is unlikely to cooperate with political party Y or Friendly Forces until incentive structure is adjusted. Leader X1 is High-value Target.
E (Events)	Supreme court rulings	Historic pattern analysis indicates violence between supporters of political party X and Y usually corresponds with supreme court rulings, rather than around election cycles.	Upcoming supreme court rulings unknown; probable IR.
Legend: FF – Friendly Forces AO – Area of Operations IR – Information Requirement			

Figure 4. Example ASCOPE-PMESII estimate page for the Political Variable.

To their credit, Canadian doctrine writers included in B-GL-323-004-FP-003, *Counter-Insurgency Operations*, the concept of a *spectrum of relative interest* to overcome the traditional “enemy–friendly–neutral” paradigm and the obfuscation it creates (Figure 5).³⁹ Individuals and groups rarely fit neatly into such categories, and common descriptors like “pro-government” or “anti-government” fail to properly relate to the myriad interests that an individual or group may hold.

A methodical analysis of group interests leads to a better understanding of the complexities of the human terrain by determining a group’s primary and secondary interests. Primary interests are core to a group’s survival and might be considered “red flag” interests. For instance, if local groups cooperate with external forces primarily out of aligned motivation, then “red flag” interests would be those that, if crossed or otherwise violated, would mean that cooperation must cease no matter the benefits of cooperation or the alignment of objectives. The opposite could occur if a group’s primary interests are satisfied by friendly forces out of aligned motivation. Assessing and mapping

these interests offer insights into points of vulnerability, such that an external force can avoid events that turn erstwhile allies into adversaries and gain cooperation from groups that might otherwise be classified as hostile.⁴⁰

In Port-au-Prince, the Global Initiative Against Transnational Organized Crime estimates the number of active gangs at 95.⁴¹ Statistically, it is unlikely that each of these gangs would be an enemy to a foreign peace support intervention, nor would it be desirable for a foreign military force to find itself fighting all these groups. Understanding their interests provides an avenue to exploit common interests—even amongst groups that would otherwise be categorized as hostile—to achieve mission success. It also helps understand the areas where a military intervention might be able to find common ground with the various vigilante groups, several of whom already informally collaborate with state security forces in Haiti.⁴² Therefore, human intelligence and civil-military operations take on disproportionate importance for intelligence preparation of the urban environment.

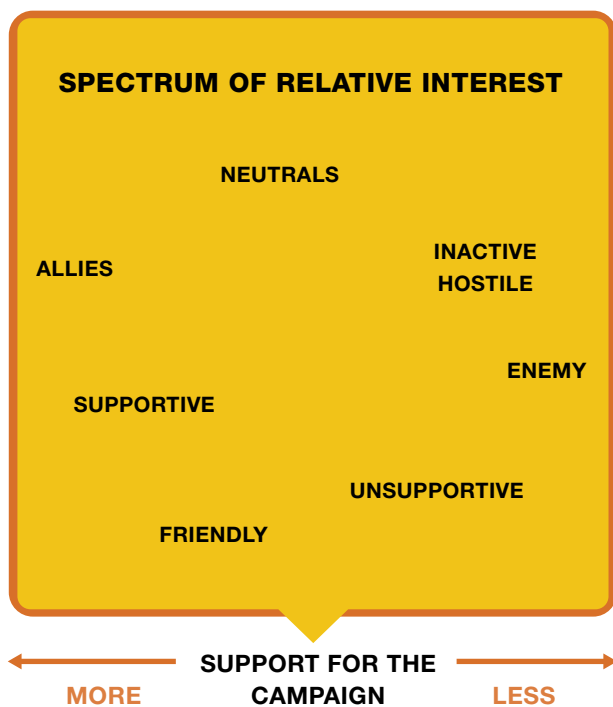


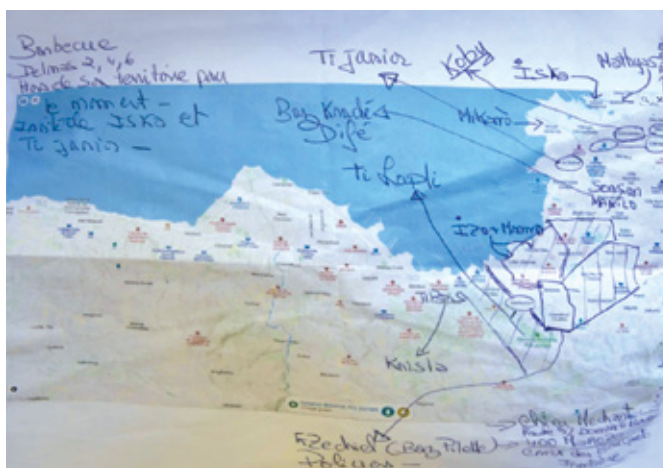
Figure 5: Spectrum of Relative Interest as depicted in B-GL-323-004-FP-003, *Counter-Insurgency Operations*.

CFJP 2-1.1 already provides helpful tools for understanding systems—network analysis chief among them. Invoking characteristics of complex adaptive systems—emergence, adaptiveness and nonlinearity—will help the analyst understand how relationships adapt and evolve by introducing a new element, such as a foreign military intervention.

Infrastructure

There are several ways to understand infrastructure in academia and in a military context. As an umbrella term, infrastructure can be conceived as physical and social. Physical infrastructure comprises the basic physical structures and facilities needed for the operation of a society—bridges, water treatment plants, electrical substations and the like. Without these structures, daily life and economic activity would halt. Social infrastructure is often understood as comprising the policies, resources and services that ensure people can participate in productive social and economic activities.⁴³

CFJP 2-1.1 identifies the importance of infrastructure analysis but does not sufficiently differentiate between infrastructure and services enabled by that infrastructure. It tends to conflate the two, arguing that “[a]n accurate portrayal of the infrastructure status will potentially prevent or help eliminate humanitarian crises.”⁴⁴ While this is undoubtedly true, this interpretation of infrastructure does not acknowledge the systemic interconnectedness of components that enable services, of which (physical) infrastructure is just one.



Source: Rodrigo Abd

A map created by a businessperson (who asked not to be identified) notes the different territories controlled by gangs in Port-au-Prince, Haiti, on 7 October 7, 2021.

For military analysis, and in the absence of a precise doctrinal definition, this article proposes a definition that can be integrated more easily into the language of complex adaptive systems. Infrastructure—physical structures like bridges, schools, hospitals and electrical substations—are one of several components that enable the provision of services that allow daily life and economic activity to occur. In this sense, the International Committee of the Red Cross (ICRC) makes a clear distinction between “critical infrastructure” and “essential services,” which is helpful for military analysis. Critical infrastructure is necessary for the functioning of an essential service whose damage or destruction significantly impacts the delivery of the service. Essential services are services indispensable to the survival of the population, such as water and sanitation, electricity, health care and solid-waste disposal.⁴⁵

Expanding on the Red Cross’s definition, services may include not only essential services but also social services, such as education and childcare, economic services like unemployment insurance and worker’s compensation, or emergency services like fire and ambulance services.

All services, essential or otherwise, depend on the function of at least four interconnected components:⁴⁶

- People (operators and technicians);
- Hardware (infrastructure and equipment);
- Consumables (raw materials and finance); and
- Regulation (policies, governance).



An aerial view of the fuel terminals of Varreux in Port-au-Prince, Haiti.

Invoking complex adaptive systems in the urban environment gives a basis for understanding the dynamic and adaptive interdependencies between these components, especially in conflict zones. None of these components are designed with urban warfare in mind. Social, political and economic dysfunction will disrupt the adequacy of these components for their demand. Even systems that are badly disrupted will adapt in unique ways for the service or some semblance of it to be delivered. Employing nonlinear causal analysis allows the analyst to understand how even a relatively minor disruption in any of these components can result in disproportionate impacts on the overall system.

Infrastructure is too narrowly understood in military analysis, and the ASCOPE-PMESII matrix by itself does not adequately reveal these interconnections. Adopting complex adaptive systems enables one to better acknowledge these components and how these components and systems will evolve and adapt, especially in the context of urban warfare.

Used properly and to understand relationships, the ASCOPE-PMESII matrix can reveal the myriad ways in which the human terrain interacts with physical infrastructure and the services it enables. Whether hostile or not, all population groups in an urban environment will use, exploit, defend or attack infrastructure and the services it enables. How these acts occur may seem imperceptible to a foreign force, highlighting the relationships and interdependencies between population groups and urban infrastructure. For example, in Port-au-Prince the G9's occupation of the Varreux fuel terminal in 2022 offers an obvious example of how population groups can interact with a city's infrastructure in evolving ways.⁴⁷

But infrastructure does not simply enable the provision of services—it also provides the foundation for economic activity whether legal, illegal, or in the gray space between. Various attempts have been made to represent these activities graphically. A popular method is to view these activities as flows (metabolic flows using the language of urban metabolism) of people, goods, capital and information.⁴⁸ Mapping these flows



geospatially and through network analysis diagrams, considering where they originate and terminate, why they exist, what nodes they use, how they are linked, who controls them, and who depends upon them, will reveal how they impact military operations. As described above, a causal analysis will show how military operations impact these flows.

UNDERSTANDING COMPLEX ADAPTIVE SYSTEMS

At first glance, one disadvantage of implementing complex adaptive systems in intelligence analysis is the apparent contradiction between the responsibility to provide predictive analysis and the explicit inability of complexity theory to predict outcomes. Traditional correlation and cause-and-effect analysis do not adequately describe complex adaptive systems because of emergence and nonlinearity. In truth, analysts have never been able to provide absolute certainty in their assessments regardless of the analytical approach used. Implementing complex adaptive systems does not introduce more uncertainty into analysis. Instead, it provides a stronger theoretical basis to identify the sources of that uncertainty than the current “systems perspective” employed in doctrine. An advantage of implementing complex adaptive systems in the intelligence preparation of urban environments is overcoming the language of “feral cities.” Dr. Richard Norton coined the term in 2003 to describe an urban environment that

“is now a vast collection of blighted buildings, an immense petri dish of both ancient and new diseases, a territory where the rule of law has long been replaced by near anarchy in which the only security available is that which is attained through brute power... [T]his city would still be globally connected. It would possess at least a modicum of commercial linkages, and some of its inhabitants would have access to the world’s most modern communication and computing technologies. It would, in effect, be a feral city.”⁴⁹

The phrase has been employed to describe cities like Port-au-Prince or Mogadishu, where the rule of formal law is weak relative to informal governance structures, where social services have broken down and security in various forms is uneven at best. It describes the same conditions the CALWC does in *Canada’s Future Army*, where rapid urbanization compounds poverty and insecurity of health care, water and energy, especially in developing regions, increasing tensions and the prospect of armed conflict.

Dr. Norton acknowledges that his selection of the phrase is controversial and provocative, although the term “feral” has biological and zoological utility. However, common and uncaredful application of the term to describe human populations risks imposing cultural and racial



EXPANDING THE USE OF CERTAIN TECHNOLOGIES, INCLUDING ARTIFICIAL INTELLIGENCE, WILL HELP PROCESS THE VAST QUANTITIES OF DATA THAT CHARACTERIZE URBAN OPERATIONS AND OVERWHELM ANALYTICAL CAPABILITIES.

Source: Combat Camera

biases. Employing the language of complex adaptive systems, on the other hand, provides an analytical framework to describe the same phenomena without risking the implicit inclusion of cultural and racial biases that might undermine sound intelligence analysis.

CONCLUSION

The tools provided by CFJP 2-1.1, its systems perspective and network analysis, can be expanded upon with the help of complex adaptive systems to understand urban environments better. Expanding the use of certain technologies, including artificial intelligence, will help process the vast quantities of data that characterize urban operations and overwhelm analytical capabilities. It is already commonplace to invoke complex adaptive systems to describe the urban environment, but applying its characteristics to intelligence analysis—specifically emergence, adaptiveness and nonlinearity—can better support military operations. Effective targeting that discriminates between adversarial actors and innocent civilians and avoids collateral damage depends upon it. 🍁

ABOUT THE AUTHOR

Captain Colin Papuschak joined the Canadian Armed Forces in 2009 as an infantry officer with the Loyal Edmonton Regiment, where he participated in numerous urban

operations exercises. He has held various positions at the Western Area Training Centre and 3rd Canadian Division Headquarters. In 2020 Capt Papuschak transferred to the Regular Force as an intelligence officer and was previously posted to 3rd Battalion, Princess Patricia's Canadian Light Infantry (3 PPCLI), as the battalion's intelligence officer.

ENDNOTES

1. *Canada's Future Army, Volume 1: Methodology, Perspectives and Approaches* (Kingston: Canadian Army Land Warfare Centre, 2015), 73.
2. *Close Engagement: Land Power in an Age of Uncertainty* (Kingston: Canadian Army Land Warfare Centre, 2019), 12.
3. For example, by employing concepts of urban metabolism, David Kilcullen makes a compelling case for understanding the urban environment as an organism but leaves open the question of whether a city is better understood as an organism or as an ecosystem. See David Kilcullen, *Out of the Mountains: The Coming Age of the Urban Guerilla* (New York: Oxford University Press, 2013), 41.
4. Kilcullen, *Out of the Mountains*, 17, and John Spencer and David Kilcullen, "Understanding the City," in *Understanding Urban Warfare*, ed. Liam Collins and John Spencer (Havant: Howgate Publishing 2022), 18.

5. Ibid.
6. John Turner and Rose Baker, "Complexity Theory: An Overview with Potential Applications for the Social Sciences" *Systems* 7, No. 4 (2019): passim.
7. Tom Pike and Eddie Brown, "Complex IPB." *Small Wars Journal*, March 24, 2016, and Tom Pike and Piotr M. Zagorowski, "Dense Urban Areas: The Case for Complex IPB," *Military Intelligence Professional Bulletin* 42, no. 3 (Jul-Sep 2016): 28-35.
8. CFJP 2-1.1 *Intelligence Preparation of the Operational Environment* (2016), 2-37.
9. Turner and Baker, "Complexity Theory," 4.
10. CFJP 2-1.1, p. 2-40. "All systems in the operational environment can be complex. A typical social system consists of numerous subsystems, each having additional subordinate layers. There can be hundreds of nodes and links at different levels that compose the entire social system." This describes a *complicated* system, but not necessarily a *complex* system.
11. Turner and Baker, "Complexity Theory," 2.
12. Policarpo deMattos, Daniel Miller, and Eui Park, "Decision making in trauma centers from the standpoint of complex adaptive systems," *Management Decision* 50, No. 9 (2012): 1550.
13. Turner and Baker, "Complexity Theory," 4.
14. Cynthia Larson, "Evidence of shared aspects of complexity science and quantum phenomena," *Cosmos and History: The Journal of Natural and Social Philosophy* 12, No. 2 (2016): 161.
15. United Nations Integrated Office in Haiti. S/2023/274. 14 April 2023. https://binuh.unmissions.org/sites/default/files/sg_report_on_binuh_14_april_2023.pdf
16. Diego Da Rin, "Haitians Turn to Mob Justice as the Gang Threat Festers," *International Crisis Group*, 3 July 2023, <https://www.crisisgroup.org/latin-america-caribbean/haiti/haitians-turn-mob-justice-gang-threat-festers>, United Nations Integrated Office in Haiti. S/2023/274. 14 April 2023, and "Haiti on 'brink of civil war,' humanitarian group warns," *Al Jazeera*, 1 May 2023, <https://www.aljazeera.com/news/2023/5/1/haiti-on-brink-of-civil-war-humanitarian-group-warns>. Accessed 27 June 2023.
17. Turner and Baker, "Complexity Theory," 10-12, 23.
18. For the purpose of this article, there are necessary generalizations of Haiti's vivid history. Many of Haiti's economic, social, and political ills can be traced to the immediate post-colonial period and how the country was marginalized in the international system by the great powers. These conditions shape Haiti's economic, social, and political landscape today. A concise depiction of this history is provided by Jon Henley, "Haiti: a long descent to hell," *The Guardian*, 14 January 2010, <https://www.theguardian.com/world/2010/jan/14/haiti-history-earthquake-disaster>.
19. Henley, "Haiti: a long descent to hell."
20. "G9 and Family," *Insight Crime*, 18 July 2022, <https://insightcrime.org/haiti-organized-crime-news/g9-family-profile/>, and Acre and Coto, "Haiti's Gangs."
21. Alberto Acre and Rodrigo Abd, "In Haiti, the Difficult Relationship of Gangs and Business," *Pulitzer Center*, 27 October 2021, <https://pulitzercenter.org/stories/haiti-difficult-relationship-gangs-and-business>.
22. "Who is Haiti's sanctioned gang leader Jimmy 'Barbecue' Cherizier?" *Al Jazeera*, 21 October 2023, <https://www.aljazeera.com/news/2022/10/21/who-is-haitis-sanctioned-gang-leader-jimmy-barbecue-cherizier>.
23. Turner and Baker, "Complexity Theory," 14
24. "Suspected Haiti gang members stoned, set on fire by crowd," *Al-Jazeera*, 25 April 2023, <https://www.aljazeera.com/news/2023/4/25/suspected-haiti-gang-members-stoned-set-on-fire-by-crowd>.
25. Henry Shuldiner and Chris Dalby, "Haiti Gangs Embrace Political and Police Chaos," *Insight Crime*, 31 January 2023. <https://insightcrime.org/news/haiti-gangs-de-facto-authority-state-institutions-struggle-respond/>. See also "Gang Profiles – June 2023," *Canadian Forces Intelligence Command Open Source Intelligence Operational Support*, OSINT-2023-025, 20 June 2023, 4.
26. Summer Walker, *Gangs of Haiti: Expansion, Power and an Escalating Crisis* (Geneva: Global Initiative Against Transnational Crime, 2022), 6, 12, 15. See also "Gang Profiles – June 2023," *Canadian Forces Intelligence Command Open Source Intelligence Operational Support*, OSINT-2023-025, 20 June 2023, 4.
27. Larry Hardesty, "Explained: Linear and nonlinear systems," *MIT News*, 26 February 2010, <https://news.mit.edu/2010/explained-linear-0226>. Accessed 12 June 2023.
28. Henry Shuldiner, "Haiti's Anti-Gang Vigilantes May Pose Future Criminal Threat," *Insight Crime*, 9 May 2023, <https://insightcrime.org/news/bwa-kale-vigilante-movement-challenging-haitis-gangs/>.
29. Michael Miller, "Thinking About Second & Third Order Effects: A Sample (And Simple) Methodology," *IO Sphere* 36 (Summer 2006), http://www.au.af.mil/info-ops/iosphere_summer06_miller.pdf.

30. "Causal Models," *Stanford Encyclopedia of Philosophy*, 7 August 2018, <https://plato.stanford.edu/entries/causal-models/>.
31. Frances Robles and Andre Paultre, "Vigilante Justice Rises in Haiti and Crime Plummet," *The New York Times*, 4 June 2023, <https://www.nytimes.com/2023/06/03/world/americas/haiti-crime-gangs-vigilantes.html>.
32. "Feedback Loops & Non-Equilibrium," *Systems Innovation*, <https://www.youtube.com/watch?v=JDqV19Byjtk>.
33. Although not the focus of this article, the current approach to terrain analysis struggles to depict the multi-dimensional nature of dense urban terrain. Analytical tools such as FLOCARK (which assesses how features, lanes, obstacles, canalizing ground, avenues of approach, avenue rating, and key terrain constrain and shape manoeuvre) work well to support mechanized manoeuvre in open and peri-urban terrain. Army doctrine for terrain analysis is currently being updated (to include replacing objectives with obstacles) with an upcoming Canadian Army Doctrine Note, *Intelligence Preparation of the Operating Environment: Terrain Analysis – FLOCARK*. However, this model struggles to depict complex urban terrain where buildings become the mobility corridors, subterranean systems intermingle with surface features to make a contiguous operational space, and supersurface and subterranean structures complicate the use of imagery to grasp the depth and volume of the physical terrain.
34. ASCOPE-PMESII: Area, Structure, Capabilities, Organization, People, Events – Political, Military, Economic, Social, Information, and Infrastructure.
35. In the Intelligence Branch, the training plans for DP 1 Officer and NCM courses make limited passing reference to PMESII and ASCOPE. The Civil-Military Cooperation Operator Training Plan discusses CIMIC assessments, where PMESII and ASCOPE are discussed, but this treatment suffers critical shortfalls identified by Lucy A. Whalley and Judith M. Vondryk in "Improving US army civil affairs assessment through social power analysis," *Small Wars & Insurgencies* 31, No. 3 (2020), 618.
36. ATP 2-01.3 *Joint Intelligence Preparation of the Operational Environment* and CFJP 2-1.1 *Intelligence Preparation of the Operational Environment* (which is a verbatim copy of the Joint US doctrine) include ASCOPE to PMESII maps, but not the entirety of the workbook developed by the USMC, which can be found here: <https://www.trngcmd.marines.mil/Portals/207/Docs/wtbn/MCCMOS/Planning%20Templates%20Oct%202017.pdf?ver=2017-10-19-131249-187>.
37. Whalley and Vondryk, "Improving US army civil affairs assessment through social power analysis," 618.
38. Laina Sonterblum, "Gang Involvement as a Means to Satisfy Basic Needs," *Applied Psychology Opus 7* (Spring 2016), https://wp.nyu.edu/steinhardt-appsych_opus/gang-involvement-as-a-means-to-satisfy-basic-needs/.
39. This concept and others were likely drawn from Jamison Jo Medby and Russell W. Glenn, *Street Smart: Intelligence Preparation of the Battlefield for Urban Operations* (RAND Corporation, 2002).
40. Jacob Stoil, "Beyond Traffic Lights: Towards a More Complex Human Terrain," *The Journal of Military Operations*, 2, No. 4 (Fall 2014), 19-20.
41. Walker, *Gangs of Haiti*, 3.
42. Diego Da Rin, "Haitians Turn to Mob Justice as the Gang Threat Festers," *International Crisis Group*, 3 July 2023, <https://www.crisisgroup.org/latin-america-caribbean/haiti/haitians-turn-mob-justice-gang-threat-festers>.
43. Alix Could-Werth, Sam Abbott, and Emilie Openshowski, "What is social infrastructure, and how does it support economic growth in the United States?" *Washington Center for Equitable Growth*, 26 January 2023, <https://equitablegrowth.org/what-is-social-infrastructure-and-how-does-it-support-economic-growth-in-the-united-states>.
44. CFJP 2-1.1, 4-6.
45. *Reducing Civilian Harm in Urban Warfare: A Commander's Handbook*, (Geneva: International Committee of the Red Cross, 2021), 39.
46. Three of these components are identified by the ICRC, while the fourth, regulation, is the author's addition. *Reducing Civilian Harm in Urban Warfare*, 40.
47. "Police take control of Haiti fuel terminal," *BBC News*, 4 November 2022, <https://www.bbc.com/news/world-latin-america-63509654>.
48. Kilcullen, *Out of the Mountains*, passim.
49. Richard J. Norton, "Feral Cities," *Naval War College Review* 56, No. 4 (2003), 1.

THE ROLE OF WARGAMING IN URBAN OPERATIONS TRAINING

Stuart Lyle

INTRODUCTION

Training effectively for high-intensity urban combat is a challenge that militaries have faced for decades, and it has not become easier with time. Relying solely on live physical training is insufficient to adequately prepare troops and commanders for the unique challenges anticipated in future urban battlefields.

Urban combat, taking place in the most intricate terrain, involves combined arms engagements with threats from all directions. It presents 360-degree threats, an abundance of concealment for defenders and attackers, and walls providing cover from view but not necessarily from fire. Short engagement ranges can reduce a weapon's effectiveness, endangering the user or preventing the weapon's use entirely. Different structural construction types result in drastically different effects being delivered to the target or no effect at all. Narrow streets can constrain vehicle access, restricting a commander's tactical options.¹

Urban environments undergo rapid alterations due to heavy fighting, evident in historical battles where buildings collapse, roads become blocked by rubble, new openings appear in buildings for entry, exit and/or firing, and obstacles suddenly appear as infrastructure is degraded. There are different urban terrain zones (UTZ), each with unique, albeit generalized, physical and human characteristics.² Each favours a different force design and approach to conducting combat. For example, light forces excel in dense "old towns" or areas with high-rise buildings, while heavy armoured forces are better suited for industrial areas with more manoeuvre space and long sight lines for cannons/anti-armour weapons.



Furthermore, the presence of civilians distinguishes urban areas from rural ones. Thousands of civilians flee the fighting and put strain on higher formation sustainment plans, while at the tactical level many remain in the combat zone. Their presence poses constraints on military actions that are often not a factor in rural fighting.³ Moreover, these humans communicate, creating electromagnetic clutter that is distinct from any other environment and likely unique for each urban one.

Collectively, these features make traditional military training based on physical training exercises difficult, if not impossible. It is demanding, but *possible*, to deploy units ranging from a company to a brigade to a rural training area (whether temperate, desert or arctic) for a variety of exercises, including combined arms live fire, and such deployments are often a prerequisite for achieving deployment readiness. However, as this article will explore, replicating such training for urban combat is simply not achievable. Therefore, we must embrace and exploit an alternative method with proven potential to bridge this training gap: wargaming. The article will explore the potential of wargaming to fill the gaps in urban training and where it best fits within the overall training needs.





**“THIS IS NOT A GAME!
THIS IS TRAINING FOR WAR!”**



LIMITATIONS OF LIVE TRAINING

The physical and cognitive stresses inherent in live training are invaluable. Wargames fall short in replicating the physical exertion, the complexities of coordinating force elements and the physical manipulation of battlefield systems as effectively as live training does. However, despite the benefits live training offers, it cannot cover everything that is required to truly prepare for high-intensity urban combat at all echelons. There are notable limitations in live training which become increasingly amplified when attempts are made to simulate urban operations. These limitations fall into three broad categories: the environment, representing military effects, and multi-domain activities.

1. The Environment

The representation of other environments is heavily dominated by the physical topography, in addition to some unique characteristics such as weather for arctic and desert regions. It is quite manageable to find training grounds that mimic these topographical features. However, urban terrain is much more complex than just its topography. The urban environment consists of four layers:

- a. Physical terrain – This includes the topography of the area, the urban sprawl, the physical features of different urban terrain zones and even the physical characteristics of individual buildings.
- b. Human terrain – Urban and rural terrain are differentiated by civilian populations, and these populations significantly influence the conduct of operations. The complexity is further heightened by various socio-economic groups, ethnic and language diversity, and distinct patterns of life in different city areas. For instance, residential areas tend to be relatively empty during the daytime but busy at night, whereas the opposite is true for office spaces.
- c. Information layer – The electromagnetic spectrum (EMS) is cluttered by civilian and military communications, mobile phones, the internet and connected devices. These elements can be exploited to different levels and varying degrees across the spectrum of conflict.
- d. Infrastructure – This includes the systems for communications, transport, power, water and waste. These are prominent features of urban areas, integral to the functioning of both the urban area and its population, and they can have a significant impact on the conduct of urban operations. In fact, these elements might be the primary motivation behind initiating the operation.

It is nearly impossible to replicate the scale and complexity of the civilian population within a training environment. Generating sufficient role players to simulate anything beyond minor interactions is challenging, and they often lack the cultural and language diversity needed to present realistic challenges.

For more tactically focused training – in particular for simulating combat and Intelligence, Surveillance, Target Acquisition, and Reconnaissance (ISTAR) – the multi-dimensional environment is of the utmost importance. The surface, super-surface, sub-surface, and interior of buildings, as well as the information layer, are all crucial to the conduct of operations at that level. These factors will also vary depending on the simulated UTZ, meaning that there is a notable difference between a shanty town and a high-rise business district.

Compare this to simulating rural operations, where one only needs to model the topography, which probably consists of small villages (not very complex buildings) and limited infrastructure, and where the majority of the EMS is dominated by military systems. From an environmental perspective alone, representing urban operations is an order of magnitude more complicated. Further, there are issues of scale and variation. It is not feasible to build an urban training site that is large enough for a sizeable force element to manoeuvre through. The French and German militaries have built impressive facilities at the *Centre d'entraînement aux actions en zone urbaine* and *Schnöggersburg*,⁴ respectively. The US has similar facilities at Fort Irwin and Twenty-Nine Palms. These facilities comprise hundreds of buildings, replicating multiple UTZs and variety in building complexity and height. However, there are still several limitations with these sites:

- Despite their size, they are quickly memorized by exercising troops, reducing complexity for troops over time.
- They do not effectively support large-scale manoeuvres within the urban space, especially above the company/squadron level.
- They still lack the representation of combined arms effects.
- They lack a civilian population.
- They are generally “uncluttered” or lack significant “battle damage,” reducing realism.
- They generally present very limited (or no) EMS clutter.

- Although they might represent different UTZs, each representation is small, exacerbating the difficulty of training combined arms manoeuvre in them.

Simply put, it is impossible to create the necessary scale, complexity and realism of a real urban area within an artificial training estate. Additionally, cities are changing. The emergence of “smart cities,” increased verticality in both skyscrapers and subterranean complexes, the rise of slums, and complicated alternative forms of governance are reshaping how a military force may interact with a city and its population.⁵ Despite the impact these trends may have on military operations, it is highly challenging to prepare commanders for them using current physical training methods.

Lastly, the limited numbers of, and high demand for, these large urban training sites means that units rarely have the opportunity to conduct training there. Consequently, there is often a condensed training schedule which prevents troops from repeating tactical scenarios and applying lessons learned from initial attempts. This poses a challenge to establishing a solid foundation for training.

2. Military Effects

The most challenging aspects of live urban training involve accurately representing battle effects, and this includes even seemingly simple aspects like having them included as options in training scenarios.⁶ Combined arms live firing is considered essential for rural training, but it is not even feasible for urban training.

Even in non-live fire exercises, many essential weapon systems are missing. It is rare to see urban training exercises in which troops use explosive weapon systems such as grenade launchers and anti-structure munitions, despite those being the very operations for which they are designed. Similarly, there is a notable absence of represented combined arms effects: mortars, tank cannons and airstrikes are adjudicated effects at best, and more commonly they are entirely absent. As a result, most urban training, even a combined arms company group exercise, will devolve into a dismounted fight inside buildings. This fails to adequately prepare troops for combined arms urban operations and forces them to learn hard lessons in real combat.⁷

By omitting the representation of these capabilities or their effects, training reinforces incorrect assumptions or imparts poor tactics. Troops may lack the knowledge of when it is best to employ explosives instead of small arms, relying on “muscle memory” developed in exercises where explosives were never represented.

At higher formations, one of the primary functions is the coordination of joint fires effects in support of close combat elements, including kinetic effects as well as novel effects such as cyber and space capabilities. If these aspects are not integrated into urban training, a clear training gap emerges.

3. Multi-Domain Activities

At higher formations, urban operations entail a broader spectrum of responsibilities compared to rural operations. In urban battles, tasks such as coordinating with host nation services, supporting large displaced populations, managing sustainment for high-intensity urban combat and various other factors suddenly become critical. In this context, the urban flows of people, resources, waste, communications and other associated aspects play a significant role. International diasporas, global media and global links between cities begin to influence the conduct of operations.⁸ Of course, the scale of the urban area of operations is much larger also. Determining how to manoeuvre through a large urban space and coordinate multiple entities on different ground lines of communication presents a daunting challenge and not one that can be replicated in any existing urban training venue.

Furthermore, the timescales associated with these activities often extend beyond what is realistic in a live exercise. Most large urban battles typically unfold over weeks or months, encompassing shaping activities, intelligence collection, the battle itself and the transition to security, each of which generally requires a significant amount of time.

In summary, when compared to the demands of real world urban operations, the current physical training capabilities are lacking across the spectrum of training needs and all echelons.

What is wargaming?

There is considerable debate among the world’s leading wargaming academics regarding how to define a wargame and whether such definitions are beneficial.⁹ However, for the purpose of this article it is essential to provide a definition and clarify the advocated position. In this article, a wargame is defined as a simulation of military conflict and activities that is adversarial, built around a structured model and guided by rules, and in which the players’ decisions have an impact on the progress and outcomes of the actions.

The practice has a long and rich history in aiding military preparation, from the heavily abstracted representation of combat in chess, utilized for centuries from Persia to Europe,¹⁰ to its application by the Germans in the 1930s to develop *Blitzkrieg*¹¹ and by the US Navy to develop carrier tactics.¹² More recently, Western allies have run highly detailed wargames to help the Ukrainian Armed Forces make decisions regarding

their counteroffensives, including the 2022 Kherson offensive.¹³ This particular instance highlighted the dangers of a broader offensive that the Ukrainians had been planning, with the wargames suggesting a much more limited and more focused operation around the city of Kherson. This was ultimately successful, with Ukraine recapturing the regional capital and more than 1,000 square kilometres of territory in two weeks.

Wargames come in many forms, but the simplest breakdown of the types is into two categories: manual and computer-based (formally called constructive simulation).

- Manual wargames are classic tabletop games with maps on a table and counters to represent entities in the conflict. These are especially good for collaborative training, as all participants are gathered around the map, discussing their actions and assessing how their actions affect other players. As a result, manual wargames tend to be slower to run. They can also be less intuitive for non-wargamers, with more complex games requiring specialists to run and facilitate them.
- Computer-based wargames are more immersive, potentially run in real time, and more visually engaging. They are also quicker to run, which increases their repeatability value. They are especially good for individual training and for training specific aspects such as command and control (C2) and high-tempo combat scenarios. These also tend to be more intuitive, making complex simulations more accessible to non-gamers than a comparable manual game would. However, they require more hardware to run “at scale” to train the same number of people as a manual wargame, and that hardware is more expensive.

Most military professionals are aware of wargaming or have actively participated in it. From course of action wargames as part of the planning process to larger joint exercises like Warfighter, the military is accustomed to a variety of wargaming techniques. Despite this, wargaming has still not been embraced with enthusiasm for more routine training and continues to be seen as “a game of dice not much different from Risk and is more associated with ‘childish things.’”¹⁴

This article will focus on the features of wargames that are pertinent to training, excluding the more intricate analytical wargames that serve more specialized or specific purposes.

Where does wargaming fit?

For wargaming to complement live training, it is crucial to identify the most suitable areas where it can be best applied. Broadly speaking, there are three distinct levels of training for urban warfare:

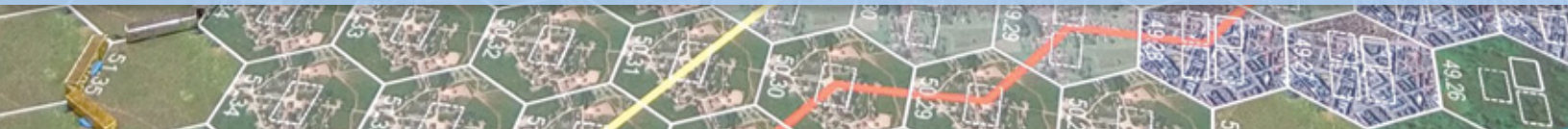
- a. low-level skills training (up to platoon/troop level);
- b. initial combined arms training (up to company/squadron level); and
- c. higher formation collective training (battalion, brigade and division level).

Although there is undoubtedly some overlap in training reliance between these levels, each level has distinct requirements that result in separate training needs for wargaming.

- a. Low-level, individual and small-unit skills are still the preserve of live training. Virtual reality, constructive simulation such as computer games and manual/tabletop wargames are not intended to replace physical training for these skills. They require the “muscle memory” developed through multiple iterations to ensure that soldiers can react quickly and, if necessary, instinctively. They require the visceral experience of making snap decisions while fatigued and under the pressure of battlefield stresses. To use the old adage, soldiers simply need to move, shoot and communicate, and this is best done for real.¹⁵ However, the cognitive foundation (the conceptual component of fighting power) can be cultivated through wargames. Certain computer wargames are relevant at this level, but the training can even be as simple as a Tactical Exercise Without Troops conducted in real urban terrain, with a suitably empowered adversary actor and an adjudicator to keep the discussions constructive.¹⁶ Manual wargame systems like Advance Squad Leader have been employed to enhance the tactical training and planning processes for platoon commanders.¹⁷
- b. Initial combined arms training is where coordination and process become more important than physical manipulation of systems. As aptly noted by Robert Taylor, Duncan Stewart and John Spencer, “A soldier’s ability to co-ordinate an artillery barrage will improve their overall lethality disproportionately more than a 5mm or better grouping at 100m.”¹⁸ Even more so will the experience of knowing when artillery or other assets are the answer, rather than dismounted close combat.¹⁹ Wargames can represent significantly more battlefield effects than physical training (even if abstracted), which means that troops can contemplate when it might be appropriate to use them and the impact they might have. In addition, they can offer a terrain scale appropriate to company-to-battalion-level manoeuvre, thereby reinforcing lessons on C2 between close combat elements, joint fires and sustainment elements, as well as posing a risk of being outflanked in the dense



HIGHER FORMATION COLLECTIVE TRAINING FOR URBAN WARFARE CAN BE ALMOST ENTIRELY CONDUCTED USING WARGAMES. THIS IS OFTEN THE AREA WHERE LITTLE OR NO URBAN TRAINING OCCURS.



NATO Allied Rapid Reaction Corps manual wargame run by the Defence Science and Technology Laboratory.

Source: Author

urban terrain. For this level, manual wargames are excellent for collaborative training of section, platoon and company commanders, while computer-based wargames are best for more focused individual training of platoon and company commanders.

- c. Higher formation collective training for urban warfare can be almost entirely conducted using wargames. This is often the area where little or no urban training occurs. In real urban combat, higher formations are likely to be static in buildings for much of their time, coordinating units they cannot physically see due to the terrain. In that context, wargaming is actually not as abstract a training reality.

At this level, wargames can inject pertinent features such as sizeable civilian populations to be managed, the impact of information operations, political

direction or interference, and the involvement of other aligned actors such as non-government organizations or host nation forces. It also provides a platform to represent joint and inter-agency actors or capabilities in a manner that is considerably more challenging in physical training settings. The Defence Science and Technology Laboratory (Dstl) in the United Kingdom recently ran a wargame for NATO's Allied Rapid Reaction Corps to assist them with developing corps-level urban doctrine. The team used representatives from various non-government organizations to assume various non-combatant roles, bringing their real-world experiences of helping civilians in war zones to the exercise. This was the first time anyone in the corps headquarters had exercised urban operations at the corps level, and for some planners it was their first-ever experience wargaming urban operations.



A representation of the same tactical scenario in the Combat Mission computer game but managed in three different ways. “Open” allows the player to see all units (Blue and Red). “Closed” allows the player to see all Blue units but only those Red units identified by Blue forces. “Closed+” allows the player to only see those units in the line of sight of the Company Commander’s location.

Regardless of the level, an important aspect of training is repeatability. The ability to conduct diverse scenarios with different adversaries using varied tactics is key to developing flexible and adaptable decision makers. If we learn from our experiences, it is undoubtedly a best practice to create as many varied experiences as possible. Physical training has a diminishing potential for repetition the higher we progress through the echelons. While computer wargames are generally quicker to run than manual wargames, each category generally has more repeatability than physical training exercises. Players can change roles, thereby experiencing being a company commander one day, a battalion commander the next and the red force commander the day after, giving them a much broader experience base for the future. According to Perla and McGrady, “The need to explore, repeat, and reflect on decisions made in the context of games is critical to what we must do to learn better how to cope with a world rapidly moving beyond our range of real experiences.”²⁰

Another crucial aspect is immersion. At its simplest, this involves having players take on roles that can shape how they approach and tackle problems. However, it goes beyond that, encompassing immersion in the processes to provide players with a realistic sense of the stress and challenges associated with conducting urban operations. For example, Dstl runs the commercial

computer wargame “Combat Mission” in a way that forces the player to see only the force elements that they could actually see in real life (see image above). This forces commanders to make decisions based on heavily restricted but realistic representations of their situational awareness. Notably, many Dstl military players have commented on how disorienting they found it.

Another facet of immersion involves considering the consequences of actions. Wargames enable the representation of outcomes such as civilian casualties, infrastructure damage, information operations failures, high Blue Force casualties and other difficult challenges. Maps can be altered to represent the degradation of the environment commensurate with the level of destruction applied by the players. Even a simple wargame with card-driven “events” like these can force commanders to take responsibility for their actions – both positive and negative – and grasp their implications and how they might influence subsequent actions.²¹

It's not that simple, though

To be clear, even simulating the complexity of urban operations in a wargame is still very difficult. The US Army conducted a review of all their legacy simulations for urban operations utility. When assessed across the PMESII-PT²² spectrum, the only category that warranted a green rating was, unsurprisingly, “Military.”²³



Source: Author

A photo from a manual urban wargame designed by Dstl, known as CUBS (Complex Urban Battlefield Simulation), used during a Five Eyes collaborative experiment focused on contested urban environments.

Dstl conducted a review of UK Defence’s wargaming capabilities and, having identified comparable limitations in its core wargaming capabilities, is actively making efforts to address them. Acknowledging that valuable ideas are not exclusive to any single organization, Dstl is addressing these challenges by leveraging both computer-based and manual commercial wargames and adapting them to meet their specific requirements. Many commercial games strive to cover the conflict in an engaging way that allows representation of many of the factors outlined above or the use of mechanics that emphasize specific functions such as C2 and information operations.

Wargames serve as simulations of conflict, but not all wargames are created equal. There is a maxim among modelling and simulation practitioners: “All models are wrong, but some are useful.” No single wargame can cover everything, and there will always be compromises, just as in live training.²⁴ The key lies in discerning the level of realism required for the intended outcome and tailoring the wargame accordingly.

It is equally essential to recognize that wargames deliberately emphasize certain aspects and may not attempt to encompass every possible entity and influence. Aspects deemed less relevant to the purpose of the wargame are often represented in more abstract ways to enable players to focus on the primary aim.²⁵ A classic example is the resolution of combat using dice, symbolizing the risk commanders must weigh and the inevitable frictions that can disrupt even the best-laid plans. While it may not achieve 100% accuracy

for all combat engagements, it is often considered sufficient to allow the progression of the wargame and focus the players’ attention on the main objectives.

The manual wargame “We Are Coming Nineveh!” covers the operational level during the Battle of Mosul, Iraq (16 October 2016–20 July 2017). The combat is heavily abstracted but the game uses blocks to restrict Blue’s picture of Red (representing incomplete intelligence) and cards to represent a wide spectrum of possible events to influence the outcome. The incorporation of cards introduces a variable element, providing players with a different set of challenges in each playthrough. The game also has a function where the players must choose how to build their force before the battle, compelling players to consider force compositions. The trade-offs made at the outset have second- and third-order effects, influencing the later stages of the game. This allows players to replay the game with different force compositions, introducing an element of experimentation.

Computer wargames like *Combat Mission* allow combined arms companies to conduct high-intensity combat in heavily built-up areas using the full spectrum of joint effects, including airstrikes, electronic warfare, artillery and ISTAR. However, the trade-off is that the system is primarily designed for displaying company-sized elements, and the infantry combat is relatively simplistic. As it is a commercial game, though, it is reasonably easy to learn and can be used for individual training or with two opposing sides. The inclusion of a map maker function enables the generation of new urban areas, ensuring a variety

of layouts and scales to keep the training challenging. Additionally and as noted previously, there are methods to run the game in ways that enhance the C2 challenges.

To train larger groups and at higher echelons, Dstl employs custom-designed wargames that can be tailored to achieve the intended training outcomes. In these scenarios, individuals with specific knowledge and expertise are often employed to play various factions, such as the enemy, the host nation, the local population and other international actors. This approach enables military players to focus on their specific, real-world roles.

While these approaches offer potential solutions to the limitations of physical urban training, they are not without challenges. For instance, finding suitably experienced players for faction roles can be challenging. Furthermore, the aggregated features inherent in wargames make them less suitable for training certain aspects of urban operations. For some players, card-driven events and dice resolutions might be perceived as too random, leaving them feeling as if they are playing a game of chance rather than conducting serious military training. Effective facilitation can mitigate these challenges. Ultimately, however, the alternative might be the exclusion of these aspects from urban training or, worse, a lack of urban training altogether.

CONCLUSION

Exclusive reliance on live training will fall short in adequately preparing militaries for future urban combat. The limitations of training locations become apparent as they are unable to replicate the scale, complexity (including EMS), variety and fragility of the physical urban landscape. Existing training facilities are also incapable of accurately representing the scale of the human dimension of conflict within this environment and how it evolves dynamically as a direct result of actions taken by commanders. Lastly, these sites are incapable of allowing representation of combined arms and joint effects (including non-kinetic), and live fire in particular, in sharp contrast with regular training requirements in rural environments. As a result of these deficiencies, militaries fail to sufficiently prepare commanders at all levels for the best employment of the full spectrum of available effects.

Despite the existing limitations, wargaming stands out as a viable means of genuinely preparing commanders to conduct urban operations, especially at higher formations. With adequate support, the acknowledged limitations of wargaming can be mitigated. While they may never achieve a perfect reflection of reality, wargames have the potential to provide a much more comprehensive representation of tactical and operational challenges in urban warfare compared to other means of training. Investing in the development of wargames

offers a faster and more efficient and effective way to address the gap in urban training, rather than directing resources solely towards live training estates.

In order to prepare the allied and partner forces for the future urban battlefield, it is crucial to stop relying solely on live training. The inherent limitations of live training can lead to the entrenchment of poor tactics, as constrained exercises become the foundational experience for leaders at all levels from section to platoon, company and beyond. Relying on these constrained live exercises as the cognitive foundation for war readiness risks ingraining sub-optimal lessons in the force. Similarly, it would be imprudent to hope that soldiers can adapt when real urban combat presents itself. As the saying goes, hope is not a strategy, and this reliance on adaptation under fire may result in unnecessary casualties and collateral damage. Wargames offer a proven alternative. As highlighted by General von Muffling, the Chief of the Prussian General Staff in 1824, upon observing a wargame, "This is not a game! This is training for war!"²⁶ 🍷

ABOUT THE AUTHOR

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ENDNOTES

1. See "Mosul Study Group: What the Battle for Mosul Teaches the Force," *US Army TRADOC* (September 2017), <https://www.armyupress.army.mil/Portals/7/Primer-on-Urban-Operation/Documents/Mosul-Public-Release1.pdf> (accessed on 03 December 2022), 30–31.
2. NATO doctrine identifies eight distinct UTZ. NATO STANDARD – ATP-99 – Urban Tactics.
3. ICRC, "*Reducing Civilian Harm in Urban Warfare: A Commander's Handbook*," (ICRC.org, November 2021), <https://www.icrc.org/en/document/reducing-civilian-harm-urban-warfare-commanders-handbook> (accessed on 24 May 2023).
4. "British troops train at Europe's largest urban training facility complete with own airport," *Forces.net* (July 2022), <https://www.forces.net/operations/germany/british-troops-welcomed-enormous-german-training-town> (accessed on 12 December 2022).

5. S. Lyle, J. Bogan, and A. Feeney, "Future Cities: Trends and Implications," *UK MOD Defence Science and Technology Laboratory* (February 2020), <https://www.gov.uk/government/news/the-future-of-our-cities-dstl-publishes-new-report-on-the-future-of-urban-living>.
6. J. Spencer, "The Twelve Days Of Urban Warfare Christmas," *Modern War Institute* (December 2020), <https://mwi.usma.edu/twelve-days-of-urban-warfare-christmas/> (accessed on 25 May 2023).
7. An excellent example of this is how the US Marines reverted to high-intensity urban doctrine as the second Battle of Fallujah unfolded, despite supposedly being prepared for a high-intensity urban fight before crossing the line of departure. Covered in P. O'Donnell, *We Were One: Shoulder to Shoulder with the Marines Who Took Fallujah* (Cambridge: Da Capo Press, 2006), 141.
8. Lyle et al., "Future Cities," 24–28.
9. G. Longley-Brown, "What, actually, is a wargame; and why does this matter to you?" *Wargaming Connection*, <https://wargamingcommunity.wordpress.com/terminology/> (accessed on 18 May 2023). Original blog post on <http://lbsconsultancy.co.uk/blog/what-actually-is-a-wargame-and-why-does-this-matter-to-you/>.
10. "Why Is Chess Called the Game of Kings?" *The Chess Journal*, www.chessjournal.com/why-is-chess-called-the-game-of-kings/ (accessed on 05 December 2023).
11. M. Vego, "German War Gaming," *Naval War College Review* 65, no. 4 (Autumn 2012), <https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1494&context=nwc-review> (accessed on 05 December 2022).
12. K. Mizokami, "A Brief History of Naval Wargames," *USNI News*, September 2013, <https://news.usni.org/2013/09/24/brief-history-naval-wargames> (accessed on 05 December 2022).
13. Isabelle Khurshudyan, Paul Sonne, Serhiy Morgunov and Kamila Hrabchuk, "Inside the Ukrainian counteroffensive that shocked Putin and reshaped the war," *The Washington Post*, 29 December 2022, <https://www.washingtonpost.com/world/2022/12/29/ukraine-offensive-kharkiv-kherson-donetsk/> (accessed on 23 May 2023).
14. I. Gardiner, "Wargaming: An Overlooked Educational Tool," *British Army Review*, BAR 165 (Winter 2016): 65, https://paxsims.files.wordpress.com/2016/02/bar_165_web1a.pdf.
15. See this video for an example of this type of training being done in a modern facility within a barracks location: https://www.youtube.com/watch?v=h_JsfYjvlgU.
16. J. Athow-Frost, "Better Urban Training," *Wavell Room*, March 2022, <https://www.gov.uk/government/news/the-future-of-our-cities-dstl-publishes-new-report-on-the-future-of-urban-living> (accessed on 12 December 2022).
17. I. Gardiner, "Wargaming," 66–69, available at https://paxsims.files.wordpress.com/2016/02/bar_165_web1a.pdf.
18. R. Taylor, D. Stewart and J. Spencer, "The Vampire Fallacy: Virtual Reality vs Needs Based Strategies," *Wavell Room*, 17 June 2021, <https://wavellroom.com/2021/06/17/virtual-reality-strategy-military/> (accessed on 26 May 2022).
19. R. Hooker, "The Tyranny of Battle Drill 6" (Modern War Institute, 08 July 2021), <https://mwi.usma.edu/the-tyranny-of-battle-drill-6/> (accessed on 26 May 2023).
20. P. Perla and E. McGrady, "Why Wargaming Works," *Naval War College Review* 64, no. 3 (2011): 112.
21. *Ibid.*, 113. See also J. Sepinsky, "Is It a Wargame? It Doesn't Matter: Rigorous Wargames Versus Effective Wargaming," *War on the Rocks*, <https://warontherocks.com/2021/02/is-it-a-wargame-it-doesnt-matter-rigorous-wargames-versus-effective-wargaming/> (accessed on 23 May 2023).
22. Political, Military, Economic, Social, Information, Infrastructure, Physical Environment, and Time.
23. TRADOC Pamphlet 525-92-1, "The Changing Character of Warfare: The Urban Operational Environment" (US Army Training and Doctrine Command, April 2020), <https://adminpubs.tradoc.army.mil/pamphlets/TP525-92-1.pdf> (accessed on 26 May 2023).
24. E. Bartels, "Wargames as an Educational Tool," (*RAND*, February 2021), <https://www.rand.org/blog/2021/02/wargames-as-an-educational-tool.html> (accessed on 24 May 2023).
25. E. Bartels, "Getting the Most Out of Your Wargame: Practical Advice for Decision-Makers," *War on the Rocks*, November 2019, <https://warontherocks.com/2019/11/getting-the-most-out-of-your-wargame-practical-advice-for-decision-makers/> (accessed on 25/05/2023).
26. Quoted in UK Ministry of Defence, *The Defence Wargaming Handbook* (Crown copyright, MOD 2017), <https://www.gov.uk/government/publications/defence-wargaming-handbook> (accessed on 05 May 2022), ix.

UNDERSTANDING RISKS AND MITIGATING CIVILIAN HARM IN URBAN OPERATIONS

Sahr Muhammedally





The world has watched how cities of Bakhmut, Gaza, Khartoum, and Mariupol have suffered aerial bombing, artillery shelling and siege warfare, resulting in destroyed lives and infrastructure. Similar images of urban battles have been seen in Aleppo, Kyiv, Raqqa, Mosul, Marawi and Sana'a, where civilians have been maimed, killed or displaced and the social fabric has broken, impacting entire generations.¹ The conflicts of today are fought in bustling neighbourhoods and markets and at people's doorsteps. Fighting in urban areas is the most dangerous form of warfare in terms of civilian harm, with an estimated 50 million people worldwide currently bearing the brunt of it.² War in cities disrupts education, health and livelihoods, and it profoundly impacts a country's human capital, economic growth, development and peacebuilding ability, all of which can take decades to rebuild.

Cities are vulnerable to conflict because they are the centres of gravity for civilian life.³ The control of major cities is one of the clearest indicators of military progress and can determine the success or failure of a conflict. Urbanization reinforces the strategic value of cities, with 68 percent of the world's population expected to live in urban environments by 2050.⁴ Belligerents may take the fighting to urban areas, as the physical and human terrain can blunt a superior military's technology and precision capabilities. Attackers have resorted to siege warfare, including limiting supplies of food, water,



Source: Wikimedia Commons



medicine and electricity to the civilian population, and have used large explosive munitions such as unguided artillery, multiple-barrel rockets, large-radius bombs and mortars, and improvised explosive devices (IED), with devastating consequences for civilians.

Combat in urban areas is the most challenging type of operation, with the commingling of military objectives, civilians and civilian objects. International humanitarian law (IHL), also known as the law of armed conflict (LOAC),⁵ limits the means and methods of warfare that parties to the conflict may employ and ensures protection and humane treatment of persons not taking part in hostilities, through the principles of humanity, distinction, proportionality, and precautions. Most militaries also remain ill prepared in terms of doctrine, training, weapons and equipment design for such operations. However, the heightened risk to civilians in urban war mandates changes in military training, policies and practices to address the humanitarian consequences of urban warfare while achieving mission success. In recent wars, commanders have also identified strategic reasons to reduce civilian harm, as extensive civilian casualties may undermine the legitimacy of the military mission, thus benefiting the enemy. As one commander noted, “In wars among the people—where the real battles are for legitimacy—civilian harm, even within the bounds of LOAC, can have major negative impacts on the mission.”⁶

As militaries prepare to improve capabilities to operate in urban environments, including large-scale combat operations, and leverage multi-domain operations⁷ synchronizing air, land, sea, cyber and space, it is imperative to understand the risks to civilians and civilian objects and adapt/enact new military practices to reduce civilian harm.

This article proposes that understanding the urban environment, including the terrain, population, supporting infrastructure and technology, through the lens of civilian harm mitigation is essential for enabling military planners to analyze how to minimize harm to civilians and civilian objects and how to upgrade doctrine, policies, practices, training and equipment.⁸

LEGAL, POLICY AND STRATEGIC FRAMEWORKS FOR MINIMIZING HARM TO CIVILIANS

Law

The law of armed conflict reflects an attempt to balance military necessity with the principle of humanity.⁹ LOAC may be found in treaties such as the four 1949 Geneva Conventions that were negotiated and ratified following World War II, in the 1977 Additional Protocols I and II, and in customary international law.¹⁰

LOAC requires that, once an attack on a verified military target is judged permissible, those responsible for planning and deciding upon that attack must apply



Source: Wikimedia Commons

the rules to avoid or minimize incidental civilian harm. The three main principles that apply to the conduct of hostilities are distinction, proportionality and precautions, and they apply in international and non-international armed conflicts.¹¹ Additional Protocol I and customary international law require that parties to a conflict must at all times distinguish between civilians, civilian objects and military objectives.¹² Civilians and civilian objects must not be the object of attack.¹³ The rule on indiscriminate attacks prohibits attacks that target military objectives and civilians or civilian objects without distinction.¹⁴

The rule on proportionality prohibits attacks that may cause incidental loss of civilian life, injury to civilians, or damage to civilian objects that would be excessive to the concrete and direct military advantage anticipated.¹⁵

In all military operations, LOAC requires that constant care be taken to spare the civilian population, civilians and civilian objects.¹⁶ The term “military operations” encompasses “any movements, manoeuvres and other activities whatsoever carried out by the armed forces with a view to combat” or “related to hostilities” and not just attacks.¹⁷ Thus, measures to protect civilians must be factored into operational planning and mission execution not only as a matter of policy, but also to adhere to legal obligations, not only during war but also in preparation for war.¹⁸ This can include ground operations, establishment of bases, defensive preparations and search operations.¹⁹

LOAC imposes additional obligations to take all feasible precautions in planning an attack and requires parties to the conflict to protect civilians and civilian objects under their control against the effects of attacks. Precautionary measures available to an attacking party may include assessing risks to civilians, providing effective advance

warning, take all feasible precautions in the choice of means and methods of attack with a view to avoiding incidental harm, refrain from attacks that cause disproportionate civilian harm, adjusting the timing of an attack, or cancelling attacks altogether if incidental harm will be excessive to the military advantage gained.²⁰ A defending party is also obligated to undertake precautionary measures from the effects of an attack, which may include giving sufficient warnings of incoming attacks, remove civilian population under their control from the vicinity of military objectives, and avoiding locating military objectives within or near densely populated areas.²¹

LOAC also prohibits the use of human shields and the starvation of civilians.²² Encirclement and siege tactics are lawful only when used directly against enemy forces, and the besieging party may not deliberately deprive civilians of supplies that are essential for survival.²³

Operations in the urban environment may blur police and military functions as areas of responsibility overlap and will require coordination between military and police, including special operations forces; police special weapons and tactics; and police intelligence teams. Plans must be made to enact appropriate policies—in adherence to international human rights law (IHL), the use of force for law enforcement—for the screening of combatants amongst the civilian population; detention/internment operations; conditions/treatment; judicial guarantees; procedural safeguards; and transfer/repatriation/release.²⁴

Lastly, there is a growing body of analysis on the application of LOAC principles and rules in the context of cyber and space operations.²⁵ For example, military commentators note that, in future wars, the accelerated pace of operations may result in delegated decision-making authority with respect to subordinates and the use of automated decision-

making tools.²⁶ It is therefore vital to ensure that emerging technologies used in war sufficiently assess the foreseeable humanitarian impact and are in compliance with LOAC.²⁷

The complex nature of urban environments, the intermingling of militaries and civilians, and the delegation of decision-making authority require that personnel at all levels are trained on LOAC, ethical judgment and theatre-specific rules of engagement (ROE) in order to comply with LOAC and minimize civilian harm.

Policies

In recent conflicts, some militaries have enacted mission-specific policies tailored to minimizing civilian harm. The North Atlantic Treaty Organization (NATO)'s International Security Assistance Force (ISAF) in Afghanistan—in response to public criticism of civilian harm—enacted several tactical directives to reduce civilian deaths and injuries as well as damage to civilian property.²⁸ In 2011, after widespread criticism of civilian harm, the African Union Mission in Somalia (AMISOM) similarly introduced a policy to restrict the use of indirect fire in populated areas.²⁹ In 2017, the Afghan government enacted the Civilian Casualties Mitigation and Prevention Policy, which committed its forces to mitigate and respond to civilian harm through training, policies, and financial assistance to conflict victims.³⁰

In 2016, NATO adopted its first-ever protection of civilians (PoC) policy and reinforced the organization's commitment to more effective civilian harm mitigation.³¹ It was developed partly in response to criticism of NATO's actions, which had contributed to causing civilian casualties during its operations in Libya and Afghanistan. NATO has tried to develop a comprehensive PoC framework to not only “minimize and mitigate the negative effects that might arise from NATO and NATO-led military operations” but also to “protect civilians from conflict-related physical violence or threats of physical violence by other actors, including through the establishment of a safe and secure environment.”³² This was followed by a PoC Handbook published in 2021.³³ Over a period of six years, NATO significantly elevated the development of PoC policies and frameworks, and their applicability to urban warfare is all the more critical now given the war against one of NATO's strategic partners, Ukraine.

Most recently, in response to reports of civilian harm attributed to the US in Iraq and Syria and internal review of incidents,³⁴ in August 2022 the US Department of Defense enacted the Civilian Harm Mitigation Action and Response Plan (CHMR-AP) to improve how the US military prevents and responds to civilian harm along the spectrum of conflict, including counterterrorism operations and high-intensity conflict, and directed the military to develop a civilian protection centre of excellence;



overhaul doctrine, policies, training and response plans to mitigate civilian harm; and integrate civilian harm mitigation into security cooperation and with partners and allies.³⁵ In November 2022, 83 nations, including all NATO countries, as well as Canada, the US, and the UK, signed the *Political Declaration to Limit Humanitarian Suffering from the Use of Explosive Weapons in Populated Areas*.³⁶

Strategic Reasons

In addition to legal obligations and policies, armed forces have strategic reasons to take measures to minimize civilian harm in populated areas. Extensive civilian harm may undermine the legitimacy of the military mission.³⁷ It can result in a decline in political, military or financial support (both local and international), including intelligence collection from sources,³⁸ and can become a divisive issue between multinational partners.³⁹ Extensive civilian harm also might eliminate avenues for reconciliation, trigger more violence and, as recognized by the 2022 U.S. Army/U.S. Marine Corps *Urban Operations* doctrine, turn initially neutral or positive sentiment into hostility toward the US and its partners, thereby prolonging the conflict.⁴⁰ Damage to civilian objects, including critical infrastructure⁴¹ which civilians depend on for their survival, such as electricity, water, sanitation and health care, generates reverberating effects on lives and livelihoods, increases post-conflict reconstruction costs⁴² and risks alienating the population if services are not restored.⁴³ Extensive destruction also impacts military operations' ability to manoeuvre in urban terrain.⁴⁴

Militaries have cited strategic reasons to enact additional measures to minimize civilian harm. For example, ISAF's restrictive measures were imposed to "avoid the trap of winning tactical victories—but suffering strategic defeats—by causing civilian casualties or excessive damage and thus alienating the people."⁴⁵ AMISOM's indirect fire policy was enacted due to the failure to protect civilians in the fight against al-Shabab, which was undermining AMISOM's strategic and operational success.⁴⁶ NATO's Protection of Civilians Handbook notes, "[L]ack of consideration for [civilian harm mitigation] will have a negative impact on the overall mission" because such "failures will generate negative strategic effects and their consequences will reverberate at all levels of command. [Protection of Civilians] is therefore key for mission success and legitimacy."⁴⁷ Similarly, in August 2022, the US Department of Defense affirmatively acknowledged that the protection of civilians is a strategic priority as well as a moral imperative.⁴⁸

CIVILIAN HARM MITIGATION PLANNING CONSIDERATIONS IN URBAN ENVIRONMENTS

Military operations are challenging in urban areas for several reasons that must be examined in order to enable planning and preparedness, including through the lens

of civilian harm mitigation.⁴⁹ The overlap of the terrain, the population, the infrastructure and the information systems within the urban environment will challenge all aspects of a military's command and control structure. Urban systems are complex and interconnected and include flows of people, resources and information into and out of cities. This interconnectedness of cities magnifies the harm that occurs when there is damage to or destruction of one urban system, since that damage or destruction may have reverberating and long-term impacts on others.

Terrain

Urban areas can include horizontal, vertical, interior, exterior and subterranean forms imposed on the natural environment. A multi-storey building takes up the same land area as a small field, but the area of each storey is approximately equal to that of the ground floor. In addition, urban areas can include informal settlements ranging from shanty towns to high-rise buildings. It is the sheer volume and density created by this urban geometry that makes urban operations resource-intensive in time, personnel and materials.⁵⁰

Understanding the effects of munitions in urban terrain is vital. Over 60 percent of the world's buildings are composed of penetrant-resistant brick or concrete, thereby impacting weapons effects and blast, fragment, ballistic or manual breaching.⁵¹ When buildings are weakened by weapon strikes, the result may be falling debris and even collapse, increasing the risk of injuries to civilians and soldiers in the area. Rubble from collapsed buildings may be contaminated with unexploded ordnance (UXO), posing risks and limiting manoeuvrability in the area. It also takes time and special equipment to extract people trapped under rubble, which increases the probability of death or limb amputation.⁵²

Subsurface areas magnify the complexity of the urban terrain. Below-ground facilities are inherent physical features of today's cities, and their number and dispersion are increasing apace with population growth and its accompanying structural spread. Subterranean tunnels have been used by armed actors such as Islamic State (ISIS) and Hamas to prevent observation and attack, as well as to target and smuggle supplies. Detecting entrances and exits to subterranean facilities can be extremely difficult, with different types of resources necessary to detect, trace and target military objectives. Identifying underground routes is nearly impossible, given the depth of some infrastructure and the clever concealment of airshafts. Even when a military objective is detected, the tunnel could lie beneath civilian infrastructure, such as homes and hospitals, necessitating application of the LOAC rule on proportionality to avoid causing excessive civilian harm. Targeting teams must also assess the dual-use nature of tunnels: they can be used not only by armed actors, who

may choose to hide their command posts underground, but also by civilians as shelters or underground hospitals, as witnessed recently in Ukraine and Syria.⁵³

Buildings, walls, tunnels and other structures can interfere with communications signals and global positioning system (GPS) navigation systems. This can limit situational awareness and the ability to verify the locations of the adversary and civilians.

Ground operations can also become dispersed when forces need to move through city streets, stairwells and corridors, thereby causing command and control to be decentralized and increasing the risk to civilians. Soldiers at the tactical level, therefore, must be fully knowledgeable regarding the ROE and exercise a high standard of ethical judgment in order to comply with LOAC rules on distinction, proportionality and precautions.

Cities located near coastlines, including littoral zones such as inlets, rivers and canals, are another important facet of urban terrain. In fact, 40 percent of the world's population lives within 60 miles (100 km) of a coastline.⁵⁴ Controlling or being able to access urban littoral allows forces certain manoeuvre and logistical capabilities. This entails planning considerations, given the presence of population; infrastructure; and government, economic and industrial activity in the littoral area. Such locations also pose the risks of flooding, waterborne diseases and coastal erosion.

Moreover, coastal cities include ports and trade hubs, which energy and supply chains rely upon and which are key entry points for the movement of people and the delivery of humanitarian assistance. Any disruption to port operations, including from a blockade,⁵⁵ could disrupt the supply of food, water and medicine needed for the population and by hospitals, damage the local economy, and potentially impact the national and global supply chains, as occurred in Ukraine in 2022.

The sheer volume and type of terrain in urban areas challenges command, control and information-collection activities, the deployment of forces, sustainment/logistics, and heavy equipment to move and manoeuvre. It also increases the planning, resources and contingency measures required to conduct urban operations.

Climate Change and the Natural Environment

Armed conflicts also cause environmental degradation and destruction, thereby affecting the well-being, health and survival of the population.⁵⁶ The effects can last for years or decades after wars, as seen in Iraq, Mali, Central African Republic and Yemen.⁵⁷ Extreme weather events will also have a magnifying impact in urban areas due to the density of population and infrastructure that might require disaster relief missions during military operations. Planners should examine how weather and

climate affect living conditions, including the impact of extreme heat on people with limited access to water, or of cold weather on those without access to electricity or heating fuel. Direct hits to critical infrastructure, such as water pumping and purification plants and sewage facilities, lead to service failure and denial of clean water and food systems, as witnessed in Gaza and Ukraine.⁵⁸

Planners should also assess the risks and consequences to the natural environment, both immediate and long term, of toxic substances and other pollutants released from explosive ordnance, including mines and explosive remnants of war.⁵⁹ Toxic substances can seep into the soil, subsoil and water, contaminating those sources and spreading disease, as well as threatening civilians' livelihood and food security and endangering the ecosystem. There is also a risk of pollutants and contaminants being released when facilities that contain hazardous materials (such as chemicals, biological agents and radiological substances) are damaged, and the spread of such materials can impact public health. Industrial, forest and agricultural fires and oil burning will also increase greenhouse gas emissions and degrade the ecosystem, as has occurred with development in Ukraine. LOAC prohibits direct attacks on dams, dykes and nuclear electrical generating stations, even if those objectives are military objectives, because of the direct and long-term impact to civilians and the natural environment.⁶⁰

Population

Understanding the urban population—its composition, size and location—assists in operational planning to mitigate the effects of an attack and to defend against attacks. Knowing the race, religion, national origin, tribe, clan, economic or social class, education level, age, gender, occupation, and other significant social demographics of an urban population, as well as urban societies' sources of power and influence (both formal and informal), enhances understanding of the population. Knowing civilians' perceptions and intentions with regard to their safety and security, including what they perceive as threats and how they will live and move during a battle, enables commanders to better understand the human environment. Commanders need to understand how civilians contribute to adversarial efforts⁶¹ but do not meet the legal definition of direct participation in hostilities (DPH)⁶² or how adversaries may misuse civilians as human shields.⁶³ Such broad understanding will also inform how security forces can communicate effectively with civilians in order to protect them during an attack and from the effects of an attack and enable efforts to shield or safely evacuate civilians from areas of combat.

Fighting in urban areas often results in mass displacement,⁶⁴ permanently changing the landscape and social fabric of many towns and cities across the world. Civilians are often left with no choice but to flee, and they often do so in great danger as they may be targeted, caught in the crossfire,

mistreated by parties to armed conflict, and separated from their family members. Once the fighting is over, contamination from UXO, as well as a lack of essential services, prevent many displaced people from returning, often for years.⁶⁵

But not all civilians leave. Some are unable to do so due to age, disability or health conditions or do not have resources for transportation. Some do not want to leave their home, or they are afraid of undertaking a journey that is unsafe due to kinetic operations, or are concerned about the uncertainties of living in a refugee camp or in a new environment where basic services are unavailable. When kinetic operations begin, some civilians may move from their home temporarily to any building to seek shelter. Military commanders—both attackers and defenders—are required by LOAC to protect civilians during an attack and from the effects of attacks. Attackers must provide effective advanced warnings to allow civilians to voluntarily leave safely, but it is likely that some or many civilians will remain. Therefore, attackers operating in urban areas should assume the presence of civilians in buildings and adhere to the rules on distinction and proportionality in targeting processes. Humanitarian pauses by parties to the conflict to allow civilians who leave voluntarily to do so safely, as were implemented in the besieged city of Mariupol, should be considered.⁶⁶

Infrastructure

Urban infrastructure is designed to support a city's inhabitants and includes interconnected systems such as commerce, culture, communications and information, administration, sanitation, water, electricity, hospitals, airfields, roads, bridges, subways, ports, trains, and transit corridors for goods and services. Urban warfare also creates food insecurity by disrupting the supply chains and markets that urban dwellers depend on to survive.

Disrupting or degrading power infrastructure relied upon by an adversary can be militarily advantageous, but it is lawful only if such operations are judged to be compliant with LOAC rules on precautions in attack.⁶⁷ However, the damage and destruction of services—sanitation, water, electricity and medical—that are essential for the survival of the population is detrimental to the civilian population, as seen in Gaza, Ukraine and Syria.⁶⁸ Cuts to these basic services are aggravated when cities are besieged, when impartial humanitarian organizations are denied access to the civilian population⁶⁹ or when urban conflicts become protracted as technical experts needed to restore and maintain infrastructure are killed or injured or leave for safety. Often the services require consumables (fuel, chlorine, medicine) whose availability is limited by the fighting. This can have a progressive and often irreversible impact on the functioning of critical infrastructure.

Planners must know the locations of these structures, their condition and the likely weapons' effects on them, including by consulting with urban engineers and experts, to enable a commander to determine appropriate courses of action that are LOAC-compliant. This might include placing elements of the infrastructure on a "No-Strike List." Parties to conflict can also help prevent food insecurity by protecting civilian structures such as markets, warehouses, shops and water installations from attack and by ensuring the continued functioning of food logistics and markets.

Requirements to protect, restore and maintain essential services also require significant resources and personnel. These must be factored into planning to meet the urgent needs of the population and to allow the return of displaced people, in order to enable the conditions for transition toward civilian authorities, improved civil-military relations and overall operational effectiveness.

Cyber, Artificial Intelligence and Information Warfare

In urban areas, the interconnectedness of networks and supporting infrastructure creates challenges when both state and non-state actors pursue military aims using technology. Urban areas are highly dependent on communication infrastructure, and any disruption may cause major disturbances to the normal functioning of the city. Cyberspace is predominantly used for civilian purposes, but civilian and military networks may be interconnected. Military networks may rely on civilian cyber infrastructure, such as fibre-optic cables; satellites; routers or nodes; as well as sensor networks, and, arguably, military use can turn the infrastructure into a military objective. But attacks must respect the prohibition against indiscriminate attacks, the rules of proportionality, and precautions in attack. Thus, in applying these rules, the interconnected nature of cyberspace and the risk of widespread incidental civilian harm must be considered.

For example, sophisticated cyberattacks can disrupt the provision of services essential to the civilian population, including healthcare, electrical, energy and water supply systems. The destruction of fibre-optic cables, wireless networks, data centres or sensor networks can have a sizeable impact on the city and neighbouring countries. As such, the weaponization of and targeting within the cyber domain pose a high risk to civilian populations that are reliant on such infrastructure when they also qualify as military objectives.⁷⁰

Advances in artificial intelligence (AI) are also being integrated into military capabilities, which would lead to a degree of operational autonomy but would introduce new risks of civilian harm if used for selecting and engaging targets.⁷¹ Future military intelligence gathering will draw from not only drone sensor feeds, high-altitude platforms and satellites but also social media, text messages and AI classifications to inform awareness. As data sources



Source: Wikimedia Commons

Fighting in urban areas often results in mass displacement, permanently changing the landscape and social fabric of many towns and cities across the world.

expand, risks to civilians can increase due to the limitations of technology, such as unpredictability, bias in AI algorithms,⁷² and demands of keeping algorithms up to date in a changing environment. Leveraging these capabilities in armed conflict need to be compliant with LOAC and ethics frameworks.⁷³

Technology also increases the risk of armed actors accessing data to identify, target or influence the civilian population through the manipulation of information.⁷⁴ Information warfare—which includes disinformation (the spreading of false information with intent to deceive) or misinformation (the spreading of false information without specific intent to deceive)—can be used by armed actors and have negative consequences for civilians.⁷⁵ While information warfare is as old as warfare itself, advancements in technology can influence opinions and behaviour on a larger scale than ever before. For example, fake information produced by AI-enabled systems through text, audio, photos and video is becoming increasingly difficult to distinguish from real information.⁷⁶

False content can be circulated widely on social media, inflaming ethnic tensions and violence between communities, as seen in Myanmar with attacks on Rohingya Muslims.⁷⁷ As

a result, civilians may be subjected to ill treatment, arrest, discrimination, denial of access to essential services, or attacks on their person or property. Disinformation has also resulted in endangering aid workers and can disrupt access to critical services during armed conflict, as experienced in Syria with attacks on Syrian Civil Defence (the White Helmets), which operates in opposition-controlled Syria.⁷⁸ In current armed conflicts, private citizens have also been deputized to be “electronic armies,” “troll farms” or “web brigades” and are promoting disinformation.⁷⁹ This can reinforce confirmation bias and accelerate the sharing of specious reports that can impact the quality of verifiable intelligence collection for commanders planning an attack or defending a city.⁸⁰

Training

Urban operations are resource-intensive, requiring significant logistical support, personnel, medical evacuation locations and resources for both civilians and military and sufficient coordination for facilitating humanitarian access to the civilian population. Specialized skills, experience and training are needed for urban operations, and training is hindered when it is not possible to model dense urban areas with appropriate human behaviour,

infrastructure and technology. Training in urban warfare typically focuses on room clearing and entry breaching and is generally conducted in training centres lacking a realistic and representative population. Moreover, training typically happens at the company level or below and is infrequent. Staff training, which is often limited to case studies or tabletop exercises, occurs without the input of external civilian and humanitarian agencies.⁸¹

Munitions

According to urban war experts, the primary methods of attacking an urban enemy fortification are to either destroy it or prepare the building with explosive munitions and then send infantry to enter and clear the entire building, if needed.⁸² Many armed actors rely on explosive weapons with wide area effects, such as large-radius bombs, unguided artillery and mortars, IEDs, and multi-launch rocket systems, to accomplish this objective. Those weapons, however, are ill adapted for use in populated areas, as they have wide area effects due to large blast and fragmentation radius and to the lack of accuracy of the delivery systems, or when the weapon system is designed to deliver multiple munitions over a wide area. When used in urban areas where military objects and civilians and civilian objects are in closer proximity, such weapons cause injury and death among civilians and damage to civilian objects on a dramatic scale.⁸³

In response to the humanitarian toll when such weapons are used, 83 states, including Canada, met in Dublin in November 2022 to endorse the *Political Declaration to Limit Humanitarian Suffering from the Use of Explosive Weapons in Populated Areas*.⁸⁴ States are committing to strengthen adherence to IHL, enact new policies to restrict/refrain from the use of explosive weapons in populated areas “when use may be expected to cause harm to civilians or civilian objects,” improve training, undertake battle damage assessments and civilian harm tracking mechanisms, and improve victim assistance programs.

Precision guided weapons can reduce civilian harm and have been used in recent urban wars, but stockpiles may be depleted quickly. In addition, when these weapons are deployed against a determined adversary using the cover offered by the urban terrain, their effectiveness can be undermined.⁸⁵ Precision guided kits, which cost less and can be attached to unguided bombs to improve accuracy, have been used most recently in Ukraine. However, in a contested environment, the GPS of some munitions can be jammed, undermining precision, as has also been done in Ukraine.⁸⁶ Thus, in urban warfare, constant innovation is needed to adapt and use appropriate munitions that can be effective against the military objective, remain LOAC compliant and minimize civilian harm.

THE WAY FORWARD

Militaries should better prepare their forces for the challenges of urban warfare in order to mitigate the problem of civilian harm. Forces need to understand not only the environment in which they are fighting but also how to operate in it while minimizing civilian harm, as required by law and policy. Being prepared for urban war requires the use of tools, policies, practices, munitions and training that are all contextualized for the urban environment and that sufficiently take into account risk to civilians and civilian objects. Urban operations involve combined arms fighting, which includes infantry, armoured forces, direct-fire weapon systems, artillery and indirect fires, snipers, cyber, and airstrikes to support ground forces. It also combines special forces, intelligence, civil affairs and engineers. In this context, civilian harm mitigation considerations must be integrated into all warfighting functions, in addition to their critical enablers.

In large-scale combat operations (LSCO),⁸⁷ which are conceptualized as state versus state conflict with a modern, peer or near-peer adversary, the need to innovate on civilian harm mitigation tools and adapt is critical. Excessive collateral harm impacts domestic and world opinion and also affects ongoing operations, hindering consolidation of gains and transition to stability operations. In today’s battlefield, commanders must contend with the challenges of a connected information environment in which all armed actors can use information to amplify divisions and affect strategic outcomes.⁸⁸ Civilian harm mitigation tools are not just for counterinsurgency or counterterrorism operations where the support of the local population is a strategic goal; they are mandatory in LSCOs, given the operational challenges. The 2022 US Army and U.S. Marine Corps *Urban Operations* doctrine states, “long-term negative impacts of collateral damage in a populated area can overshadow any short-term positive effects on the enemy. Leaders must constantly assess the impacts of their actions and weigh the risks against the potential gains.”⁸⁹

First, civilian protection must be integrated into the commander’s intent for each mission and into their operational planning. Second, militaries must focus on comprehensive analysis of the civilian environment in the intelligence preparation phase of operations that involve population, critical infrastructure, and terrain considerations. Third, planners must have an understanding of baseline resiliencies in an urban environment, such as the capacities of communities; government institutions; critical infrastructure and systems; and the economy to withstand the shock of an outbreak of hostilities. Fourth, militaries must update doctrine and training to reflect the operational and tactical challenges of urban operations with regard to the presence of and risk to civilians. Fifth, militaries must adapt targeting practices to the urban

environment and prioritize learning and adaptation. Sixth, militaries must train partner forces on best practices (and also learn from them) regarding civilian harm mitigation.

Protection of Civilians in Commander's Intent

From a strategic point of view, militaries should ensure that the protection of civilians is included in the commander's objectives for each mission and is integrated into their operational plans. This was done by ISAF in Afghanistan from 2009 onward and by AMISOM in 2011, and both missions achieved a reduction in civilian harm after those changes in ROE, training and tactics took effect.⁹⁰ In Iraq, PoC was a specific objective in the Iraqi Security Force (ISF) concept of operations, and the Prime Minister and religious leaders used public messages to reinforce the importance of civilian protection during military operations against ISIS. This resulted in good coordination between Iraqi forces and humanitarian organizations, but the broader strategic intent was not translated into doctrine, ROE, training or tactics on the ground.⁹¹

Including PoC in the commander's intent, if it is done properly, can set up the framework that minimizing harm to civilians and civilian objects is not only a legal requirement and supported by policy but is also part of the commander's direction. This would help to ensure its implementation in follow-on resources, training, tactics, tools, and coordination with external actors. Protecting civilian lives and objects is not a task solely for the Civil Affairs branch, which takes the lead on humanitarian access and stability operations. Rather, the protection of civilians must be integrated into planning, intelligence, operations, targeting and training, and it should be considered when determining what lessons can be learned from past missions.

Understanding the Civilian Environment

A good understanding of the civilian environment is needed for future wars that will involve multiple domains and will include joint warfighting functions from land, air, maritime, space and cyber services.⁹² Civilians and civilian objects are a crucial dimension of urban war. Militaries, therefore, need to analyze civilian populations; civilian demographics; cyber effects on critical infrastructure; the proximity of civilians and civilian infrastructure to military objectives in determining weapons effects; and the courses of action that civilians are likely to take before, during and after military operations. Such analyses, including those for large-scale operations, would not only ensure greater fidelity to the LOAC and so fulfil legal obligations, but would also enable operational effectiveness, as population density and infrastructure in large-scale combat operations greatly determine a force's ability to move and manoeuvre in a city.

By better understanding civilian behaviour and patterns of life, the military can improve its information-gathering efforts in order to distinguish between civilian and

military objectives for targeting purposes, especially in dynamic targeting. Such analysis can also enable the coordination of humanitarian assistance to facilitate the movement of civilians and provide food, water, shelter and medicine, even if siege-like conditions develop.⁹³

Although intelligence surveillance and reconnaissance (ISR) assets can contribute significantly to understanding the operational environment, a modern peer or near-peer competitor could potentially hack intelligence systems, jam signals, engage in cyberattacks, and conduct superior misinformation and disinformation operations. In such a scenario, where airspace would likely be denied, degraded and disrupted, analog systems and non-technological tools, including human intelligence and open-source intelligence, will be essential to developing a comprehensive understanding of the operational environment to support collateral damage estimation (CDE) methodologies. There will be resource challenges in leveraging both ISR and human intelligence; thus, a commander's intent to mitigate civilian harm can enable the prioritization of such resources.

Given the proximity of civilians and military targets in urban warfare, analysis of the environment should integrate terrain effects, the threat capabilities of the adversary, and the presence of the population. For example, in an urban environment where civilians are present, any targeting of ammunition storage facilities should include an analysis of the effects of a strike on the surrounding area, which can include electric power stations or empty buildings where displaced persons may be seeking shelter. As militaries incorporate AI-enabled technologies, creating trusted communication systems to report and update information from non-military personnel on the ground to better understand the civilian environment and integrate it into military systems should be explored.⁹⁴ In choice of weapons, the weaponeering process should be tailored to the urban terrain (for example, building wall thickness, effects on underground sewage systems) to inform ways to adjust the type, fuze and size of ordnance and limit wide area effects to minimize civilian harm.

In large-scale combat operations, the emphasis on speed means that militaries will need to do more to adapt targeting tools and weapons to avoid repeating past mistakes that have resulted in civilian harm.⁹⁵ Militaries can examine past operations to inform future assessments so as to learn from mistakes that were not adequately anticipated or mitigated and thus inform an assessment of what effects are "reasonably foreseeable." What is reasonably foreseeable will vary depending on the circumstances of the attack, the target and the operational environment, including learning from past operations. Training exercises must include enough of the civilian environment dimension to make it possible to determine courses of action, inform learning, and identify resources and tactics.

Understanding Baseline Preparedness to Assist Civilian Population

Military planners should undertake a deep assessment of how local and national governments, in the event of a crisis, have plans and capacity to continue delivering and supporting essential government functions. The assessment should include baseline food and water, contingency plans for alternative supplies of food and water, cyber mitigation plans, early warning systems, mapping of healthcare and transport systems, medical supplies, personal protective gear / decontamination resources, restoration of capabilities for secure communications and critical infrastructure, ability to deal with mass casualties, and preparation for mass casualties and evacuation situations.

The following is not an exhaustive list, but preparedness should include baseline food, water and medicine, including personal protective gear / decontamination resources, and contingency plans for alternative supplies of food and water. It should also include training on how to respond to mass casualties in the midst of combat or in the event of a disease outbreak; how to support humanitarian access and ensure food, water, trauma care and medical supplies for displaced persons, including during a siege; how to counter enemy tactics that use civilians as human shields through strategic communications aimed at delegitimizing human shields and/or tactical alternatives; how to protect critical infrastructure, including from cyberattacks; how to determine what conditions and resources will be needed to restore essential services and clear unexploded ordnance; how to establish safe routes for civilians who wish to leave an area of fighting; and how to assess what mechanisms will be effective in warning civilians of an incoming attack.⁹⁶

Doctrine and Training

Military doctrine and training need to be updated to focus on fighting not only in built-up areas where terrain is a key factor, but also in populated areas where civilians are a major consideration. Doctrine should articulate, from the strategic to the tactical level, the priority for protecting civilians across the range of operations, including large-scale combat operations, where there are significant challenges when it comes to handling the movement, displacement and evacuation of large populations, as well as the possibility of mass casualties.

Urban warfare training is pivotal to equip soldiers for the realities they will encounter, and it must include scenarios with civilians present to help soldiers better understand how civilians will behave during the fighting. Soldiers must be guided away from the assumption that civilians will leave the area of a conflict or that the majority will be evacuated out of an area in the lead-up to operations. Any future conflict with a peer will take place amid a large civilian population. Training should simulate the challenges of urban combat, which



Source: Wikimedia Commons

is decentralized and must be conducted with limited visibility and intermittent communications. Virtual reality tools, wargames, and scenario discussions between commanders, forces and civilian agencies are essential to prepare forces for the realities of war.⁹⁷

Targeting Practices and Learning Lessons

Militaries must strictly apply positive target identification, timely pattern of life analysis, and effective warnings in order to reduce risk to civilians. As line-of-sight observations are degraded in urban areas, precision munitions, if available, can reduce circular error probability and improve accuracy compared to indirect munitions, but they do not remove all the dangers in urban areas. Mitigation measures such as comprehensive understanding of the civilian environment to engage military objectives and manipulating technical features of the explosive weapons (including warhead, fuze and calibre, as well as direction and angle) are essential. Where available, non-lethal weapons and low-collateral-damage munitions should also be considered to reduce the blast-affected area.⁹⁸ CDE procedures should be supported with necessary subject matter experts, such as engineers or chemical, biological, radiological and nuclear specialists, as well as with access to current data sets to assess the second- and third-order effects that CDE methodology cannot account for. For dynamic targeting, with compressed time to engage the adversary, CDE should be adapted, or new tools should be leveraged to improve operator awareness of civilian movement and civilian objects.

If uncrewed aerial vehicles and loitering munitions are to be used, they must comply with LOAC and with human verification (“human in the loop”). This could include the use of full-motion video and human intelligence sources to observe the presence and movement of civilians and obtain a sufficient pattern of life analysis to minimize civilian harm.⁹⁹

Matching pre- and post-strike assessments and tracking all incidents of civilian harm are also essential in order to consider the correlation between civilian harm and the means and methods of warfare and to learn lessons and incorporate them into training, planning, policies and practices.¹⁰⁰ As operations in Afghanistan, Iraq, Syria, Somalia, Ukraine and Yemen have shown, battle damage assessments done primarily via ISR or remotely do not fully capture the impact on civilians and civilian objects.¹⁰¹ Instead, protocols to receive and analyze information from international or local organizations on the ground, as well as media or open-source reporting is a good practice to enhance learning in order to improve military effectiveness and mitigate civilian harm.¹⁰²

Share with Partner Forces

Future wars with a peer or near-peer enemy are likely to be fought with partner forces or in support of proxy forces. Canada and its allies and partners should therefore be politically and operationally aligned in the effort to protect civilians through compatible doctrine, policies, training and ROE.¹⁰³ Partners should integrate their strategies and tactics and use appropriate munitions and scenario-based training in order to mitigate and respond to civilian harm during military operations. In addition, militaries should assess the benefits and risks of supporting a partner, including what the potential effects will be on the civilian population. It should also assess whether the partner has adequately resourced capabilities for developing and implementing mitigation plans and programs.¹⁰⁴

CONCLUSION

Fighting in urban areas is the present and the future. For military forces, it is the most challenging type of operation, complicated due to the proximity of civilians and military objectives in terms of command and control, resources, training, weapons and equipment design. For civilians, it is the most dangerous form of warfare in terms of the scale of civilian harm from death and injury, infrastructure, and its impact on livelihoods and education. While the past can inform lessons that need to be integrated to avoid mistakes, militaries must adapt to the new realities of warfare. Integrating a civilian harm mitigation approach in urban war planning, policies, training, tactics and weapons usage is essential for militaries to be in compliance with LOAC and enable better strategic outcomes. 🌸

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ENDNOTES

1. ICRC, *A Decade of Loss: Syria's Youth After Ten Years of Crisis*, https://www.icrc.org/sites/default/files/wysiwyg/Worldwide/Middle-East/syria/icrc-syria-a-decade-of-loss_en.pdf.
2. United Nations Press, "Urban Warfare Devastates 50 Million People Worldwide, Speakers Tell Security Council, Calling for Effective Tools to End Impunity, Improve Humanitarian Response," 25 January 2022, <https://press.un.org/en/2022/sc14775.doc.htm#:~:text=Urban%20war%20affects%20more%20than,to%20upholding%20international%20humanitarian%20law>.
3. See generally, Joseph Bogan and Aimee Feeney, *Future Cities: Trends and Implications*. Defense and Security Analysis, 2020, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/875528/Dstl_Future_Cities_Trends___Implications_OFFICIAL.pdf.
4. United Nations, "Around 2.5 Billion More People Will be Living in Cities by 2050, Projects New UN Report," 16 May 2018, <https://www.un.org/development/desa/en/news/population/2018-world-urbanization-prospects.html#:~:text=News-,Around2.5billionmorepeoplewillbelivingin,2050pro—jectsnewUNreport&text=By2050twooutof,urbanplanninganpublicservices>.
5. "LOAC" is the term most commonly used by militaries to refer to IHL (also known as the law of war).
6. Christopher Kolenda, "Civilian Lives and Fate of Campaigns," *War on the Rocks*, 16 June 2016, <https://warontherocks.com/2016/06/civilian-lives-and-the-fate-of-campaigns/>.
7. NATO, Multi-Domain Operations in the Urban Environment, July 2022, <https://arrc.nato.int/newsroom/archive/2022/multidomain-operations-in-the-urban-environment-conference>.
8. This article does not include analysis of urban stability operations, when civil control and civil security are established, essential services restored, the economy and infrastructure developed, and regional and local governance established. See generally, U.S. Department of Army and U.S. Marine Corps, ATP 3-06/MCTP 12-10B, *Urban Operations*, July 2022, Ch. 6 (hereinafter U.S. Army and U.S. Marine Corps, *Urban Operations* (2022)), https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN35826-ATP_3-06-000-WEB-1.pdf. See also Sahr Muhammedally, "Primer on Civilian Harm Mitigation in Urban Operations," *Center for Civilians in Conflict* (June 2022), https://civiliansinconflict.org/wp-content/uploads/2022/06/CIVIC_Primer_Civilian_Harm_Mitigation_in_Urban_Operations.pdf (hereinafter Muhammedally, "Primer on Civilian Harm Mitigation"), pp. 16–18.

9. The “laws of armed conflict” is the term preferred by some militaries, but it is also referred to as “international humanitarian law.” The Hague Regulations noted, “The right of belligerents to adopt means of injuring the enemy is not unlimited.” Convention with Respect to the Laws and Customs of War on Land, 18 October 1907, Article 22, <https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=56AA246EA8CFF07AC12563CD0051675A>.
10. The Statute of the International Court of Justice (ICJ) describes customary international law as “a general practice accepted as law” and it is generally agreed that a rule of customary international law requires “State practice (*usus*) and a belief that such practice is required, prohibited or allowed, depending on the nature of the rule, as a matter of law (*opinio juris sive necessitas*).” ICJ Statute, Article 38(1)(b). Jean-Marie Henckaerts and Louise Doswald-Beck, *Customary International Humanitarian Law, Vol 1: Rules* (Cambridge University Press, 2005), (hereinafter “ICRC Customary International Law Study”), <https://www.icrc.org/en/doc/assets/files/other/customary-international-humanitarian-law-i-icrc-eng.pdf>, pp. xxxvii–xxxviii.
11. Other LOAC rules relevant to urban warfare include specific protections for medical personnel, sick and wounded and for objects (hospitals, objects indispensable to the survival of the civilian population, and cultural property); protection of persons under control of a party to conflict (those deprived of liberty, living in occupied territory or besieged areas); the requirement for wounded and sick (civilians and members of an adversary force) to be treated with respect and protected against ill treatment, etc.; allowing for impartial humanitarian activities; and regulating the protection of the natural environment.
12. While nearly all states have ratified the four Geneva Conventions of 1949, Additional Protocol I, which is applicable in international armed conflict and contains extensive regulations on conduct of hostilities, has been ratified by 174 states. Additional Protocol II, ratified by 164 states, is applicable only in armed conflicts taking place in the territory of a state that has ratified it, and it contains limited regulations on the conduct of hostilities. However, a majority of today’s armed conflicts are non-international. The ICRC Customary International Law study shows that the gaps in the regulation of the conduct of hostilities in Additional Protocol II have largely been filled through state practice, which has led to the creation of rules parallel to those in Additional Protocol I, but applicable as customary law in non-international armed conflicts. See ICRC, *Customary International Law Study*, pp. xxxiv–xxxvi. Common Article 3 to the four Geneva Conventions also establishes fundamental rules from which no derogations are permitted and makes this applicable to international and non-international armed conflict. It requires humane treatment for all persons in enemy hands, without discrimination. It specifically prohibits murder, mutilation, torture, the taking of hostages, unfair trial, and cruel, humiliating and degrading treatment. It requires that the wounded, sick and shipwrecked be collected and cared for. It grants the ICRC the right to offer its services to the parties to the conflict. It calls on the parties to the conflict to bring all or parts of the Geneva Conventions into force through “special agreements.”
13. Civilians are protected from attack, “unless and for such time as they take a direct part in hostilities.” *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, 8 June 1977 (hereinafter AP I), Articles 48(1), 51(2), 51(3), <https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/4e473c7bc8854f2ec12563f60039c738/50fb5579fb098faac12563cd0051dd7c>.
14. AP I, Article 51(4): “Indiscriminate attacks are those: (a) which are not directed at a specific military objective; (b) which employ a method or means of combat which cannot be directed at a specific military objective; or (c) attacks which employ a method or means of combat the effects of which cannot be limited as required by IHL, and consequently, in each such case, are of a nature to strike military objectives and civilians or civilian objects without distinction.”
15. AP I, Articles 47 and 57.
16. AP I, Article 57(1).
17. AP I, Article 57, *Commentary of 1987*, <https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=D80D14D84BF36B92C12563CD00434FBD>.
18. International Law Association Study Group on the Conduct of Hostilities in the 21st Century, “The conduct of hostilities and international humanitarian law: Challenges of 21st century warfare,” *International Law Studies*, U.S. Naval War College, Vol. 93, No. 322, 2017 (hereinafter “ILA Study Group Report”), p. 381.
19. ICRC, *Reducing Civilian Harm in Urban Warfare: A Commander’s Handbook*, 2022 (ICRC “Urban War Commander’s Handbook”), <https://www.icrc.org/en/document/reducing-civilian-harm-urban-warfare-commanders-handbook>. (The author was one of the subject matter experts consulted for the handbook.)
20. AP I, Article 57.
21. Muhammedally, “Primer on Civilian Harm Mitigation.”
22. AP I, Article 54 (1), and AP II, Article 14 (prohibition on starvation); Third Geneva Convention, Article 23; Fourth Geneva Convention, Article 28; AP I, Article 51(7) (prohibition of human shields).
23. See Emanuela-Chiara Gillard, “Sieges, the Law and Protecting Civilians,” *Chatham House*, June 2019, https://www.chathamhouse.org/sites/default/files/publications/research/2019-06-27-Sieges-Protecting-Civilians_0.pdf.

24. See Common Article 3 of Geneva Conventions; see also ICRC, *Urban War Commander's Handbook* (For discussion on screening); see also Kenneth Watkin, "Use of Force During Occupation: Law Enforcement and Conduct of Hostilities," *International Review of the Red Cross*, Vol. 94, No. 885 (Spring 2012), <https://international-review.icrc.org/sites/default/files/irrc-885-watkin.pdf>; and Kenneth Watkin, "Urban Warfare: Policing Conflict," in *Between Crime and Wars: Hybrid Legal Framework for Asymmetric Conflict*, edited by Jens David Ohlin, <https://doi.org/10.1093/oso/9780197638798.003.0008>.
25. ICRC, *International Humanitarian Law and Cyber Operations During Armed Conflict*, November 2019, <https://www.icrc.org/en/document/international-humanitarian-law-and-cyber-operations-during-armed-conflicts>; see also *Tallinn Manual 2.0*, <https://www.cambridge.org/core/books/tallinn-manual-20-on-the-international-law-applicable-to-cyber-operations/E4FFD83EA790D7C4C3C28FC9CA2FB6C9>.
26. Robert Lawless and Sean Watts, "The Law and Character of War in 2035," (Lieber Institute West Point, 25 March 2022), <https://lieber.westpoint.edu/law-character-war-2035/>. There is robust debate on the levels of human control and human judgment in the conduct of hostilities, which this article does not discuss. The U.S. maintains a policy of appropriate use of human judgment in use of autonomous or semi-autonomous weapons. U.S. DoD Directive, *Autonomy in Weapons Systems*, 23 January 2023, <https://www.esd.whs.mil/portals/54/documents/dd/issuances/dodd/300009p.pdf>. In December 2019, Prime Minister Justin Trudeau instructed Minister of Foreign Affairs François-Philippe Champagne to advance international efforts to ban fully autonomous weapon systems. Government of Canada, Office of the Prime Minister, "Minister of Foreign Affairs Mandate Letter," 13 December 2019, <https://pm.gc.ca/en/mandate-letters/2019/12/13/archived-minister-foreign-affairs-mandate-letter>.
27. See generally, ICRC, *New Technologies and IHL*, <https://www.icrc.org/en/war-and-law/weapons/ihl-and-new-technologies>.
28. Sahr Muhammedally, "Minimizing Civilian Harm in Populated Areas: Lessons From Examining ISAF and AMISOM Policies," *International Review of the Red Cross*, no. 901 (April 2016) [hereinafter Muhammedally, "Minimizing Civilian Harm in Populated Areas"], <https://international-review.icrc.org/articles/minimizing-civilian-harm-populated-areas-lessons-examining-isaf-and-amisom-policies>. (NATO's International Security Assistance Force took measures in Afghanistan to restrict indirect firing in residential areas, increase training on civilian harm mitigation, and track and analyze causes of civilian casualties, which led to changes in tactics that, in turn, reduced civilian deaths. In Iraq, the requirement of positive identification of military objectives and escalation of force measures at checkpoints led to the reduction of civilian harm.)
29. Ibid.
30. See Sahr Muhammedally and Marc Garlasco, "Reduction of Civilian Harm in Afghanistan: A Way Forward," *Just Security*, 25 February 2020, <https://www.justsecurity.org/68810/reduction-of-civilian-harm-in-afghanistan-a-way-forward/#:~:text=The%20Afghan%20government%20stood%20up,harm%20through%20trainings%2C%20policies%2C%20and>.
31. NATO, *NATO Policy for the Protection of Civilians Endorsed by the Heads of State and Government Participating in the Meeting of the North Atlantic Council in Warsaw*, 9 July 2016, http://www.nato.int/cps/en/natohq/official_texts_133945.htm.
32. Ibid.
33. NATO, *Protection of Civilians ACO Handbook*, 2021, <https://shape.nato.int/resources/3/website/ACO-Protection-of-Civilians-Handbook.pdf>. (The author contributed to this handbook.)
34. "The Civilian Casualty Files," *New York Times*, 18 December 2021, <https://www.nytimes.com/spotlight/the-civilian-casualty-files-pentagon-reports>; McNerney, Michael J., Gabrielle Tarini, Karen M. Sudkamp, Larry Lewis, Michelle Gris , and Pauline Moore, *U.S. Department of Defense Civilian Casualty Policies and Procedures: An Independent Assessment*, RAND Corporation, 2021, https://www.rand.org/pubs/research_reports/RRA418-1.html.
35. U.S. Department of Defense, *Civilian Harm Mitigation Action and Response Plan*, 25 August 2022, <https://media.defense.gov/2022/Aug/25/2003064740/-1/-1/1/CIVILIAN-HARM-MITIGATION-AND-RESPONSE-ACTION-PLAN.PDF>. In January 2022, based on internal review of civilian harm incidents, congressional oversight on civilian harm issues, several years of civil society advocacy to improve transparency of and accountability for civilian harm, U.S. Defense Secretary Lloyd Austin directed the Department of Defense to develop the Civilian Harm Mitigation and Response Action Plan in order to improve how the department prevents and responds to civilian harm.
36. Ireland Department of Foreign Affairs, Political Declaration on EWIPA, <https://www.dfa.ie/our-role-policies/international-priorities/peace-and-security/ewipa-consultations/>. (Formal consultations between states, UN, ICRC and civil society began in November 2019.)
37. Christopher D. Kolenda, Rachel Reid, Chris Rogers and Marte Retzius, *The Strategic Costs of Civilian Harm: Applying Lessons from Afghanistan to Current and Future Conflicts*. (Open Society Foundations, 2016). (Hereinafter Kolenda et al., *The Strategic Costs of Civilian Harm*.)

38. Andrew Shaver and Jacob Shapiro, "The Effect of Civilian Casualties on Wartime Informing: Evidence from the Iraq War," *Journal of Conflict Resolution*, 10 March 2021, <https://journals.sagepub.com/doi/10.1177/0022002721991627>.
39. Luke N. Condra, Joseph H. Felter, Radha K. Kyengar and Jacob N. Shapiro, "The Effect of Civilian Casualties in Afghanistan and Iraq," National Bureau of Economic Research Working Paper No. 16152, July 2010, https://www.nber.org/system/files/working_papers/w16152/w16152.pdf.
40. See U.S. Army and U.S. Marine Corps, *Urban Operations* (2022), para 1-64; U.S. Army, *Protection of Civilians*, ATP 3-37.31, p. 1-3, <https://irp.fas.org/doddir/army/atp3-07-6.pdf>; Kolenda et al., *The Strategic Costs of Civilian Harm*, pp. 23–24.
41. ICRC, *Explosive Weapons with Wide Area Effects: A Deadly Choice*, January 2022 (hereinafter "ICRC EWIPA Report"), <https://www.icrc.org/en/document/civilians-protected-against-explosive-weapons>, pp. 42–48.
42. See, for example, World Bank, *Ukraine Recovery and Reconstruction Estimated at 348 billion*, 9 September 2022, <https://www.worldbank.org/en/news/press-release/2022/09/09/ukraine-recovery-and-reconstruction-needs-estimated-349-billion>. CNBC, "88.2 Billion US Dollar Price Tag for Rebuilding After Islamic State War," 12 February 2018, <https://www.cnn.com/2018/02/12/88-point-2-billion-us-dollar-price-tag-for-rebuilding-iraq-after-islamic-state-war.html>.
43. See McNerney, "Understanding Civilian Harm in Raqqa."
44. See U.S. Army and U.S. Marine Corps, *Urban Operations* (2022).
45. General Stanley McChrystal, *Tactical Directive*, 2 July 2009. Gen McChrystal was the Commander of NATO's ISAF.
46. Paul D. Williams, "The African Union Mission in Somalia and Civilian Protection Challenges," *Stability International Journal of Security & Development* 2(2), p. 39, <https://www.stabilityjournal.org/articles/10.5334/sta.bz/>.
47. NATO, *Protection of Civilians ACO Handbook* (2021), p. 9, <https://shape.nato.int/resources/3/website/ACO-Protection-of-Civilians-Handbook.pdf>. (The author contributed to this handbook.)
48. U.S. Department of Defense, *Civilian Harm Mitigation Action and Response Plan*, 25 August 2022, <https://media.defense.gov/2022/Aug/25/2003064740/-1/-1/CIVILIAN-HARM-MITIGATION-AND-RESPONSE-ACTION-PLAN.PDF>. In January 2022, in response to the New York Times investigations into civilian casualties in Iraq and Syria, congressional oversight on civilian harm issues, and several years of civil society advocacy to improve transparency of and accountability for civilian harm, U.S. Defense Secretary Lloyd Austin directed the Department of Defense to develop the Civilian Harm Mitigation and Response Action Plan in order to improve how the department prevents and responds to civilian harm.
49. For comprehensive resource on urban warfare, see 40th Infantry Division California National Guard, "40ID Urban Warfare," <https://calguard.ca.gov/40id-urban-warfare/>.
50. See generally, U.S. Department of the Army and U.S. Marine Corps, ATP 3-07 MCTP 12-10B, *Urban Operations* (December 2017), https://armypubs.army.mil/ProductMaps/PubForm/Details.aspx?PUB_ID=1003694.
51. Ibid.
52. Author's interviews and observations from conflicts in Iraq and Syria. See also Bong Sarmieto, "Rubble, Unexploded Bombs, and More than 100,000 Displaced: Marawi Two Years On," *The New Humanitarian*, 23 May 2019, <https://www.thenewhumanitarian.org/news-feature/2019/05/23/Philippines-rubble-unexploded-bombs-displaced-marawi-two-years>.
53. Kevin Fallon, "As Bombings Destroyed Syria, She Moved Her Hospital Underground," *Daily Beast*, 17 October 2019, <https://www.thedailybeast.com/the-cave-the-female-syrian-doctor-risking-death-to-run-an-underground-hospital>.
54. United Nations, *Factsheet: People and Oceans Generally* (May 2017), https://sustainabledevelopment.un.org/content/documents/Ocean_Factsheet_People.pdf; NATO, *The Role and Relevance of the Maritime Domain in an Urban-Centric Operational Environment*, 2017, https://www.coecsw.org/fileadmin/content_uploads/projects/Role_and_Relevance_of_the_Maritime_Domain_in_an_Urban-Centric_Operational_Environment.pdf
55. For example, due to the naval blockade in Yemen, supplies of fuel, food and medicine were limited, thereby worsening the country's humanitarian situation. ICRC, *Yemen, Naval Blockade*, <https://casebook.icrc.org/case-study/yemen-naval-blockade-0>.
56. See generally, ICRC, *Guidelines on the Protection of the Natural Environment*, 2020.
57. See UN Security Council, Protection of Civilians in Armed Conflict: Report of the Secretary-General, UN Doc. S/2023/345, 12 May 2023, pp. 5–6; ICRC, *When Rain Turns to Dust: Understanding and Responding to the Combined Impact of Armed Conflicts and the Climate and Environment Crisis on People's Lives*, July 2020; Center for Civilians in Conflict, *Risking the Future: Climate Change, Environmental Destruction and Conflict in Yemen*, October 2022, <https://civiliansinconflict.org/risking-the-future-climate-change-environmental-destruction->

- and-conflict-in-yemen/#:~:text=CIVIC%20spoke%20with%20communities%20and,%2D%20and%20intra%2Dcommunity%20relations. (Climate change and environmental degradation caused by warfare are threatening Yemenis' rights to life, food, and water.)
58. UNEP, *UN Warns of Toxic Environmental Legacy for Ukraine*, Region, 4 July 2022, <https://www.unep.org/news-and-stories/press-release/un-warns-toxic-environmental-legacy-ukraine-region>; Michael Talhami and Mark Zeitoun, *The Impact of Attacks on Urban Services II: Reverberating Effects of Damage to Water and Wastewater Systems on Infectious Disease*, *International Review of the Red Cross* 102 (915): 1293–1325 (with analysis on water treatment plants in Gaza hit in 2009 and 2014 and impact on civilians and healthcare).
59. AP I, Articles 55 and 56 (prohibiting use of methods or means of warfare that are intended or may be expected to cause damage to the natural environment and that would prejudice the health or survival of the population; and prohibiting attacks on installations containing dangerous forces, dams, dykes or nuclear generating stations). See also ICRC Casebook, *Works and Installations Containing Dangerous Forces*, https://casebook.icrc.org/a_to_z/glossary/works-and-installations-containing-dangerous-forces.
60. UNEP, *The Environmental Impact of the Conflict in Ukraine: A Preliminary Review*, 2022, https://wedocs.unep.org/bitstream/handle/20.500.11822/40746/environmental_impact_Ukraine_conflict.pdf?sequence=3&isAllowed=y (includes analysis in Afghanistan, Colombia, DR Congo, Kosovo and the Western Balkans, Iraq, Lebanon, the occupied Palestinian territories, Somalia, and South Sudan).
61. Lukasz Olejnik, *Smartphones Blur the Line Between Civilian and Combatant*, *Wired*, 6 June 2022, <https://www.wired.com/story/smartphones-ukraine-civilian-combatant/>.
62. Civilians may not be targeted “unless and for such time as they take a direct part in hostilities.” AP I, Article 51(3). Militaries have their own interpretation of what acts constitute DPH. See also Nils Melzer, *Interpretative Guidance on the Notion of Direct Participation in Hostilities in International Humanitarian Law*, ICRC, May 2009, <https://www.icrc.org/en/publication/0990-interpretive-guidance-notion-direct-participation-hostilities-under-international>.
63. Groups such as ISIS, Al Shabab and Boko Haram have used fear as a tactic to control civilian populations and have forced females and children to become spies, suicide bombers, and servants to fighters in non-state armed groups.
64. World Bank, *Forced Displacement*, <https://www.worldbank.org/en/topic/forced-displacement>.
65. ICRC, *Explosive Remnants of War*, <https://www.icrc.org/en/document/explosive-remnants-of-war>.
66. UN Press News, “Third Humanitarian Convoy Under Way to Evacuate Civilians from Besieged Ukraine City, Secretary-General Tells Security Council,” <https://press.un.org/en/2022/sc14882.doc.htm>.
67. See Eirini Giorgou and Abby Zeith, “When the Lights Go Out: The Protection of Energy Infrastructure in Armed Conflict,” *Humanitarian Law and Policy*, 20 April 2023, <https://blogs.icrc.org/law-and-policy/2023/04/20/protection-energy-infrastructure-armed-conflict/>. Michael Schmitt, “Attacking Power Infrastructure Under International Humanitarian Law,” *Lieber Institute, Articles of War*, 20 October 2022, <https://lieber.westpoint.edu/attacking-power-infrastructure-under-international-humanitarian-law/> (drawing a contrast with Russia’s attacks in Ukraine with example of Coalition forces in Iraq in 2003 which struck electrical power distribution rather than power generation facilities and employed the BLU-114 cruise missile that dispensed carbon-fibre filaments to short-circuit equipment rather than damage it with an explosive charge).
68. OCHA, *Hostilities in the Gaza Strip and Israel*, Flash Update #46, 22 November 2023, <https://www.ochaopt.org/content/hostilities-gaza-strip-and-israel-flash-update-47>; Marc Santora, “For Ukraine Keeping the Lights On Is One of the Biggest Threats,” *New York Times*, 17 November 2022, <https://www.nytimes.com/2022/11/17/world/europe/ukraine-electricity-water-infrastructure.html> (Russian attacks against critical infrastructure deprive millions of heat, light, clean water); Human Rights Watch, *Syria/Russia: Strategy Targeted Civilian Infrastructure*, 15 October 2022, <https://www.hrw.org/news/2020/10/15/syria/russia-strategy-targeted-civilian-infrastructure>.
69. Rules of IHL regulate humanitarian access that must be respected by parties to an armed conflict. ICRC, *Q and A on Lexicon on Humanitarian Access*, <https://www.icrc.org/en/doc/assets/files/2014/icrc-q-and-a-lexicon-on-humanitarian-access-06-2014.pdf>.
70. See Government of Canada, *International Law Applicable in Cyberspace*, https://www.international.gc.ca/world-monde/issues_development-enjeux_developpement/peace_security-paix_scurite/cyberspace_law-cyberespace_droit.aspx?lang=eng; Laurent Gisel, Tilman Rodenhäuser and Knut Dörmann, “Twenty Years On: International Humanitarian Law and the Protection of Civilians Against the Effects of Cyber Operations During Armed Conflicts,” *International Review of the Red Cross* (2020), 102 (913), pp. 287–334 (Digital technologies and war), <https://international-review.icrc.org/sites/default/files/reviews-pdf/2021-03/twenty-years-ihl-effects-of-cyber-operations-during-armed-conflicts-913.pdf>.

71. NATO, *Science & Technology Trends 2020–2040: Exploring the S&T Edge*, NATO Science & Technology Organization, March 2020, https://www.nato.int/nato_static_fl2014/assets/pdf/2020/4/pdf/190422-ST_Tech_Trends_Report_2020-2040.pdf; Kubo Mačák and Ewan Lawson, "Avoiding Civilian Harm During Cyber Military Operations: Six Key Takeaways," *ICRC Humanitarian Law and Policy*, 15 June 2021, <https://blogs.icrc.org/law-and-policy/2021/06/15/avoiding-civilian-harm-military-cyber-operations/>.
72. "Artificial Intelligence and Machine Learning in Armed Conflict: A Human Centered Approach," in *International Review of the Red Cross* (2020), 102 (913), 463–479 (Digital technologies and war), <https://international-review.icrc.org/articles/ai-and-machine-learning-in-armed-conflict-a-human-centred-approach-913>.
73. Ibid.
74. Center for Civilians in Conflict, *Entering the Gray Zone: Hybrid Warfare and Protection of Civilians*, June 2021, https://civiliansinconflict.org/wp-content/uploads/2021/06/CIVIC_Ukraine_Report_Web.pdf.
75. See e.g. Center for Civilians in Conflict, *When Words Become Weapons: The Unprecedented Risks to Civilians from the Spread of Disinformation in Ukraine*, October 2023, <https://civiliansinconflict.org/publications/research/when> (Found disinformation spread by Russian-affiliated actors impacted Ukrainian civilians decisions on whether and how to flee from frontline areas putting them at risk).
76. Steven Hill and Nadia Marsan, "Artificial Intelligence and Accountability: A Multinational Legal Perspective," in *Big Data and Artificial Intelligence for Military Decision Making*, STO Meeting Proceedings, STO-MP-IST, NATO, 2018.
77. Paul Mozur, "A Genocide Incited on Facebook with Posts from the Myanmar Military," *New York Times*, 15 October 2018, <https://www.nytimes.com/2018/10/15/technology/myanmar-facebook-genocide.html>. Social media companies have started taking steps to monitor disinformation on their platforms. See, for example, Quinn Owen, "Meta Disrupts Social Media Misinformation Campaigns Targeting Ukrainians," *ABC News*, 28 February 2022, <https://abcnews.go.com/Politics/meta-disrupts-social-media-misinformation-campaigns-targeting-ukrainians/story?id=83158868>.
78. Louisa Loveluck, "Russian Disinformation Campaign Targets Syria's Beleaguered Rescue Workers," *The Washington Post*, 18 December 2018, https://www.washingtonpost.com/world/russian-disinformation-campaign-targets-syrias-beleaguered-rescue-workers/2018/12/18/113b03c4-02a9-11e9-8186-4ec26a485713_story.html.
79. Wolfram Lacher, "Drones, Deniability, and Disinformation: Warfare in Libya and the New International Disorder," *War on the Rocks*, 3 March 2020, <https://warontherocks.com/2020/03/drones-deniability-and-disinformation-warfare-in-libya-and-the-new-international-disorder/>; Mona Alami, "Russia's Disinformation Campaign Has Changed How We See Syria," *Atlantic Council*, 4 September 2018, <https://www.atlanticcouncil.org/blogs/syriasource/russia-s-disinformation-campaign-has-changed-how-we-see-syria/>; Andrei Soshnikov, "Inside a Pro-Russian Propaganda Machine in Ukraine," *BBC News*, 13 November 2017, www.bbc.com/news/blogs-trending-41915295; "Online Trolls and Fake Accounts Poison Arab Social Media," *BBC News*, 31 August 2018, www.bbc.com/news/technology-45372272.
80. Samantha Bradsaw, "How Unmoderated Platforms Became the Frontline for Russian Propaganda," *Lawfare*, 17 August 2022, <https://www.lawfareblog.com/how-unmoderated-platforms-became-frontline-russian-propaganda-0>; OECD, *Policy Responses: Ukraine Tackling the Policy Challenges*, 3 November 2022, <https://www.oecd.org/ukraine-hub/policy-responses/disinformation-and-russia-s-war-of-aggression-against-ukraine-37186bde/>; "Russia–Ukraine Disinformation Tracking Center," *News Guard*, 16 February 2023, <https://www.newsguardtech.com/special-reports/russian-disinformation-tracking-center/>.
81. John Spencer, "The Army Needs an Urban Warfare School and It Needs It Soon," *Modern War Institute*, 5 April 2017, <https://mwi.usma.edu/army-needs-urban-warfare-school-needs-soon/>. See also Caroline Baudot and Sahr Muhammedally, "Policies and Practices to Protect Civilians: Lessons from ISF Operations Against ISIS in Urban Areas," *Center for Civilians in Conflict*, October 2018 (hereinafter Baudot and Muhammedally, "ISF Policies and Practices Report"), <https://civiliansinconflict.org/publications/research/policies-practices-to-protect-civilians/>. Baudot and Muhammedally, "ISF Policies and Practices Report" (discussing ISF training).
82. John Spencer, "The Eight Rules of Urban Warfare and Why We Must Work to Change Them," *Modern War Institute*, 12 January 2021, <https://mwi.usma.edu/the-eight-rules-of-urban-warfare-and-why-we-must-work-to-change-them/>.
83. See generally, ICRC, "EWIPA Report."
84. Ireland Department of Foreign Affairs, *Political Declaration on EWIPA*, <https://www.dfa.ie/our-role-policies/international-priorities/peace-and-security/ewipa-consultations/>. (Formal consultations between states, UN, ICRC and civil society began in November 2019).
85. Amos Fox, "Precision Fires Hindered in Urban Jungle," *Association of the U.S. Army*, 16 April 2018, <https://www.ausa.org/articles/precision-fires-hindered-urban-jungle>.

86. Alex Marquardt, Natasha Bertrand and Zachary Cohen, "Russia's jamming of US-provided rocket systems complicates Ukraine's war effort," CNN, 5 May 2023, <https://www.cnn.com/2023/05/05/politics/russia-jamming-himars-rockets-ukraine/index.html>.
87. Defined in U.S. military urban warfare doctrine as "Extensive joint combat operations in terms of scope and size of forces committed, conducted as a campaign aimed at achieving operational and strategic objectives." See U.S. Army and U.S. Marine Corps, *Urban Operations* (2022).
88. Dan Stigall, "Future Conflicts, Civilian Harm and the CHMR-AP, Part II, *Articles of War Lieber Institute*, 5 May 2023, <https://lieber.westpoint.edu/future-conflicts-civilian-harm-chmr-ap-part-ii/>
89. U.S. Army and U.S. Marine Corps, *Urban Operations* (2022), para 4-16.
90. See Muhammedally, "Minimizing Civilian Harm in Populated Areas."
91. See generally, Baudot and Muhammedally, "ISF Policies and Practices Report." (The Iraqi military also had a general prohibition on the use of "heavy weapons," though this term was not well defined. Many Iraqi soldiers were well aware of their general orders to mitigate harm to civilians but often lacked specific instructions as to how to carry out that intent. The Coalition tracked civilian harm caused by its own fires but did not train Iraqi forces in similar techniques, thus limiting the Iraqi forces' ability to learn and adapt their operations.) See also Michael J. McNerney, Gabrielle Tarini, Nate Rosenblatt, Karen M. Sudkamp, Pauline Moore, Michelle Grisé, Benjamin J. Sacks and Larry Lewis, *Understanding Civilian Harm in Raqqa and Its Implications for Future Conflict* (Santa Monica, CA: RAND Corporation, 2022), https://www.rand.org/pubs/research_reports/RRA753-1.html. (hereinafter McNerney et al., "Understanding Civilian Harm in Raqqa"). (The authors found that the U.S. military did not sufficiently adapt and implement its civilian harm mitigation measures for urban operations and while working with partner forces.)
92. William Dries, "Some New, Some Old, All Necessary: The Multi-Domain Imperative," *War on the Rocks*, 27 March 2017, <https://warontherocks.com/2017/03/some-new-some-old-all-necessary-the-multi-domain-imperative/>.
93. See, generally, Muhammedally, "Primer on Civilian Harm Mitigation." See also the CHM checklist for defenders and attackers in the Appendix.
94. USAID is leading the development of a new communication system—the Human Security Information System (HSIS)—to provide a secure means to improve the fidelity of the civilian environment picture. HSIS will use blockchain technology that only the intended party can access, which creates a cryptologically secure set of records that is built up over time through distributed transactions. It also features incorruptible records, creating an audit trail that can be leveraged for learning and accountability and will make it easier for organizations to report and update their information and promote accuracy. Civilian information about such things as critical infrastructure, cultural heritage sites, medical facilities, and other civilian objects can be reported by organizations or by a trusted agent on their behalf. See Larry Lewis, "Emerging Technologies and Civilian Harm Mitigation," *Center for Naval Analysis*, 2023, <https://www.cna.org/quick-looks/2023/EMERGING-TECHNOLOGIES-AND-CIVILIAN-HARM-MITIGATION.pdf>.
95. Baudot and Muhammedally, "ISF Policies and Practices Report"; and McNerney et al., "Understanding Civilian Harm in Raqqa."
96. Muhammedally, "Primer on Civilian Harm Mitigation."
97. Sahr Muhammedally, "Preparedness in Urban Operations: A Commander's Planning Checklist to Protect Civilians," *Humanitarian Law and Policy*, 11 May 2021, <https://blogs.icrc.org/law-and-policy/2021/05/11/preparedness-in-urban-operations/>.
98. Muhammedally, "Primer on Civilian Harm Mitigation," pp. 28–29.
99. *Ibid.*, pp. 28–30 (for recommendations on targeting practices)
100. *Ibid.*, p. 34.
101. RAND, "U.S. Department of Defense Civilian Casualties Policies and Procedures: An Independent Assessment, 2022," https://www.rand.org/pubs/research_reports/RRA418-1.html; Azmat Khan and Anand Gopal, "The Uncounted," *New York Times*, <https://www.nytimes.com/interactive/2017/11/16/magazine/uncounted-civilian-casualties-iraq-airstrikes.html>.
102. Muhammedally, "Minimizing Civilian Harm in Populated Areas," (discusses civilian harm tracking).
103. See, for example, missed opportunities of sharing good practices on CHM with partner forces in Iraq and Syria. Baudot and Muhammedally, "ISF Policies and Practices Report"; and McNerney et al., "Understanding Civilian Harm in Raqqa."
104. Daniel Mahanty, Julie Snyder, Jenny McAvoy, Kelsey Hampton, Hijab Shah and Melissa Dalton, *The Protection of Civilians in U.S. Partnered Operations*, Center for Strategic and International Studies, Center for Civilians in Conflict, and InterAction, October 2018, https://civiliansinconflict.org/wp-content/uploads/2018/10/USProgram_PartneredOperations.pdf.

NAVIGATING THE CHALLENGE OF THE WEAPONIZATION OF CIVILIANS:

Leveraging Intermediate Force Capabilities

Dr. Peter Dobias



INTRODUCTION

Effective military operations require tactical mobility and the freedom of movement.¹ Both urban and rural environments, especially those with canalization points (e.g. roads through impassable terrain) pose a number of unique challenges to mobility.² One of the significant challenges is the ubiquitous presence of civilians.³ During the planning stage, the civilian population is often viewed as a mere background in which the adversary can operate (e.g. as a cover for armed groups in insurgencies or terror attacks).⁴ However, the last 30 years have demonstrated that some actors have resorted to employing civilians as a “weapon,” particularly in a counter-mobility

role or in obstructing military movements. As evident in early stages of the war in Ukraine, even a small crowd when strategically positioned at critical locations can potentially stop or delay movements of military units.⁵

Past conflicts offer numerous examples where the adversary leveraged civilians to impede military forces’ freedom of motion. For instance, in Mogadishu in 1993, civilian crowds slowed down the ground forces, potentially leading to heavy friendly force casualties and extending the mission duration. The convoys were slowed by roadblocks set up by militias and Somali civilians.⁶ Similarly, in 2021 in Burkina Faso, a civilian crowd opposed

Insights from various conflicts indicate that civilian crowds can be strategically employed as a counter-mobility capability.



to French involvement in the region successfully halted a French military convoy for hours, resulting in a standoff that escalated tensions.⁷ Such incidents are not limited to counter-insurgencies. In the aftermath of the 2014 invasion of eastern Ukraine, pro-Russian separatist forces reportedly used crowds to block Ukrainian military convoys or to prevent quick reaction forces leaving Ukrainian bases to support units.⁸ Further, in February 2022, there were reports of a Ukrainian crowd blocking a Russian armoured convoy in the vicinity of the Zaporizhzhia nuclear power plant, delaying Russian advances.⁹

While some countries, despite being signatories of Geneva and Hague conventions,¹⁰ demonstrate complete disregard of non-combatant status,¹¹ NATO countries strictly adhere to the law of armed conflict (LOAC)¹² and try to prevent any unnecessary civilian casualties. The 2016 NATO *Policy for the Protection of Civilians (PoC)* reinforces the NATO commitment to protecting civilians from harm and notes, "A PoC perspective should be included in the planning and conduct of operations and missions, training, education and exercises, lessons learned, as well as defence and security-related capacity building activities."¹³ Interestingly, even the Russian military, despite showing regretful disregard for the protection of civilians and the law of armed conflict,¹⁴ was at

least temporarily stopped by determined Ukrainian civilians, as shown by the last example in the previous paragraph. Moreover, in today's pervasive information environment where any questionable action can make it to social media in no time, it is important that the allied forces' actions be above reproach. Even the slightest hint of improper action or behaviour can be damaging to the credibility and legality of an allied mission. As Dan E. Stigall puts it, "On the modern battlefield, information and images will catalyze and shape the course of a conflict. They will also enhance or undermine military efforts in significant ways."¹⁵

Given that background, NATO forces often find themselves in a challenging position when dealing with non-compliant or openly hostile crowds. Their response is often limited to doing nothing. According to Ben Lagasca et al., "in such cases, U.S. warfighters often had no good choice other than to kill or possibly be killed. Dismounted soldiers operating in Mosul, Iraq, and other cities faced similar situations. When armed threats appeared, it was sometimes hard to sort out combatant from civilian or child."¹⁶ These challenges, especially amidst the fog of war, makes the adversaries' tactic of weaponizing civilians more successful. It is imperative to explore innovative crowd-management methods in conflict/war zones while ensuring the protection of civilians and upholding both legal and ethical standards and intention.

In light of this context, this paper contends that the accessibility of intermediate force capabilities (IFC), specifically directed energy (DE) non-lethal capabilities (NLC), has the potential to bolster NATO forces' ability to counter the use of civilians as a counter-mobility capability. To expand on the concept, the IFC encompasses a range of "non-lethal weapons as well as other non-lethal tools" designed to "bridge the gap between a mission of mere presence and the use of lethal effects, allowing active measures when presence alone is insufficient to deter malign activities or when the use of lethal or destructive force is neither desired nor appropriate."¹⁷ Within the broader umbrella of the IFC lie conventional and DE non-lethal weapons (NLW) capabilities.

Asserting this broader argument, the paper is structured as follows: the subsequent section provides a brief exploration of the use of civilians for counter-mobility. Thereafter, the paper details the wargame series conducted in support of the NATO IFC concept development. It is followed by a discussion of the tactical and operational impact of a crowd as a counter-mobility capability, and the effects of the IFC employment based on the wargame observations. Finally, there is a brief overview of the use of agent-based models to assess key IFC characteristics relevant to counter-crowd utilization.

COMBATting THE WEAPONIZATION OF CIVILIANS

The success of military operations relies on freedom of manoeuvre, which is closely linked to the effective management of the civilian population in a war or conflict zone. This becomes particularly critical when adversaries utilize civilians to obstruct or impede military operations, potentially placing them in harm's way. While it may be possible to use military police in the crowd control role in some instances, their actions are usually subject to significant scrutiny. This creates a vulnerability, as adversaries can often achieve their goals while staying below the threshold of lethal force, effectively neutralizing NATO's superior firepower. If NATO forces resort to using force that is deemed non-proportional, they risk being portrayed as the aggressors in the situation. It is crucial to find ways to strike a balance between maintaining security and mitigating harm to civilians.

There is a range of capabilities that would enable NATO forces to deal more effectively with the presence of crowds; some are operationally ready while others require more research and development.¹⁸ The operational ones include conventional crowd control capabilities such as batons and shields (usually employed by the military police), blunt trauma (rubber bullets) and warning rounds, as well as some DE NLC, such as a long-range acoustic device (LRAD) designed to propagate sound over distances of hundreds to thousands of metres (either spoken word or high-pitch warning sound), or an active denial system (ADS).¹⁹ The ADS is a millimetre wave system that creates an unbearable heat sensation without any actual physical harm.²⁰ The ADS was selected as an example of mature DE NLW technology on advice of the experts from the US Joint Intermediate Force Capabilities Office. It was evaluated extensively through a number of military utility experiments and, contrary to some media reporting, it was determined to be safe for operation.²¹ This alternative is possibly significantly less contentious than, for instance, malodorants like the Skunk used by the Israeli forces.²² The Skunk's odour can last several days, rendering buildings uninhabitable and thus impacting people and infrastructure.²³ Furthermore, use of malodorants and tear gas to facilitate military operations would most likely run afoul of the LOAC,²⁴ which prohibits the use of riot-control agents as a method of warfare.²⁵ These concerns most likely do not apply to the ADS, as the weapon is capable of discriminate targeting, and the intensity is purposefully below the level that would cause burns.²⁶

Within the context of conventional and DE NLW capabilities that fall under the broader term, IFC, there are more advanced experimental capabilities with promising research and development aimed at a smaller form-factor and lesser energy demand. In 2020–2021, NATO Supreme Allied Commander Transformation (SACT) led the development of an IFC concept. The wargames conducted in support

of the IFC concept development provided insights into the employment and performance requirements of IFC more broadly.²⁷ Although there are unresolved legal questions regarding the deployment of IFC to counter both civilians and combatants within the constraints of the LOAC, the study team was advised that the intended use of the NLC aligned with the LOAC principles.²⁸

WARGAME SERIES IN SUPPORT OF IFC CONCEPT DEVELOPMENT

During 2020–2022, NATO Systems and Analysis Studies 151 (SAS-151) designed and executed a series of six wargames supporting development of the NATO SACT IFC concept.²⁹ Traditional wargaming approaches normally represent a tactical, operational, or strategic level. The divergence of time and spatial scales typically hinders the simultaneous representation of multiple levels because the game would either become overwhelmingly resource-intensive and lengthy or largely provide a higher-level overview, limiting insights into the tactical capabilities. The SAS-151 study group implemented a novel wargaming approach based on renormalization approaches,³⁰ which can be described as essentially employing the lowest possible resolution unless higher resolution is necessary. This approach combines different games operating at different levels with a view to resolve the limitations inherent in individual game types.³¹

While there were specific details in the implementation of the mentioned wargames, in a broad sense, they were designed as follows: the tactical vignettes were implemented within the framework of a semi-rigid *Kriegsspiel*. The games had a duration ranging from one to a few hours, with time steps represented in the range of 10–30 minutes. Individual units or small groups of three to four people were used to represent the units. The available capabilities were represented by capability cards, which included the probability of success with or without the adversary's countermeasures, along with possible collateral damage. These cards were developed in collaboration with the technical experts. The players had the liberty to determine movements and actions for each turn. The effect of the chosen actions was adjudicated using dice. The broader strategic implications of these actions were then replayed through a matrix-style game. The players stated their actions, objectives, and rationale for anticipated success. The entire round was then adjudicated by the white cell. Owing to the necessary abstractions, the secondary effects and damages (such as injuries due to downed uncrewed systems or due to stampeding crowds) were generally not represented.³²

In three of the SAS-151 wargames, crowds were employed to disrupt the movement of NATO forces. The first wargame focused on force protection of a naval task group in a port, where hostiles used a crowd to block access to the ship. In the second wargame, which included the most significant crowd component, the hostiles used a large

crowd to prevent quick reaction forces from leaving the base (or convoys from accessing the base). Finally, the last of these wargames centred on contested non-combatant evacuation with hostiles using small crowds to slow down or stop the evacuation convoy. Subsequent paragraphs discuss the observations in greater detail.³³

In the first wargame (titled "NATO Task Group in Port"), a NATO naval task group executed a rest and resupply operation in a friendly country.³⁴ The hostiles opposing their country's partnership with NATO organized a crowd of approximately 70 people at the access point to the ship with twofold objectives: a.) prevent supplies from reaching the docked ship, and b.), use the crowd as a cover to kidnap sailors who were away from the ship. In the option without IFC, the friendly forces lacked the ability to handle the crowd. The only available resource was the use of local security forces with minimum crowd control capabilities (pepper spray, batons). These local forces were in a difficult situation, as any action against the crowd could potentially spark additional riots in the port city and increase opposition to the NATO forces' presence. This resulted in conceding the initiative to the adversary. The security forces were unable to disperse the crowd, which prevented the task group from finishing their resupply. Furthermore, the crowd succeeded in kidnapping the sailors, enabling the opposition forces to blackmail the local government.³⁵

In this scenario, the ADS proved to be the most effective IFC for crowd control. While the current version is not mobile, it demonstrated sufficient range to create a corridor through the crowd and ensure safe passage of sailors and completion of the resupply. This contributed to the overall operational success of the NATO forces. The scenario of the wargame highlighted the vulnerability of NATO forces to hostile crowds, revealing that even a relatively small crowd (less than a 100 people) could significantly disrupt or block NATO forces' freedom of movement. In the absence of advanced IFC, reliance on the local forces proved insufficient and had the potential to aggravate the already tenuous strategic situation. The ADS was a game changer as it provided the NATO forces with the counter-capability to this particular use of crowds as a weapon.³⁶

In the second wargame titled "NATO Task Force in Land Wargame Scenario," a NATO Task Force was engaged in training local forces in a third country. The population of the country was divided into two groups. While the first group that was controlling the government sought NATO presence as a means of stabilizing the security situation in the region, the second group was aligned with the neighbouring country that opposed NATO presence in the region. This division resulted in localized insurgency, with the neighbouring country threatening an attack if NATO or NATO-aligned security forces committed violence against civilians of their ethnic group. The tactical vignette

started when a returning joint local–NATO patrol was ambushed while crossing a marketplace filled with civilians. Concurrently, the hostile element organized a crowd of approximately 400 people (men, women, elderly people and children), preventing the exit of a quick reaction force (QRF) from the base. The agitated but unarmed crowd, with the threat of throwing rocks, completely blocked the access route to the base, making it impassable for both the convoy and the QRF sent by the base commander to assist the ambushed patrol. The discussion below focuses on the part of the vignette involving the crowd by the base.³⁷

In this wargame, three options were evaluated. In the baseline, the local military police was the only crowd control capability available to the NATO and aligned forces. The local military police were equipped with legacy non-lethal systems including batons and shields, tear gas, and blunt trauma systems (rubber bullets). The second option introduced the currently available ADS, which is portable but stationary when employed. The third option offered a “next generation” ADS (shorter range, but air-mobile).³⁸

In the first option, the NATO task force commander deployed a military police crowd control company out of the base to attempt to disperse the crowd and facilitate safe passage of the QRF convoy. However, the legacy capabilities proved inadequate and led to further escalation of the situation. The crowd even threatened the base access point and attempted to cut off the military police company from the base support. The hostile groups, both domestically and in the neighbouring country, used the employment of the rubber bullets to generate negative publicity for the government forces. Given the inability to send the QRF, the ambushed patrol needed to fight their way out with no assistance. Even after escaping the ambush, the patrol found it challenging to return to the base. Overall, the escalation of force contributed to the neighbouring country’s decision to invade, using oppression of their ethnic minority as an excuse.³⁹

In the other two options, the availability of the ADS altered the dynamics of the confrontation.⁴⁰ However, the current version of the ADS lacking mobility proved to be insufficient to secure the QRF passage. While effective in protecting access points, the crowd could simply move out of the ADS range, establishing a new blocking point down the road. That necessitated dependence on the military police to open the corridor, although it still provided the NATO and local forces with the initiative. The ability to rapidly defuse and resolve the crisis by the base, with minimum use of force, helped de-escalate the overall situation. In this option, the neighbouring country lacked sufficient grounds for invasion. In the next generation option, the mobility of the ADS prevented the crowd from shifting its location, thus enabling the NATO and aligned forces to rapidly send out the QRF and ensuring freedom of movement.⁴¹

This game demonstrated that the crowds are an effective counter-mobility tool. The inability to displace the crowd in the baseline option carried significant strategic implications. In the two options with the IFC, the ADS was effective even in its current form as it helped to keep the crowd away from the gate and created room for more effective intervention by the forces. The next-generation ADS was considered light enough to be mounted on mobile platforms. Although it assumed shorter range, its mobility enabled rapid crowd dispersion. In fact, it prevented the crowd from re-establishing the block point far enough from the base to be out of reach of the ADS, emphasizing that mobility outweighed range in importance.

The final wargame, titled “Game 4 – Contested Non-Combatant Evacuation Operation (NEO) Scenario,” unfolded within the context of strategic competition/confrontation between two nuclear-armed powers vying for influence in a neutral country called Hypatia. Once aligned with the regional hegemon Illyria, Hypatia is now attempting to align itself with Western democracies. The NEO is triggered by an impending invasion of Hypatia by Illyrian forces seeking to prevent pro-western Hypatian orientation. The NEO is to be executed by a NATO amphibious task force that deployed a battalion-sized force responsible for evacuating NATO military trainers and civilians from a Hypatian base. The hostile paramilitary forces controlled by Illyria were trying to prevent the evacuation in order to use the NATO citizens as a negotiation tool.⁴²

The convoy of evacuees was composed of buses and accompanied by light military vehicles (Growler⁴³ was used as a representative). To stop the convoy, or at least delay it long enough for the Illyrian forces to cut it off from the extraction point, the paramilitary forces attempted to assemble small crowds (from the local population opposed to the Hypatian government) at several points along the road. As a result of the swift insertion of NATO forces, the paramilitary had minimal time to set up crowds and associated roadblocks. With the invading forces rapidly approaching the planned evacuation point, any delays would have likely led to failure of the evacuation attempt.⁴⁴

In this wargame, only two distinct options were played, each featuring IFC present on both the NATO and Illyrian sides. In the first option, the IFC relevant to crowd control were limited to legacy NLW (blunt trauma and warning rounds). The second option equipped the NATO forces with next-generation ADS mounted on both the Growlers and on helicopters available onboard the amphibious landing ship. In the first option with no ADS available, the initial crowd successfully blocked the convoy for an extended period of time, allowing other hostile groups sufficient time to organize additional blocking points. Since the buses could not travel off road, the convoy was effectively tied to the road and could not bypass the crowds. Initially the

NATO forces tried to invent a deception to get through the blockage but remained unsuccessful. Subsequently, they tried blunt trauma rounds, but these proved ineffective against the hostile and determined crowd, highlighting the limitations of legacy blunt trauma NLW.

In the course of the game, not only did the attempts using rubber bullets fail, but they also provided hostile groups with material for anti-NATO propaganda. Eventually, the convoy managed to force its way through the initial crowd but found itself trapped between two crowds, with the second crowd having more time to organize and set up roadblocks. Unable to continue or return to the base, the convoy remained passive. The second blockage underscored the significant cost of inaction, echoing findings by Shortland et al., where the lack of a response option—in this case, doing nothing—had outcomes similar to using excessive force.⁴⁵ The failure to evacuate or secure the civilians at the base led to complete operational and strategic failure of the NEO, providing the strategic advantage to the invading power and forcing the NATO forces to be passive and negotiating release of its citizens.⁴⁶

In the option with IFC, the NATO forces were equipped with the notional next-generation mobile ADS modeled as short-range and vehicle-mounted as a part of the common remotely operated weapon station (CROWS) system.⁴⁷ Despite its notional range of only 50–100 metres, the IFC was sufficient to move the crowd to the side of the road and away from the buses. This ensured a rapid passage of the convoy through the first crowd before it could block the road using debris and trees, thus further preventing the additional crowds from reaching the road in time. Consequently, the convoy could proceed swiftly toward the evacuation point while the hostile groups remained behind. This gave NATO forces the initiative and forced the invading Illyrian forces to use long-range artillery strikes against a road tunnel in order to slow down the evacuation. While the evacuation did not meet the original time limit, the evacuees made it to the extraction point. The use of lethal force by Illyria provided the NATO forces with the information advantage, enabling them to hold the strategic initiative. The difference in the strategic outcomes demonstrated that the use of crowds as a counter-mobility capability may have significant strategic effects and sway the strategic initiative. Within the scenario, the counter capability in the form of DE NLW (in this case the ADS) provided an effective option of dealing with the crowds.⁴⁸

The final game conclusively proved the observations from the previous games that crowds are highly effective as a counter-mobility tool. At the minimum, they can slow down the military forces and, in more extreme cases, block them entirely. The inability to displace the blocking crowd without causing harm could have significant strategic implications. The high cost of inaction becomes

evident, therefore highlighting the need for NATO forces to incorporate effective countermeasures in their planning stage and acquire capabilities that help displace crowds without causing harm. While some belligerents might be willing to cause large civilian casualties, the experience from Ukraine has shown that, even in those cases, sufficiently large crowds could disrupt armed forces' freedom of movement.⁴⁹ Furthermore, the final game confirmed the value of ADS in countering crowds, and showcased that the ADS' mobility was more important than its range. In comparison to legacy blunt trauma systems, DE capabilities, particularly the ADS, outperformed by preventing information advantages for adversaries.⁵⁰ This finding aligned with an earlier study by the RAND Corporation.⁵¹

MODELING CROWDS IN COUNTER-MOBILITY ROLE USING AGENT-BASED MODELS

The wargaming described above provided valuable qualitative insights into the use of NLW, both legacy systems and DE NLW systems such as ADS, for countering crowds. However, to better quantify the contribution of IFC to mission success, it is worth implementing IFC in computer simulations that could be eventually incorporated into higher level games.⁵² The initial attempts on representing IFC in simulations were done using an agent-based model called Map aware Non-uniform Automata (MANA), developed by the New Zealand Defence Technology Agency.⁵³





Source: www.marines.mil

MANA's high level of abstraction renders it suitable for modeling future capabilities when precise performance specifications are uncertain. Furthermore, the abstraction introduces an element of outcome dependency on parameter selection, making it most suitable for comparing parametric options that are subjects to the same assumptions and limitations on system performance. The earlier work considered scenarios involving the use of IFC in a counter-material role to counter swarms of potentially suicidal uncrewed systems in the maritime domain.⁵⁴ The study concluded that the effectiveness of DE NLW in countering swarms relies on their area coverage and the ability to engage multiple targets and render them immobile. This capability proves crucial for success when facing swarms that could otherwise overwhelm a limited number of lethal systems.⁵⁵

Following this earlier work, Afara et al. designed and implemented two scenarios simulating crowds in a counter-mobility role in MANA.⁵⁶ These scenarios were designed to demonstrate the employment of IFC to preserve freedom of movement in the presence of unarmed crowds. The first scenario was simplistic and served as a proof of concept for modelling a crowd as a counter-mobility capability and the use of IFC to counter the crowd. A military convoy moved along a straight line and was stopped by a crowd. MANA does not consider the size of individual entities. In other words, the vehicles could always pass between civilians. Therefore, the crowd counter-mobility role was modelled by stopping vehicles within a certain distance from civilians. Modeling the action of IFC was straightforward using different MANA weapon classes.⁵⁷

The second scenario involved a QRF moving across a populated market to support troops ambushed by insurgents on the other side of the town. The scenario assumed that the military convoy would have mounted ADS, and varied the ADS parameters (range, power), as well as the crowd and convoy size to obtain approximately 120 combinations of parameters. Each of the options

was replicated 100 times for a total of 12,000 different data points. Two measures were used to assess the effectiveness of the friendly forces: objective achievement and time taken, along with an alternative measure, the number of casualties from the ambushed unit.⁵⁸

Different machine-learning approaches were then leveraged to obtain insights into the relative importance of the varied parameters and the implications for mission success. In the first scenario, the crowd size was of the greatest importance, followed by the power (defined as the duration of the effect of the ADS on an individual). In the second case, the crowd size was not as important, largely because the convoy only interacted with a small portion of the actual crowd. Range and power were the most important parameters. When considering the time factor (how quickly the convoy could get to its objective), power became the most important factor. Overall, the study "conclusively showed that the IFC improved the ability of BLUE force to achieve their Objective (and maintain freedom of movement)."⁵⁹ The impact of crowd density on the relative importance of range and power was observed, indicating that, as crowd density increased, range became more crucial, while for sparser crowds, power (duration of the effect) gained greater significance.⁶⁰

SUMMARY AND CONCLUSIONS

Insights from various conflicts indicate that civilian crowds can be strategically employed as a counter-mobility capability. Usually, NATO and allied militaries operate under restrictive rules of engagement aimed at the prevention of civilian casualties. This, in turn, limits their ability to counter these crowds. Even during high-intensity conflict, the adherence to the LOAC limits the range of activities that the NATO forces may employ in case of civilians.

In a series of six wargames, NATO SAS-151 simulated challenges in countering crowds with their current capability set. Lethal and traditional non-lethal weapons were insufficient against determined crowds, with

military police actions risking escalation and the NATO forces losing the “battle of narratives” in the information environment. However, the use of DE NLW, specifically the ADS, provided initiative to NATO forces.⁶¹ As they are not observable, their use had limited negative information impact compared to the legacy NLW. The conclusions about the effectiveness of the ADS remained consistent with an earlier study conducted by the RAND Corporation.⁶² The SAS-151 wargames showed that the mobility of the ADS is more important than its range, and the modelling & simulation work demonstrated that the benefits of a greater range increased with greater crowd density.⁶³

In summary, crowds prove to be an effective counter-mobility tool across various scenarios of competition and conflict, emphasizing the strategic importance of addressing this challenge. Therefore, Canadian and NATO planners would be prudent to consider the use of crowds and appropriate counters in operational planning. While current military police capabilities may be useful in certain situations, their limitations in speed and potential information costs underscore the need for alternative measures. As observed from the wargames noted above, DE NLW, particularly with a focus on mobility over range, can emerge as promising counter-capabilities, offering effective crowd control without negative information implications. The qualitative results from the wargames, and the quantitative results from modeling IFC in MANA suggested that the mobility of these capabilities is more important than the range. In view of this finding, it would be rewarding for future research and development to prioritize reducing size and power demand, even at the expense of range, to enhance these capabilities. 🍁

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ENDNOTES

1. NATO, *Allied Joint Publication (AJP) – 3.2: Allied Joint Doctrine for Land Operations*, Edition B, 2022.
2. US, *Joint Publication 3-06, Joint Urban Operations*, Nov 2013, https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_06.pdf, accessed 20 Jun 2023; NATO, Multi-Domain Operations in Urban Environment, Draft Concept, Feb 2022.

3. “Framework for Future Alliance Operations,” signed by General Curtis M. Scaparrotti, Supreme Allied Commander Europe, and by General Denis Mercier, Supreme Allied Commander Transformation, in 2018.
4. Andrew Mumford, “Ambiguity in hybrid warfare,” *Hybrid CoE Strategic Analysis*/24 Sep 2020.
5. “Defiant Ukrainian Civilians Kneel in Front of Russian Tanks,” *Business Insider*, 27 Feb 2022, <https://www.businessinsider.com/defiant-ukrainian-civilians-kneel-in-front-of-russian-tanks-block-roads-2022-2>, accessed 22 June 2023.
6. “On this Day, October 3, 1993, Battle of Mogadishu (Black Hawk Down),” <https://sofrep.com/specialoperations/day-october-3-1993-battle-mogadishu-black-hawk/>, accessed 31 Dec 2022.
7. “French military convoy blocked in Burkina Faso by protesters,” *Reuters*, <https://www.reuters.com/world/africa/french-military-convoy-blocked-burkina-faso-by-protesters-2021-11-19/>, accessed 31 Dec 2022.
8. “Ukraine crisis: Military column ‘seized’ in Kramatorsk,” <https://www.bbc.com/news/world-europe-27053500>, accessed 31 Dec 2022.
9. “Video shows crowd of Ukrainian civilians blocking Russian army from reaching Europe’s biggest nuclear power plant,” <https://ca.news.yahoo.com/video-shows-crowd-ukrainian-civilians-131325325.html>, accessed 31 Dec 2022.
10. “Summary of Geneva Conventions of 1949 and Their Additional Protocols,” https://www.redcross.org/content/dam/redcross/atg/PDF_s/International_Services/International_Humanitarian_Law/IHL_SummaryGenevaConv.pdf, accessed 22 June 2023.
11. Human Rights Watch, *Ukraine: Apparent War Crimes in Russia-Controlled Areas: Summary Executions, Other Grave Abuses by Russian Forces*, 3 Apr 2022, <https://www.hrw.org/news/2022/04/03/ukraine-apparent-war-crimes-russia-controlled-areas>, accessed 23 June 2023.
12. International Committee of the Red Cross, *Introduction to the Law of Armed Conflict*, https://www.icrc.org/en/doc/assets/files/other/law1_final.pdf, accessed 1 Jan 2023.
13. *NATO Policy for the Protection of Civilians, Endorsed by the Heads of State and Government participating in the meeting of the North Atlantic Council in Warsaw 8–9 July 2016*, https://www.nato.int/cps/en/natohq/official_texts_133945.htm, accessed 20 June 2023.

14. Office of the High Commissioner, United Nations Human Rights, *War crimes, indiscriminate attacks on infrastructure, systematic and widespread torture show disregard for civilians, says UN Commission of Inquiry on Ukraine*, 16 March 2023, <https://www.ohchr.org/en/press-releases/2023/03/war-crimes-indiscriminate-attacks-infrastructure-systematic-and-widespread>, accessed 23 June 2023.
15. Dan E. Stigall, *Future Conflicts, Civilian Harm, and the CHMR-AP*, Lieber Institute, West Point, 3 May 2023, <https://lieber.westpoint.edu/future-conflicts-civilian-harm-chmr-ap-part-i/>, accessed 22 June 2023.
16. Ben Lagasca, Susan LeVine, and Brian Long, "Combatant or Collateral Damage? New Technology Offers Urban Ops Advantage," *Army*, August 2013.
17. Wendell B. Leimbach, and Susan D. LeVine, "Winning the Gray Zone: The Importance of Intermediate Force Capabilities in Implementing the National Defense Strategy," No. 468, 23 October 2020, https://nipp.org/information_series/leimbach-colonel-wendell-b-and-susan-d-levine-winning-the-gray-zone-the-importance-of-intermediate-force-capabilities-in-implementing-the-national-defense-strategy-information-series-no-468/, accessed 5 December 2023.
18. NATO Allied Command Transformation, *Intermediate Force Capabilities Concept – Draft 4*, December 2021.
19. LRAD Product Line, <https://genasys.com/lrad-products/>, accessed 23 June 2023.
20. Joint Intermediate Force Capability Office, "Active Denial System FAQs," <https://jnlwp.defense.gov/About/Frequently-Asked-Questions/Active-Denial-System-FAQs/>, accessed 31 Dec 2022.
21. "Safety and ethics worries sidelined a 'heat ray' for years. The feds asked about using it on protesters," <https://www.washingtonpost.com/nation/2020/09/17/heat-ray-protesters-trump-dc/>; "Military Police Considered Using Heat Ray on White House Protesters, Whistle-Blower Says," <https://www.nytimes.com/2020/09/17/us/politics/military-police-heat-ray-protests.html>, accessed 23 June 2023; Susan LeVine, *The Active Denial System: A Revolutionary, Non-lethal Weapon for Today's Battlefield*, Defence and Technology Papers, National Defence University, June 2009; John M. Kenny, Marvin Ziskin, Bob Adair, Bosseau Murray, Donald Farrer, Lawrence Marks, and Viktor Bovbjerg, *A Narrative Summary and Independent Assessment of the Active Denial System*, Penn State Applied Research Laboratory, in fulfillment of USMC Contract M67854-05-D-5153-0007, February 2008.
22. Noah Browning, "Israeli 'skunk' fouls West Bank protests," *Reuters World News*, Sep 2012, <https://www.reuters.com/article/us-israel-palestinians-skunk-idUSBRE88208W20120903>, accessed 20 June 2023.
23. Yara Hawari, "'The Skunk': Another Israeli weapon for collective punishment," *Al-Jazeera*, 12 May 2021, <https://www.aljazeera.com/opinions/2021/5/12/the-skunk-another-israeli-weapon-for-collective-punishment>, accessed 20 Jun 2023.
24. Stuart Casey-Maslen, "Non-kinetic-energy weapons termed 'non-lethal': A Preliminary Assessment under International Humanitarian Law and International Human Rights Law," Geneva Academy of International Humanitarian Law and Human Rights, October 2010.
25. Law of Armed Conflict, "Rule 75. Riot Control Agents," <https://ihl-databases.icrc.org/en/customary-ihl/v1/rule75>, accessed 20 Jun 2023.
26. Stuart Casey-Maslen, "Non-kinetic-energy weapons termed 'non-lethal': A Preliminary Assessment under International Humanitarian Law and International Human Rights Law," Geneva Academy of International Humanitarian Law and Human Rights, October 2010.
27. NATO Supreme Allied Command Transformation Wargaming and Experimentation Branch, *Intermediate Force Capabilities Concept Operational Experimentation Report*, April 2022.
28. NATO Allied Command Transformation Legal Advisor, Personal Communications.
29. NATO Systems Analysis Studies 151 (SAS-151), *Intermediate Force Capabilities (IFC) Concept Development and Experimentation to Counter Adversary Aggression*, TR-SAS-151, Dec 2022.
30. K.G. Wilson, "Problems in Physics with Many Scales of Length," *Scientific American*, 241(2), 1979.
31. P. Dobias and K. Christensen, "Wargaming the use of intermediate force capabilities in the gray zone," *Journal of Defense Modeling and Simulation*, https://cradpdf.drdc-rddc.gc.ca/PDFS/unc372/p813670_A1b.pdf, 2021.
32. NATO Systems Analysis Studies 151 (SAS-151), *Intermediate Force Capabilities (IFC) Concept Development and Experimentation to Counter Adversary Aggression*, TR-SAS-151, Dec 2022.
33. Ibid.
34. K. Christensen, M. Amyot-Bourgeois, G. Nikolakakos, J. Nelson, and P. Dobias, *Use of Intermediate Force Capability Game Series: Game 1 – NATO Naval Task Group in Port*, DRDC-RDDC-2020-L180, Oct 2020.
35. Ibid.
36. Ibid.

37. NATO Systems Analysis Studies 151 (SAS-151), *Intermediate Force Capabilities (IFC) Concept Development and Experimentation to Counter Adversary Aggression*, Annex G, TR-SAS-151, Dec 2022.
38. Ibid.
39. Ibid.
40. Regarding the efficacy of ADS and the likelihood of its limitations and possible misuse, there was discussion among the subject matter experts who had direct experience with it (including at the receiving end). There was a consensus that there is almost no risk of any enduring injuries. This is reinforced by the assessment by Penn State University that confirmed a wide safety margin between the desired effect and injury.
41. NATO, Systems Analysis Studies (SAS-151), *Intermediate Force Capabilities (IFC) Concept Development and Experimentation to Counter Adversary Aggression*, Annex G, TR-SAS-151, Dec 2022.
42. Ibid.
43. USMC M1161 "Growler Internally Transportable Vehicle," <https://www.joint-forces.com/features/49723-usmc-m1161-growler-internally-transportable-vehicle>, accessed 2 Jan 2023.
44. Ibid.
45. N. Shortland, H. Sari, and E. Nader, "Recounting the dead: An analysis of ISAF caused civilian casualties in Afghanistan," *Armed Forces Society*, 45(1) (2019), pp 122–139.
46. NATO Systems Analysis Studies 151 (SAS-151), *Intermediate Force Capabilities (IFC) Concept Development and Experimentation to Counter Adversary Aggression*, Annex I, TR-SAS-151, Dec 2022.
47. Common Remotely Operated Weapon Station (CROWS), <https://asc.army.mil/web/portfolio-item/common-remotely-operated-weapon-station-crows/>, accessed 2 Jan 2023.
48. NATO Systems Analysis Studies 151 (SAS-151), *Intermediate Force Capabilities (IFC) Concept Development and Experimentation to Counter Adversary Aggression*, Annex I, TR-SAS-151, Dec 2022.
49. "Video shows crowd of Ukrainian civilians blocking Russian army from reaching Europe's biggest nuclear power plant," <https://ca.news.yahoo.com/video-shows-crowd-ukrainian-civilians-131325325.html>, accessed 31 Dec 2022.
50. NATO Systems Analysis Studies (SAS-151), *Intermediate Force Capabilities (IFC) Concept Development and Experimentation to Counter Adversary Aggression*, Annex I, TR-SAS-151, Dec 2022.
51. K. Romita Grocholski, S. Savitz, J. P. Wong, S. Litterer, R. Khan, and M. Cooper, *How to Effectively Assess the Impact of Non-Lethal Weapons as Intermediate Force Capabilities* (Santa Monica, CA: RAND Corporation, 2022), https://www.rand.org/pubs/research_reports/RRA654-1.html, accessed 20 Dec 2022. Also available in print form.
52. P. Dobias, S. Havel, G. Nikolakakos, M. Amyot-Bourgeois, and B. Astles, *Proof-of-Concept for Integrated Simulation and Wargaming Approach to Representing Intermediate Force Capabilities*, NATO STO TM-SAS-MSG-ET-EZ, Dec 2022.
53. M. K. Lauren and R. T. Stephen, Map-Aware Non-uniform Automata (MANA) – A New Zealand Approach to Scenario Modelling, *Journal of Battlefield Technology*, 5 (2002), pp 1–13.
54. P. Dobias and C. Eisler, "Modeling a naval force protection scenario in MANA," *Operational Research and Management Science Letters*, 1(1) (2017), pp 2–7.
55. Ibid.
56. J. Afara, V. Ajila, H. Macdonell, and P. Dobias, "Use of agent-based modeling to model intermediate force capabilities in (counter)mobility crowd scenarios," *Journal of Defence Modeling and Simulations*, Online First (published 5 Dec 2022), <https://journals.sagepub.com/doi/10.1177/15485129221141717>, accessed 2 Jan 2023.
57. Ibid.
58. Ibid.
59. Ibid.
60. Ibid.
61. NATO Systems Analysis Studies (SAS-151), *Intermediate Force Capabilities (IFC) Concept Development and Experimentation to Counter Adversary Aggression*, Annex I, TR-SAS-151, Dec 2022.
62. K. Romita Grocholski, S. Savitz, J. P. Wong, S. Litterer, R. Khan, and M. Cooper, *How to Effectively Assess the Impact of Non-Lethal Weapons as Intermediate Force Capabilities* (Santa Monica, CA: RAND Corporation, 2022), https://www.rand.org/pubs/research_reports/RRA654-1.html, accessed 20 Dec 2022. Also available in print form.
63. J. Afara, V. Ajila, H. Macdonell, and P. Dobias, "Use of agent-based modeling to model intermediate force capabilities in (counter)mobility crowd scenarios," *Journal of Defence Modeling and Simulations*, Online First (published 5 Dec 2022), <https://journals.sagepub.com/doi/10.1177/15485129221141717>, accessed 2 Jan 2023.



Military History: A Guide to 21st Century Urban Warfare

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Fighting for, in, and around cities has been a critical aspect of warfare since time immemorial. Operations to control urban areas have always been and will continue to be a vital focus of land warfare, if not its most critical one. The study of the conduct of urban operations throughout military history validates this focus. The span of military history also reveals that some characteristics of the conduct of urban operations are enduring and remain valid in the 21st century. Knowing the purpose and historical roots of modern urban operations is crucial to intellectually understanding the importance and complexity of these operations. Arguably, military history has identified some trends in the way armies approach urban operations. These approaches fall into the realm of command at the higher tactical and operational levels of land warfare. Additionally, history illustrates lower-level tactics, techniques, and procedures (TTP), which continue to be relevant. All these characteristics require serious understanding and consideration by land force commanders and staff contemplating or preparing for military operations in and around urban centres.

The discussion in this article focuses on urban operations conducted in a large-scale combat operations (LSCO) environment against a peer or near-peer adversary. It is essential to realize that such an environment vastly differs from the urban environments in which many modern armies have generally operated for the last thirty years. The considerations and TTP necessary for success in LSCO are, in many ways, different from the way land forces conduct operations in an unconventional war, peacekeeping, or counterinsurgency operations.

For much of the latter half of the twentieth century, modern armies avoided a serious discussion of conducting urban operations. Particularly regarding offensive operations, the operational and tactical solution was to bypass the centres of resistance established in urban areas. Thus, conveniently, armies in the post-World War II era, particularly during the Cold War, paid scant attention to urban warfare's operational and tactical challenges.¹ However, armies often cannot bypass or ignore large urban areas, as political and military necessity often drives them to conduct urban operations. The political reasons urban areas may be necessary include protecting or liberating a friendly urban population, controlling a religiously important symbol or artifact, and controlling a historical, cultural, or politically significant area. Urban areas also have military importance—they can harbour sizable dangerous enemy forces; they frequently contain necessary logistics infrastructure; and, often, they are positioned on the terrain that controls major manoeuvre corridors. Thus, unlike wargames, simulations, and some war planning, military commanders often have no option other than to conduct LSCO in an urban environment.²

CITY DESIGN AND TACTICS

Cities have been the focus of military operations throughout history. The nature of how armies conduct operations in cities is a function of city design and weapons technology. These two factors have had a substantial influence on urban operations. For much of history, military necessity strongly influenced the design of a city. The defence was a crucial consideration in early city design.³ City design then reflected the tactics and weapons available to attack a city. As city design changed over centuries, tactics and weapons for attacking the city transformed as well.

Ancient and Medieval-Era Cities

City design remained mostly the same through most of recorded history. Cities were relatively small and surrounded by a defensive wall. Over time, leaders made numerous defensive enhancements to the walled city design, including turrets and towers, moats, inner and outer walls, and interior bastions. The TTP to meet the challenge of the walled city were relatively straightforward. The tactic was to overcome the wall. This storming of the wall, called escalade, could be accomplished in various ways. One way was through the use of siege towers and ladders. Siege towers were mobile protected stairs positioned against the wall and, together with ladders, allowed the attacking infantry to overcome the wall obstacle. Another method was to batter the wall down using catapults and trebuchets. The infantry would then storm through the breach in the wall. A final technique was to collapse the wall. This technique required mining undetected to a position under the wall and then destroying the foundation or, in later years, detonating the explosives, which would bring it down, allowing the infantry to storm through the breach.⁴



Depiction of the siege of Lisbon by Roque Gameiro.

Source: Wikipedia

Fortress Cities

The advent of the development of gunpowder and cannons made the vertical city wall an obsolete defensive barrier. Cannon fire against a vertical city wall quickly breached it, and the escalation by infantry soon followed. The answer to the cannon, in terms of city design, was the fortress city.

The fortress city became the primary city design of major urban areas beginning in the 16th century and was a prominent city feature into the 19th century. Like the walled city, a wall surrounded the fortress city, but it differed from previous vertical walls. The fortress city wall was a sloping stone backed by dozens of feet of earth. Its thickness and slope made it harder to breach by cannon fire. The fortress city walls formed a star shape and included positions for defensive cannons on top of the thick walls. The star shape allowed defensive cannons to provide enfilade (flanking) fire on any forces firing on or attempting to storm any face of the wall. Broad open spaces around the fortress city ensured that attacking infantry would be exposed to defensive cannon fire throughout the approach to any wall.⁵

The answer to the defensive challenge to the fortress city was deliberate siege tactics. This began with a professional engineering evaluation of the fortress and surrounding terrain to determine which face of the city fortress offered the best opportunity to attack. Then engineers designed an approach to the fortress using deeply dug siege trenches angled to protect them from the fire of defensive cannons. Once complete, attacking infantry and cannon were moved forward through these assault trenches to positions near the fortress wall. Offensive artillery then battered the wall to produce enough damage that the attacking infantry could climb the wall. The infantry in the protected assault trenches only had to cover a short distance under fire before penetrating the wall. These siege tactics were slow and resource-intensive but were invariably effective.⁶ The primary defence against them was for the defenders to withstand the siege until circumstances—such as the outbreak of disease among the besieging troops, a change in the weather that made trenching difficult, the failure of the besiegers' logistics system, or the arrival of a relieving army—caused the besieging force to break off the siege.

Modern Cities

Beginning in the 18th century and accelerating through the 19th century, the populations and physical size of cities expanded. This growth in size and population resulted from increased wealth from overseas trade and colonies and the simultaneous scientific and industrial revolutions. Advances in science, medicine, and agriculture reduced the need for agricultural labour, increased the need for industrial labour, decreased infant mortality, controlled the spread of diseases, and increased lifespans. All of this caused a population explosion and rapid urban expansion. As a result, the urban physical

space spilled beyond the fortress walls, and it became apparent that it was prohibitively expensive to rebuild the walls to include the ever-growing size of the city.⁷

Beginning with the Napoleonic wars at the beginning of the 19th century and continuing through the beginning of the 20th century, tactical urban operations were in transition. Classic siege tactics were still often used and were still time- and resource-consuming. Increasingly, cities could no longer rely on fortress walls. World War I was dominated by static trench warfare, so urban warfare was not a significant consideration. Following World War I, mechanization and combined arms warfare made the static trench system obsolete. As the World War II armies manoeuvred against each other, they discovered the modern form of urban defence and offence. The roots of modern urban warfare tactical dynamics can be traced to the late 19th century, when small arms technology took a leap forward in accuracy and rate of fire and became highly lethal. This lethality, combined with reinforced concrete and stone buildings in a large urban area, presented an attacker with an incredibly dense and diverse maze of effective, mutually-supporting defensive positions. Unlike city walls and field defensive positions, the building-based urban defence had a depth and breadth that equalled the size of the city. It could not be breached or flanked. This dense urban environment became the dominant characteristic of many decisive battles and has become even more common and decisive in the decades of war since World War II. This environment remains the major challenge for land forces preparing for war in the 21st century.

OPERATIONAL APPROACH

Urban warfare is more than just a small unit tactical problem. Field armies, corps, and division commands must also focus on the conduct of urban operations within their areas of operations. Arguably, the most crucial aspect of predicting success or failure at the tactical level of urban warfare is the degree to which higher tactical- and operational-level commanders and staff anticipate, plan for, and conduct operations with urban warfare central to their visualization of the battlespace. The span of military history reveals that some enduring operational approaches to urban operations remain valid in the 21st century. These include anticipating the urban battle, pre-empting the urban battle, and isolating the urban battlefield.

Anticipation

Planning and analyzing the impact of urban areas on campaigns and battles by higher tactical- and operational-level commands is critical to the success or failure of lower tactical units in the urban environment. Higher commanders must understand and evaluate the urban areas within their area of operation to include their non-military import and the military effects on both friendly and enemy forces. This evaluation should result in one of three outcomes

for all significant urban areas in the area of operations: the urban area must be seized or retained, the urban area must be bypassed or abandoned, or subordinate commanders will see to the disposition of the urban area. Even if the commander makes the latter choice, in all cases, the decision must be the result of careful consideration of the value of the urban area versus the likely cost in resources and time required to capture or defend it.⁸

Pre-emption

The dense urban environment provides significant advantages for defence. This fundamental consideration must be foremost when considering offensive operations at the operational or higher tactical level. Therefore, the ideal offensive operation against a city occurs before the city is defended. The commander must anticipate the future urban battle and then act to pre-empt the defence. There are three ways to pre-empt a defence: airborne assault, amphibious assault, or rapid advance by mobile forces. The factors of mission, enemy, terrain, troops available, and time dictate the particular operational approach chosen. All these types of operations require boldness and entail significant operational risk. However, the successful seizure of a city without significant opposition is a major operational coup and includes the added dividend of little or no collateral damage.⁹

Examples of pre-emption of the urban defence in military history abound. One of the most dramatic was the amphibious assault at Inchon during the Korean War (1950–1953), which was aimed towards liberating the capital city of Seoul. Allied forces landed against only light opposition at Inchon on 15 September 1950, crossed the Han River on 20 September, and began the systematic capture of Seoul. By 29 September, the city was secure. The fight for the city was a challenge as the North Korean forces put up strong resistance, but it would have been much more difficult and time-consuming had not North Korean forces been surprised and not able to reinforce the city or mount a stronger, more deliberate defence.¹⁰

Isolation

Operational circumstance only sometimes offers the opportunity to boldly seize a major urban area by a coup. However, a direct frontal assault on an urban area is the most costly and time-consuming way to conduct offensive operations in dense urban terrain and often fails. Land forces should seek to isolate the urban area before attacking it. The failure to isolate Soviet forces in Stalingrad in 1942 is one of the major reasons for the stout defence that Soviet forces were able to mount in that city through the late summer and fall of that year. Similarly, in the German's failed long siege of the Russian city of Leningrad in World War II, they never succeeded in isolating the city. Thus, in both decisive battles, reinforcements and supplies were able to sustain the defending force.

In contrast, an isolated force defending a city is deprived of resources and suffers a significant psychological blow. In modern warfare, successfully isolating a force defending an urban area is tantamount to winning the battle. Because of this, defending forces will commit significant combat power outside of the urban area to resist isolation. When isolation looks inevitable, defending forces have the choice of withdrawing from the urban area to preserve their force. In 1951, Chinese forces evacuated Seoul in the face of a UN counter-offensive that threatened to cut the Chinese lines of communications to the north. UN forces then occupied Seoul without significant opposition.¹¹ If it is necessary to attack the urban area after isolating it, the offensive force does so with numerous advantages. Once a city is isolated, the attacking force picks the time and the place of the attack and can mass vastly superior combat power at the point of attack. The isolated defensive force must defend everywhere.

A critique of the isolation technique is that many 21st-century urban areas are too large to isolate. This is an oversimplified understanding of the concept. Certainly, large, sprawling urban areas are difficult, if not impossible, to isolate physically. However, in a large urban area, manoeuvre operations can be focused on systematically isolating segments of the city through manoeuvre within the urban area. This segmenting of the urban area requires a strategy of seizing the urban space in systematic phases rather than seizing the entire city in a single operation. A version of this approach was used by American forces to systematically secure the city of Ramadi in Iraq in 2006.¹²

SMALL UNIT TTP

Combined Arms

History demonstrates some valuable considerations for senior commanders and provides the 21st century forces a guide for effectively employing forces in dense urban terrain at the lower tactical levels of warfare. Most fundamentally, military history illustrates the critical importance of combined arms operations, emphasizing the infantry-armour team. It also illuminates the roles of fires, engineers, logistics, air defence, and civil affairs. Not only are these capabilities necessary for urban operations, but their integration into teams must often happen at echelons lower than that which is routine for other operations.¹³ Historical precedents guide 21st century leaders in training, organizing and employing their forces for tactical success in a dense urban environment.

The Infantry Armour Team

There is a dangerous misconception that tactical operations in dense urban terrain are infantry-centric. In operations below the threshold of LSCO against a peer or near-peer adversary, some tactical operations may be infantry-centric. Still, in LSCO, they are fundamentally combined arms built around an infantry-armour team.¹⁴ The seamless



Cpl Eugene McKay searches for Germans in Aachen, Germany, while a tank destroyer, in the background, moves on German positions.

integration of these two arms is essential to successful tactical operations with minimal casualties. The exact organization of the infantry-armour team depends on the situation and the friendly forces available. The significant difference between the infantry-armour team in urban operations and other types of operations is the flexibility and teamwork required between the two arms.

Optimally, all assaulting formations in urban offensive operations should have armoured support. Ideally, at least two armoured vehicles should be aligned with

one infantry platoon as a combined arms team at platoon level.¹⁵ A ratio less than that will likely result in infantry fighting without armour support, dramatically increasing casualties and slowing the tempo of the operation.

As indicated above, friendly forces often dictate the composition of the infantry-armour team. In the battle for Aachen in 1944, the 2nd Battalion, 26th Infantry Regiment, had one platoon of tanks and one platoon of tank destroyers (mobile gun systems on a tank chasseur) for a total of ten armoured vehicles. Because of this, the



Source: Wikipedia

battalion commander allocated a section of three vehicles to each of his three infantry companies.¹⁶ In the initial stages of the 1968 battle for the city of Huế in Vietnam, the 2nd Battalion, 5th Marines, only had four tanks in support of four to five infantry companies, only two of which were M-48 main battle tanks (the other two were M-67 flame thrower tanks with no cannon). In 17 days of combat, the two M-48s fired over 1,100 90-mm main gun rounds—indicating how intensely those two vehicles were involved in the battle.¹⁷ These examples reinforce the idea that the infantry-armor team is a major component of successful urban tactics and that the number of tanks is often a function of what is available versus what is desired.

The infantry has several critical roles in the urban battle space. First and foremost, they have the mission of entering and defeating enemy forces inside urban structures in close combat. The ability of small infantry squads to close with the enemy and defeat them in the close spaces of the urban environment is critical to successful urban operations.¹⁸ In the second 2004 battle for Fallujah in Iraq, the training of small unit leadership of US Marine and Army infantry was critical to being able to clear buildings and maintain the tempo of operations while at the same time minimizing civilian casualties.¹⁹



An American machine gun crew (2nd Battalion, 26th Infantry Regiment, 1st Infantry Division) fires an M1919 Browning .30 calibre weapon against defending German soldiers during the battle of Aachen, Germany.

A second key role is protecting the armoured force from anti-armour threats. In this role, the infantry enables armour to perform its role. Close cooperation between the infantry of the 1st Infantry Division and tanks and tank destroyers was a key to the American seizure of the German city of Aachen in 1944. The infantry played the key role of watching for and suppressing German light anti-tank weapons while tank fire forced the defending German infantry into the basements of buildings. American infantry then used grenades and flamethrowers to compel the Germans to surrender.²⁰

A final role of the infantry is to defend urban terrain. When the unit's mission is defence, this becomes the infantry force's primary role. In the offence, this role involves securing terrain taken from the enemy as the attack continues and protecting exposed flanks if necessary. In the defence role, small numbers of infantry can defend against far superior forces successfully for extended periods. The recent three-month Russian siege of Ukrainian forces in the city of Mariupol exemplifies how resilient small numbers of infantry defending in urban terrain can be, even though the Ukrainian forces were eventually forced to surrender.²¹ Armour is not as critical

to a successful defence as it is to offensive operations. The infantry has a significant ability to differentiate between combatants and noncombatants. This ability allows them to seize urban terrain while minimizing collateral damage. The infantry is generally immune to defending anti-tank weapons. However, engaging in close infantry combat inside urban structures involves the risk of significantly increasing infantry casualties and negates many technological and firepower advantages that the attacking force may have. During the Second Battle of Fallujah, most of the casualties were sustained during the phase of operations when the infantry entered and systematically cleared buildings after the major objectives were secured.²² Even though systematic building clearing is time-consuming, when anti-armour forces constitute a significant threat and collateral damage is a vital command consideration, infantry forces should lead the infantry-armour team. The infantry will also lead the infantry-armour team whenever there is a requirement to enter an underground structure or upper stories of tall buildings.²³

Not all armour is equal, nor does it have the same capability. Heavy armour is the main battle tank. Tanks are impervious to small arms and light anti-tank capability. They have the



Members of the Iraqi Army's 9th Division, supported by Combined Joint Task Force – Operation Inherent Resolve fire a heavy machine gun at ISIS fighter positions near Al Tarab during the battle of Mosul, Iraq.

firepower to destroy defensive positions in buildings and bunkers and all armoured vehicles on the battlefield, and they have the mobility to break through some obstacles and overcome urban debris that would stop wheeled vehicles. In the Second Battle of Fallujah in 2004, tanks and armoured ambulances were used for resupply and casualty evacuation because of their protection and ability to move through the obstructed streets of the city.²⁴ Tank fires can also be used to create a quick and safe entryway for infantry into buildings without using doors and windows, which may be targeted by the enemy. This was a common tactic in Fallujah.²⁵ Using these capabilities, the infantry-armour team can destroy defending forces without needing to enter the urban structure, and it can facilitate the close combat tasks of the infantry when they do have to enter a structure. Tanks are also the most effective means of dealing with opposing armour in an urban environment. Thus, in many circumstances, armour should lead the infantry-armour team.

In an urban environment, tanks are vulnerable to anti-armour weapons attacking at close range and from the heights of buildings. Tanks rely on infantry to mitigate these threats. When such threats are significant because

of the proliferation of anti-tank weapons or the constriction of the urban terrain, infantry should lead the team with tanks behind but in close support. The lack of close infantry and armour cooperation proved disastrous in the 1995 Russian offensive to secure the Chechen city of Grozny. Russian infantry-armour teams were poorly coordinated, and Russian infantry rarely dismounted. This left the armour susceptible to effective ambushes, which resulted in the destruction of several Russian task forces and the failure of the Russian attack. In one task force alone, 102 of 120 armoured personnel carriers and 20 of 26 tanks were destroyed.²⁶ The Russian disaster in Grozny illustrates the necessity of close infantry-armour coordination.

Light armour includes light tanks, infantry fighting vehicles, and armoured personnel carriers. These vehicles provide protection from small arms and have more firepower than infantry forces. However, they should not typically lead the infantry-armour team because they lack significant protection against even light anti-tank weapons. During the battle for the South Vietnamese City of Huế in 1968, there was a significant difference in the performance and tempo of South Vietnamese forces and US Marine forces.



The American forces were able to conduct a much higher tempo of operations and suffered fewer casualties than the South Vietnamese even though the two allies were fighting the same enemy in the same urban environment. One of the major differences between the two forces was that South Vietnamese armour support consisted of M-41 light tanks, which were easily destroyed by the standard North Vietnamese B-40 anti-tank rocket. The American Marines were supported by M-48 main battle tanks whose armour could not be easily penetrated by the B-40 rocket. During the battle, dozens of M-41 tanks were destroyed, but only one of the M-48s supporting the Marines was lost.²⁷ Similarly, in the 2008 battles in the Sadr City neighbourhood in Baghdad (Iraq), American commanders concluded that the Stryker (eight-wheeled armoured personnel carrier) lacked lethality and survivability compared to mechanized forces (tank and infantry fighting vehicles).²⁸ These examples testify that even though armour is a critical asset in urban operations, individual system capabilities in terms of firepower, mobility and protection are vitally important.

Coordination between the infantry and armour elements of the infantry-armour team is vitally important. As described above, the elements of the team have unique capabilities. None by themselves are ideally suited to all aspects of the diverse urban environment. Because of this, the infantry-armour team must be very flexible and adaptable. Adapting and modifying the roles to different terrains and enemy challenges during missions will be necessary. Only close coordination and well-drilled teams will be able to respond rapidly and effectively as situations change from block to block and building to building during urban combat.

Artillery and Fires

Fires have always been critical to urban combat. Armies that are less sensitive to collateral damage have used massive air and artillery fires to destroy an adversary defending in urban terrain. This was the Russian approach to Grozny in 2000.²⁹ This approach reduces friendly casualties but destroys the urban infrastructure and produces significant civilian casualties.

Air and artillery-delivered modern precision fires can facilitate operations without causing a large amount of collateral damage. Greater precision has dramatically increased the role of fires in urban operations, even when collateral damage is a priority concern. Precision fires, in some cases, can be a substitute for the availability of armour forces. They have an advantage over the direct fire of armour forces as they can be significantly more powerful and tailored to impact all three dimensions of the urban environment: subterranean, surface, and supersurface. Artillery-delivered precision fires using guided munitions proved a major combat multiplier in the 2017 battle to recapture the Iraqi city of Mosul from the Islamic State of Iraq and Syria (ISIS).³⁰ Precision munitions dramatically change the ability of fires to influence close combat in urban terrain.

Conventional aviation operations can significantly assist the conduct of urban operations. However, rotary wing operations are uniquely vulnerable to defensive fire in an intense combat environment and should not be employed over unsecured urban terrain. The 1993 American raid against Somali militants in Mogadishu demonstrated the vulnerability of helicopters to relatively unsophisticated fires.³¹ Aviation should conduct overwatch and observation from positions in secure areas. In 2002, Israeli attack helicopters were careful to overwatch and support ground forces with fires from secure positions behind the ground forces.³²

Special Operations Forces

Special operations forces (SOF) integration, coordination, and support for combined arms urban operations can be critically important. High-value special operations targets often exist in the same urban battle space in which large-scale conventional operations are conducted. During the US invasion of Panama in 1989, special operations forces worked closely with conventional forces to free prisoners from the *Cárcel Modelo* prison, while a mechanized task force supported by special operations aircraft and reconnaissance captured the Panamanian military headquarters.³³ In 2006, the US brigade securing the Iraqi city of Ramada integrated Navy SEALs into its standard combat outpost operations. The SEALs provided reconnaissance, precision sniper fires and early warning and security to support the conventional infantry-armour teams.³⁴ Deconflicting conventional and special operations is essential. Coordination between SOF and integration of special operations forces into conventional operations can be a major capability enhancement in urban operations. Special forces are particularly adept at raids, subterranean operations, infiltration, and urban reconnaissance. Leveraging all these capabilities enhances the effectiveness of conventional force operations.

Engineers

Military history also indicates that there are precedents that guide the role of other arms in urban operations. Engineering has unique roles in large-scale urban operations. They have the dual roles of supporting combat and civil support operations during and after combat. The urban environment uniquely engages the Engineer arm's tasks of mobility, counter-mobility, and protection.³⁵ Logisticians must meet the unique logistics requirements of the combat forces, and they likely will have significant responsibilities for supporting large numbers of civilians.

Engineers have a major supporting role to play in urban combat operations. In offensive operations, the engineer's task of mobility is critical. In the urban environment, one of the major mobility tasks is bridging. Almost all major urban areas worldwide include rivers within the city domain. The bridges within these urban areas are critical to intra-urban

mobility. Thus, the destruction of bridges is expected in urban operations. In 1945, during the battle of Manila, all six bridges over the Pasig River were destroyed by the defending Japanese, forcing the Americans to conduct an opposed river crossing during the battle.³⁶ During the battle for Seoul in 1950, all bridges across the Han River were destroyed, forcing engineers to again support an opposed river crossing into an urban area. Engineers were also critical in clearing the barricades erected as obstacles on the streets of Seoul.³⁷ Most recently, during the 2017 battle for Mosul, all five of the city's bridges across the Tigris River were destroyed as part of the effort to isolate ISIS forces in the city. This later presented a challenge to Iraqi forces as operational focus shifted to the western part of the city.³⁸ Engineer bridging capability is essential to conducting offensive urban operations.

In the defence, Engineer counter-mobility and protection tasks are important. Manoeuvre corridors in dense urban terrain are narrow and compartmented, and small amounts of carefully placed obstacles greatly enhance the already formidable constriction of the terrain. Buildings in the urban area are important for cover and concealment. In Manila, US forces discovered that the Japanese had constructed bunkers within buildings that were impervious to fires from outside the building and that were only found after troops entered the building.³⁹ With a small amount of effort, engineers can improve these formidable defensive positions, turning them into veritable fortresses.

A final unique urban engineering requirement is to support the civilian population before, during and after combat is complete. After hostilities, critical urban infrastructure is likely to be damaged. In particular, water and power systems may be non-functioning. Military engineers are critical to getting basic infrastructure necessities operating quickly to stave off post-conflict humanitarian disasters among the civil population.

Logistics

Urban operations include unique logistics challenges. Again, military history points to some of those challenges and allows logistics planners to anticipate them. One of the significant challenges will be munitions resupply. Urban operations often are typified by high ammunition usage rates. Recent conflicts indicate that precision artillery and mortar munitions will be in high demand. During the battle for Mosul in 2017, precision guidance munitions for artillery and aviation were used extensively and, at some points in the battle, were in short supply.⁴⁰ Artillery ammunition supply in the present fighting in the Russian-Ukraine battle for Ukraine's cities is a critical issue for both sides.⁴¹ These specialized munitions are ideally suited to the urban environment, and, in large-scale operations, their use will strain both tactical logistics and the strategic supply chain.

The civilian population is a significant logistics challenge in the urban environment. City populations are not self-sufficient and rely on a complex, robust civilian supply chain for essentials such as food and medicine. Large-scale combat operations will destroy these supply chains. In the immediate post-combat period, military logisticians have a moral and legal responsibility to support the humanitarian needs of the civilian population. These requirements can be significant—possibly more extensive than the military logistics support requirements—and must be anticipated and planned for. In 1944, the US military became responsible for feeding the population of the liberated French capital of Paris. The logistics requirements for this task—4,000 tons per day—were the equivalent of the entire theatre advancing for three days.⁴² Stockpiling anticipated supply needs and task-organizing with logistics and medical support beyond combat needs are two techniques for meeting the needs of the civilian population.

CONCLUSION

Military history provides numerous insights, considerations and lessons learned regarding LSCO in dense urban terrain. It should also stimulate considerations regarding current and future operations. The pace of technological development and innovation is such that future urban operations will require additional TTP to account for changes in the conduct of war at all levels. Attack and reconnaissance uncrewed aerial vehicles are emerging as new and significant capabilities that must be accounted for in offensive and defensive city fights. Other technologies still in their infancy, including artificial intelligence and robotics, are likely to have profound effects on the conduct of future urban operations tactics. The past is a guide to what works in urban warfare, but urban warfare is dynamic and constantly changing.

Conflict in the first two decades of the 21st century has reaffirmed that land warfare is about controlling urban areas. The fall of the Afghanistan government to the Taliban in the summer of 2021, in one of the least urbanized regions in the world, was fundamentally about which side controlled the region's cities. The basics of urban operations, at the operational and tactical levels of war, are vividly illustrated in the many urban battles that have taken place since 1941. Studying the lessons of modern urban warfare, as revealed in military history, is a necessary starting point for all land force commanders and their staff as they prepare forces for, plan for, and execute operations in dense urban terrain in the future. 🍁

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ENDNOTES

1. John Antal and Bradley Gericke, Ed., *City Fights: Selected Histories of Urban Combat from World War II to Vietnam* (New York: Random House, 2003), x.
2. Department of the Army, United States Marine Corps, *ATP 3-06, MCTP 12-10B, Urban Operations* (Washington, D.C.: Department of the Army, United States Marine Corps, 2022), 2-3.
3. Lewis Mumford, *The City in History* (New York: Harcourt Brace Jovanovich, 1961), 13. Spiro Kostoff, *The City Shaped* (London: Thames and Hudson Ltd, 1991), 32.
4. Bernard S. Bachrach, "The Roman Ramparts," Geoffrey Parker, Ed., *The Cambridge Illustrated History of Warfare*, Cambridge University Press, Oxford, 64–65, 3, 8–89. Duncan Campbell, *Siege Warfare in the Roman World* (Oxford: Osprey Press, 2005), 19–30. Christopher Gravett, *Medieval Siege Warfare* (Oxford: Osprey Press, 1990), 28–36.
5. Geoffrey Parker, "The Gunpowder Revolution," *Cambridge Illustrated History*, 106–117.
6. Christopher Duffy, *Fire & Stone: The Science of Fortress Warfare, 1660–1860* (London: Greenhill Books, 1996), 109–190.
7. Christopher Duffy, *Siege Warfare: The Fortress in the Early Modern World, 1494–1660* (London: Routledge, 1979), 257–264.
8. ATP 3-06, 2.3
9. Ibid., 4-5.
10. Joseph H. Alexander, *Battle of the Barricades: US Marines in the Recapture of Seoul* (Washington D.C.: Marine Corps Historical Center, 2000), 24–46.
11. Billy C. Mossman, *Ebb and Flow: November 1950 to July 1951* (Washington D.C.: Center for Military History, 1990), 310–311.
12. Louis DiMarco, "The Battle of Ramadi," Liam Collins and John Spencer, Ed., *Understanding Urban Warfare* (Hampshire: Howgate Publishing, 2022), 238–243.

13. ATP 3-06, 3-9.
14. ATP 3-06, 2-9.
15. Department of the Army, ATP 3-06.11, *Urban Operations* (Washington D.C.: Department of the Army, 2011), 5-3, 5-5.
16. D. M. Daniel, *The Capture of Aachen Germany* (Fort Leavenworth: Command and General Staff College, 1947), 7-8.
17. US Marine Corps, *3rd Tank Battalion, 3rd Marine Division, Command Chronology, 1 February–29 February 1968*, 10 March 1968, Marine Corps Vietnam Tankers Historical Foundation, 4. Retrieved from www.mcvthf.org/MCVTHF.htm.
18. ATP 3.06.11, 4.3.
19. Richard S. Lowry, *New Dawn, The Battles for Fallujah* (New York: Savas Beatie Ltd, 2010), Kindle 33–34.
20. Daniel, 6. ATP 3.06.11, 5-4.
21. Roland Oliphant, "'We are holding back the horde': Mariupol fighters battle on weeks after experts said city would fall," *The Daily Telegraph*, 12 April 2022. Retrieved from <https://www.telegraph.co.uk/world-news/2022/04/11/holding-back-horde-mariupol-fighters-battle-weeks-experts-said/>.
22. This is based on a comparison of total casualty numbers (313 by 15 November 2004, and 682 by 31 December 2004). Timothy S. McWilliams, with Nicholas J. Schlosser, *Marines in Battle, Fallujah, November–December 2004: The Battle for Fallujah* (Quantico, VA: US Marine Corps History Division, 2014), 56, 67.
23. ATP 3-06, 3-8.
24. Dick Camp, *Operation Phantom Fury: The Assault and Capture of Fallujah Iraq* (Minneapolis: Zenith Press, 2009), Location 3172 (Kindle Edition).
25. Alexander Saxby, *Fallujah Memoirs: A Grunt's Eye View of the Second Battle of Fallujah* (2021), Location 1102, 1109 (Kindle Edition).
26. Tim Thomas, "The 31 December 1994–8 February 1995 Battle for Grozny," *Block by Block: The Challenges of Urban Operations* (Fort Leavenworth, KS: Command and General Staff College Press, 2003), 16–174.
27. Mark Bowden, *Hue 1968* (New York: Grove Press, 2017), 191. Ray Stewart, "Marine Tanks in the Battle for Hue City: Tet 1968 – A Tale of Two Cities," Marine Corps Tankers Vietnam Historical Foundation, Vietnam Personal Accounts. Retrieved from <http://mcvthf.org/Stories/Battlefor%20HueCity01.html>.
28. David E. Johnson, M. Wade Markel and Brian Shannon, *The 2008 Battle of Sadr City* (Santa Monica, CA: RAND Corporation, 2013), Location 1603–1598, 2605 (Kindle Edition).
29. Olga Olikier, *Russia's Chechen Wars: Lessons from Urban Combat, 1994–2000* (Santa Monica, CA: RAND Corporation, 2001), 46.
30. Mosul Study Group, *What the Battle for Mosul Teaches the Force*, US Army, 2017, 17–18, 58.
31. Richard Stewart, *United States Forces, Somalia After Action Report and Historical Overview: The United States Army in Somalia, 1992–1994* (Washington D.C.: Center for Military History, 2003), 11.
32. Louis DiMarco, *Concrete Hell: Urban Warfare from Stalingrad to Iraq* (Oxford: Osprey Publishing, 2012), 186.
33. Lawrence Yates, "Operation Just Cause in Panama City, 1989," in *Block by Block*, 341–345.
34. Jim Michaels, *A Chance in Hell: The Men Who Triumphed Over Iraq's Deadliest City and Turned the Tide of War* (New York: St. Martin's Press, 2010), 6. Steve Clay, *On Point III* (Fort Leavenworth, KS: Combat Studies Institute, 2008), 31.
35. ATP 3-06, 3-8, 3-9.
36. *Japanese Defense of Cities*, 6–7.
37. *Battle of the Barricades*, 37–38.
38. Alexander Smith, "Mosul Bridges Are Key to Liberating ISIS Stronghold," NBC News Online, retrieved from <https://www.nbcnews.com/storyline/isis-uncovered/mosul-bridges-are-key-liberating-isis-stronghold-n706566>.
39. *Japanese Defense of Cities*, 3–4.
40. Amos Fox, "What the Mosul Study Group Missed," Modern War Institute, retrieved from <https://mwi.usma.edu/mosul-study-group-missed/>.
41. Dan De Luce, Courtney Kube and Carol E. Lee, "Who will win in Ukraine? It could hinge on which side can secure enough artillery ammunition," NBC News Online, retrieved from [Who will win in Ukraine? It could hinge on which side can secure enough artillery ammunition \(nbcnews.com\)](https://www.nbcnews.com).
42. Russell Weigley, *Eisenhower's Lieutenants: The Campaigns in France and Germany, 1944–1945* (Bloomington: Indiana University Press, 1981), 249.

WHAT DOES THE WAR IN UKRAINE TELL US ABOUT URBAN WARFARE?

Anthony King

INTRODUCTION

On 24 February 2022, Russia invaded Ukraine. More than 190,000 Russian troops attacked Ukraine from the north, east and south. The first inter-state war on mainland Europe since the end of the Second World War (1939–1945) had begun. Against all expectations, the Ukrainian Armed Forces managed to hold off the initial assault, and the government led by President Volodymyr Zelensky remained in power. In December 2023, the war still rages. The Russian Armed Forces remain in control of most of Zaporizhzhia, Donetsk and Luhansk, but they have faced significant losses, with estimates suggesting that approximately 315,000 Russian soldiers have been killed or wounded.¹ Ukraine, despite suffering severe casualties, has exceeded expectations with Western support. It not only repelled the Russian invasion but was also well positioned to mount a counter-offensive. The success of that counter-offensive remains unclear, but the fact that the Ukrainians were even in a position to attack is remarkable. However, it is expected that the war will not be short.

The ongoing Russo–Ukrainian War remains the focus of intense professional and academic analysis. This brutal conflict is proving to be as important for observers as the Boer War (1899–1902) and the Russo–Japanese War (1905) were in the early twentieth century. It is replete with valuable lessons about the character of military operations, illustrating the importance of air power, maritime forces, cyber and electronic capabilities, artillery, armour and training. One of the most striking elements of the Russo–Ukrainian War has been its urbanized character. While there has been significant fighting in the field—for instance, in the hills around Bakhmut and the woods in the Kreminna area—what stands out is that military operations have consistently converged on urban areas, and that is where most of the major and most intense combat has occurred.

Source: Kyiv City State Administration

SINCE HALF THE WORLD'S POPULATION NOW LIVES IN URBAN AREAS, OFTEN IN DESPERATE CONDITIONS, IT IS NEARLY CERTAIN THAT CONFLICT AND WAR ARE MORE LIKELY TO TAKE PLACE IN URBAN AREAS.

Until now, the war has unfolded in five distinct phases: the invasion and the Battle of Kyiv (24 February to 1 April 2022), the struggle for the Donbas and the south (2 April to 28 August 2022), the first Ukrainian counter-attack (28 August to 11 November 2022), the winter campaign (12 November to 20 May 2022) and the Ukrainian counter-offensive (beginning on 20 May 2023). Each of those phases has been defined by a signature urban battle around which the military campaign has revolved.

In the war's opening phase, the Russians aimed to take Kyiv by a *coup de main* within the first days and thus precipitate the collapse of the Zelensky government. However, the Russian assault failed and an intense battle ensued around the city of Kyiv in the northern suburbs of Bucha and Irpen, and around Chernikiv and other satellite towns. The Russian forces suffered egregious losses in those engagements and were forced to retreat. The Battle of Kyiv emerged as a decisive point in the war, marking a defeat for Russian President Vladimir Putin and thwarting

PHASE	MAJOR OPERATIONS	SIGNATURE BATTLE
Phase 1: 24 February–1 April 2022	Invasion	Battle of Kyiv
Phase 2: 2 April – 29 August 2022	Russian Consolidation East and South	Battles of Mariupol/Severodonetsk
Phase 3: 30 August–9 November 2022	Kharkiv Counter-attack	Battle of Izyum
Phase 4: 12 November 2022–20 May 2023	Winter stasis: attrition in Donbas	Battle of Bakhmut
Phase 5: 21 May 2023–9 October 2023	Ukrainian Counter-offensive	Battle of Robotyne
Phase 6: 10 October 2023–?	Russian Counter-offensive	Battle of Avdiivka

Table 1: The Russo-Ukrainian War: Phases

his prime objective of achieving regime change in Ukraine. Urban fighting continued to shape the course of the Ukraine war in its second phase. Following their defeat around Kyiv, Russian commanders concentrated their forces in the Donbas and the south, and sought to seize Luhansk, Donetsk, Zaporizhzhia and Kherson. That led to a series of attritional urban fights in the spring and summer of 2022. The battles for Mariupol and Sieverdonetsk were the largest-scale and most intense combat during the second phase of the war, resulting in heavy casualties and the massive destruction of both cities, but there were many other battles, including Rubizhne. On 29 August, Ukrainian forces launched a counter-offensive, initially targeting Kherson and subsequently focusing on Kharkiv. The operation proved remarkably successful and, notably, it unfolded predominantly in urban areas. As in most cases, Russian forces ceded ground without a significant fight. In September, Russian troops abandoned the towns east of Kharkiv, including Izyum and Kupiansk. In early November, Russian troops withdrew from Kherson. The re-taking of Kherson, the only regional capital taken by the Russians, marked the end of the Ukrainian counter-offensive.

As winter set in, both sides faced the challenges of dwindling ammunition supplies and troop numbers, leading to a temporary stalemate as lines solidified. Nevertheless, even in the fourth phase, the war was defined by urban combat. Ukrainian forces focused on seizing Svatove and Kreminna, while the Wagner Group continued its brutal struggle for Bakhmut. That battle persisted until 20 May 2023, when Russian forces finally secured the town. On 4 June 2023, the Ukrainians launched their long-awaited counter-offensive, and the fighting remained intense throughout the summer. They attacked on three axes: to the east around Bakhmut, to the southeast from Velyka Novosilka, and to the south from Orikhiv. The new NATO-trained and -equipped brigades were employed in those operations. However, although the Ukrainian forces fought hard and bravely, and although they re-took some small parcels of terrain, they were unable to penetrate the Surovikin Line. There was some criticism of the Ukrainian forces and their approach: they failed to concentrate their forces and made some errors. Yet the counter-offensive was always going to be very difficult. The Ukrainians lacked air superiority; they were fighting with inexperienced forces; and they did not possess effective division- and corps-level headquarters with a cadre of professional staff officers to orchestrate the operation. The result was a series of small tactical battles, many of which were successful but none of which were decisive. However, even if the Ukrainians had succeeded in breaching Russian defensive lines, the offensive would likely have culminated in a major urban fight, possibly for Tokmak, Melitopol or Mariupol. The success of any counter-offensive would probably have been decided in an urban operation. The very fact that there was no major urban battle is very good

evidence that the counter-offensive did not succeed. Although the Russo-Ukrainian War goes beyond just urban battles, it can be characterized as an urbanized campaign. This raises questions about contemporary land warfare and prompts a re-evaluation of my previous analysis of urban warfare. In my 2021 book, *Urban Warfare in the Twenty-First Century*, I argued that urban warfare has become more prevalent in the twenty-first century, largely due to reduced military forces.² Not only does this increase the likelihood of urban combat, but in addition the urban battle has assumed a distinctive anatomy: the inner-urban micro-siege. At the same time, the localized siege has extended outward along political, economic and ethnic networks to recruit supporters across the global urban network, making the urban battle both localized and transnationalized. The question now is whether a similar battlescape is unfolding in Ukraine.³

This article is divided into three sections to address these questions. The first section explains why urban warfare has predominated in Ukraine, suggesting that reduced force size has played a more important role than the classic explanations of urbanization and asymmetry. The second section examines the siege-like character of urban battles in the Russo-Ukrainian War. In the third and final section, the article argues that while combat has occurred in small places like Rubizhne, the fighting has reverberated out across a global urban archipelago. Like other recent wars, urban battles in Ukraine have both localized and globalized, holding profound significance for military professionals.

WHY URBAN?

In the last 25 years, many scholars have identified two central factors contributing to the proliferation of urban warfare: demography and asymmetry. In the past 50 years, the urban population has exploded. In 1960, 0.5 billion out of 3.5 billion people lived in cities. By 2020, the world population had doubled to 7 billion, and 3.5 billion resided in cities or other urban areas.⁴ Since half the world's population now lives in urban areas, often in desperate conditions, it is inevitable that conflict and war are more likely to take place in urban areas.⁵ At the same time, urban terrain provides would-be insurgents/defenders with the best asymmetric opportunities against advanced state forces, including the challenge of identifying and targeting them in the complex, dense urban environment.⁶

The dual explanation for the surge in urban insurgency and civil conflicts in the twenty-first century seems to be effective. However, it falls short in clarifying why inter-state wars, like the Russo-Ukrainian War, have become heavily urbanized. At this point, a third variable, which has been overlooked, should be considered: the force size. In the twenty-first century, military forces are much smaller compared to the massive citizen armies of the twentieth century. Western state forces are now about half or a third of their Cold War size, and significantly smaller than during

the Second World War. For example, in 1945, the US Army possessed a strength of more than 8 million active duty military personnel (8,267,958 to be exact); in 1991 there were 731,700; and as of 30 September 2023 there were only 453,551.⁷ The forces of the West's opponents have suffered a similar contraction. The Russian army, at 290,000 in 2020, was approximately 20 percent of the size of the Soviet Army at the end of the Cold War (1.4 million soldiers).⁸ The reduction of forces may appear mundane, but it has fundamentally transformed the geometry of land warfare. In the twentieth century, mass armies were able to, and indeed had to, form large fronts against their equally large opponents. Those fronts often bisected entire countries and even regions, spanning hundreds of miles. Towns and cities punctuated those fronts and were often fought over. However, since the majority of combat power was concentrated in the field, most of the major battles of the twentieth century took place in the countryside, not in the towns. Naturally, the fact that urban areas were smaller in the past increased the likelihood that forces would engage each other in the field.

With the contraction of military forces, that campaign geometry has been inverted since the end of the Cold War. Because of the relatively limited number of troops, small twenty-first century armies cannot hold dense fronts. Consequently, they tend to converge on decisive locations: political centres, critical national infrastructure, economic centres, road and rail networks, bridges and junctions. As these key facilities are typically found in urban areas, forces converge on towns and cities: "battles materialize in urban areas because rail and highways converge in cities, and not in rural locations."⁹ Needless to say, strategic hubs are important, but even small urban areas become crucial operational objectives because roads and rail networks run through them. To advance a campaign, it is necessary to secure those junctions, and therefore the urban areas they are located in. As military forces have contracted, there has been a notable trend of actively converging on urban areas. Defenders seek to hold key terrain in those urban areas, while the attackers strive to capture them.

Following the reduction of military forces, we should expect to see increased fighting in and around urban areas. Consequently, whether a theatre is particularly urbanized or not, urban combat is likely to increase, even in inter-state war.

The Russo-Ukrainian War strongly affirms this thesis. Although Ukraine has some major cities, including Kyiv (with a population of 3 million) and Kharkiv (1 million), it is primarily a vast rural country spanning over 600,000 square kilometres. Based on the topography alone, it was not self-evident that urban fighting in Ukraine would predominate. As Rubizhne shows, many of the most intense urban battles have occurred in relatively small settlements rather than in the larger cities, except for the

Battle of Kyiv itself. This might seem strange or anomalous. Examining the force size helps us understand why the combatants in Ukraine have converged on cities. It is useful here to compare the ongoing war in Ukraine with the Red Army campaign during the Second World War. When the USSR drove the Wehrmacht out of Ukraine in 1943–44, it fielded some 3 million troops, organized into 20 armies. Notably, in 1941, the Wehrmacht had invaded Ukraine with 3 million troops and sought to defend it with about 700,000. At the fourth battle of Kharkov/Belgorod-Kharkov in August 1943, fought over some of the same terrain as the current war, the Red Army deployed 1.2 million troops against a German force of 200,000. The sheer size of the Red Army and the Wehrmacht meant that their forces created a continuous and densely held front from the Black Sea to Russia. During 1943–44, although there was fighting in towns like Kharkiv (or Kharkov as it was then known) and Kyiv, the vast majority of combat forces were in the field on the front, and that led to large-scale battles.

This situation contrasts significantly with the way in which Russian and Ukrainian forces are currently deployed. In February 2022, Russia initially deployed some 190,000 troops—approximately 150,000 combat troops—in about 100 battalion tactical groups (BTG) into Ukraine.¹⁰ By May, the Russians had deployed 146 BTGs, with 93 actively engaged in Ukraine.¹¹ With mobilization and proxy reinforcement following heavy losses, Russia probably (at the time of writing) has about 150,000 to 200,000 combat troops in the theatre. Ukraine initially had an army of about 120,000, and its frontline combat forces were much less numerous. To repel Russia's initial attack, Ukraine used five spearhead brigades, totalling about 30,000 troops. The counter-offensive of 2023 was conducted by about twelve brigades, perhaps 60,000 troops.¹² The Ukrainian Army is currently (at the time of writing) about 200,000 strong,¹³ with 500,000 local militia, but only a fraction of them have been engaged in offensive action. While these forces may appear objectively large, they are diminutive by Second World War standards. The Russian Army that invaded Ukraine in 2022 was about 6 percent of the size of the Red Army in Ukraine in 1943–44. Together, the two combatants currently have about 250,000 soldiers on the ground which is only about 7 percent of their total in-theatre forces in the Second World War. Ukrainian and Russian forces are simply not numerous enough to form the fronts which typified the Second World War. Consequently, these smaller forces have been compelled to concentrate on decisive terrain, which is found not on fronts in the fields but in urban areas.

As a direct result of their size, during the first and second phases of the war, Ukrainian forces concentrated on and in urban areas, where critical strategic, operational and tactical objectives were located. This was not the original plan for the Ukrainian Armed Forces. Initially, they

expected Putin to target the Donbas, so they positioned ten brigades and their best troops in the Joint Forces Operations Area in the east. However, when the invasion unfolded and Russian intentions became clear, several brigades were transferred rapidly to Kyiv.¹⁴ They defended Kyiv and its environs because it was a critical strategic objective for Putin. Additionally, they held on to Mariupol and Sieverodonetsk for as long as possible to slow the Russians' advance and attrit their forces. The Ukrainians recognized the operational significance of these cities: the Russians needed to clear the Black Sea coast and had to take Mariupol as an important port. They could not advance further into Luhansk and Donetsk without having secured Sieverodonetsk and its road system. Russian logistics relied on it. As Amos Fox has noted: "Russia, for instance, requires significant railroad exchange points and depots because its logistics network is built on a non-palletized bulk supply distribution system.... At those distribution points, Russian supplies are manually downloaded, sorted, and either repackaged and reloaded for movement to further frontline units, or collected to form field depots."¹⁵ Inevitably, Russian and Ukrainian forces both converged on urban areas, turning the war into a series of gruelling sieges.

In my book *Urban Warfare in the Twenty-First Century*, drawing on the available evidence from the civil wars and insurgencies of the last two decades, I claimed that fighting had taken and would take place predominantly within urban areas.¹⁶ It must be acknowledged that, compared to Libya, the Philippines, the Syrian Civil War and the war against ISIS, there has been much more fighting in the field in Ukraine. For instance, Ukrainian and Russian forces struggled intensely in Bakhmut from November 2022 to May 2023, during which time that combat destroyed or damaged much of the town. Yet trench warfare also occurred in the countryside around Bakhmut, with struggles for a series of localized positions and around villages, especially to the north of the town in the winter of 2022–23. Similarly, the battle of Lyman was substantially decided by Russian operations outside the town. While military operations in Ukraine have converged on urban areas, a notable amount of fighting has still taken place in the field. Therefore, an important revision to my argument is required.

There are several reasons why there has been more field combat in Ukraine than in Syria or Iraq. In the Donbas, the war has been fought over small towns of 100,000 or fewer people: Bakhmut has a population of 73,000; Rubizhne 56,000; Sieverodonetsk 100,000; Lysychansk 100,000; and Lyman 20,000. Consequently, although those towns have become important operational objectives with intense close urban fighting inside them, the localized fronts have also often extended into the nearby fields. Because these urban areas are so small, Russian forces have been sufficiently sized to try to envelop them, compromising Ukrainian defences within the towns. The fighting on those mini-fronts outside the towns

has certainly been rural. However, that combat has been an adjunct to an urban operation, and the fighting seeks to gain an advantage in terms of the urban objective. By contrast, in Syria and Iraq, fighting typically took place in much larger cities like Aleppo, Raqqa and Mosul. The insurgent forces in those areas were also much smaller. For instance, in Mosul, a city with a population of 1.5 million, ISIS deployed about 6,000 fighters. Defending Mosul from outside the town with such a force was impractical, leading ISIS to concede freedom of movement to the Iraqi Army and fight from within the city itself.

It must be underscored that, because of the small size of urban areas in the Donbas, and the fact that Russia and Ukraine have fielded more troops than insurgent groups in Syria and Iraq, more field fighting has taken place in Ukraine than I suggested in *Urban Warfare in the Twenty-First Century*. But even so, the Russo–Ukrainian War broadly supports the thesis I put forth in my book. As military forces contract, they are gravitating toward urban areas where the key terrain is located. In the Russo–Ukrainian War, the fighting has indeed concentrated on towns and cities, but significant combat has also taken place in the fields surrounding those urban areas.

LOCALIZATION

Due to their limited troop numbers, the Ukrainian and Russian armies have principally engaged each other in and around urban areas. However, the diminutive size of their forces has also influenced the character of their urban battles. In the twentieth century, manoeuvre was a central principle of land warfare. Armies discovered that the most effective way of achieving military success in the field was to try and manoeuvre against the enemy, disrupt its front line and then attack its flank or rear. This proved difficult for much of the Great War (1914–1918) on the Isonzo and Western fronts, but the invention of tanks in 1917 and the development of new operational and tactical concepts helped armies become proficient at manoeuvre in the field. The Second World War saw significant stasis at certain points, but overall, the war was defined by manoeuvre, not position. Throughout the Cold War, armies still aspired to manoeuvre, as seen with the Yom Kippur War (1973) and the Gulf War (1990–1991).

The Russo–Ukrainian War has taken on a notably different form. There have been limited opportunities for manoeuvring. The Russians managed to seize Kherson without facing a significant fight, but the Ukrainians executed a very successful counter-offensive, retaking Kherson and a large area around Kharkiv from September to November 2022. Although manoeuvre played a role in those operations, it has been overshadowed elsewhere by positional warfare. In the first phase of the war, the Russian Army tried to take Kyiv by a *coup de main* operation in February and March involving strategic- and operational-level manoeuvre. They seized Hostomel Airport

Because these urban areas are so small, Russian forces have been sufficiently sized to try to envelop them, compromising Ukrainian defences within the towns.



Source: mvs.gov.ua

in a heliborne assault; however, the attack was repulsed, resulting in the failure of manoeuvre. Since then, the Russians have shifted their focus away from manoeuvre warfare, instead engaging in the gradual reduction of Ukrainian urban strongholds, particularly in the Donbas.

Throughout the Russo–Ukrainian War, position, not manoeuvre, has been primary. Consequently, defence has taken precedence. Operating from fortified positions, Ukrainian forces have attrited Russian forces in close battle. They have created kill-boxes outside urban areas, engaging and eliminating enemy forces at a distance through deep ground fires and airstrikes, including highly

effective uses of uncrewed air vehicles (UAV). Urban areas have also provided a base for special operations forces raids and counter-attacks. During the first and second phases of the war, special operations forces, equipped with next-generation light anti-tank weapons or Javelin anti-tank missiles mounted on light vehicles, proved to be highly effective in attriting Russian forces as they approached urban areas.¹⁷ Following the failed *coup de main* operation, the Russians shifted to a technique—reducing urban strongholds by slow, deliberate operations—reminiscent of their approach during the battles of Grozny in 1994–1995 and 1999–2000. They relied on massive firepower to reduce Ukrainian defences

before sending in troops to seize defensive positions.¹⁸ In Mariupol, for example, the Russians destroyed around 90 percent of the city, according to the mayor.¹⁹ Their attrition method was used particularly on Sieverodonetsk in June and July, when they damaged 80 percent of the structures in the town and destroyed much of it.²⁰

The Battle of Rubizhne, fought from 15 March to 12 May 2022, when Russian forces eventually took the town, is now all but forgotten, but it provides a useful example of the character of inner urban micro-siege during this war. It accords almost exactly with the argument in my book. Rubizhne might seem an unlikely place for a major urban battle. Situated on the left bank of the Severi Donets river, less than five kilometres northwest of Sieverodonetsk in Luhansk Oblast, it has had an undistinguished history, apart from housing a Nazi police headquarters in the Second World War. A relatively new town, it was originally founded in 1904 as a railway station and was incorporated as a city in 1934. In 2021, Rubizhne had a population of approximately 56,000. Probably its most distinctive feature was the large high-rises of the Luhansk Medical School on the northwestern edge of the town, while the rest of the town consisted of low-rise residential housing, businesses and facilities.

A Russian soldier's Google-translated account of the Battle of Rubizhne, "Fighting for Rubizhne: How was it?" was posted on Twitter by @Ich_Bryan.²¹ The soldier described how his mechanized battalion was ambushed by Ukraine artillery fire as it approached the town, resulting in the killing of 200 soldiers. Assuming that the Ukrainians would defend the apartment blocks of the medical school in the north of the town, his battalion attacked those buildings, only to discover that the Ukrainians had fortified themselves into concrete garages in the southeast. He described the intense and desperate fighting to drive the Ukrainians out, leading to the decimation of his battalion in the process. In retaliation, Ukrainian forces launched a counter-attack using tanks to inflict more casualties on the Russian forces. A small Ukrainian force effectively utilized urban terrain to destroy a mechanized brigade and delay the Russian advance; it took the Russians six weeks to take the town.

The Battle of Bakhmut stands out as the longest and most brutal urban conflict in the Russo-Ukrainian War, demonstrating the brutal attrition of urban warfare. However, it also serves as a useful illustration of why fighting in the field around urban areas has been an important part of the war in Ukraine. This suggests a potential revision to my initial thesis. Bakhmut, an industrial city situated on the Bakhmuta river in eastern Luhansk, is similar in some ways to Sieverodonetsk and Soledar. The eastern side of Bakhmut is a suburban residential area consisting of low-rise homes, while the western part is more densely populated, featuring

nine-storey apartment buildings and several large industrial plants, many with basements. Consequently, the town, which is bisected by a river whose bridges were blown up by the Ukrainians, contained some excellent structures for defence. However, Bakhmut sits in a bowl; it is surrounded by hills whose occupation compromised defensive positions in the city. Michael Kofman has even suggested that in Bakhmut, "the key was on the flanks."²²

In May 2022, Russian forces attempted a grand but unsuccessful assault on Bakhmut as part of a larger effort to encircle Ukrainian forces in the Slovyansk Pocket. Failing in that endeavour, they began a serious, more focused limited offensive against Bakhmut in November 2022. Since the M-03 and H-32 highways run through or near the town, from which the E-40 is accessible, it was vital to seize the town in order to advance on Krematorsk and Slovyansk.²³ It would have been unthinkable for the Russian forces to annex Luhansk Oblast without taking Bakhmut. Both Russian and Ukrainian forces had compelling operational reasons to either seize or defend Bakhmut. The town also assumed a political and symbolic significance in the course of the fighting for both sides. Disagreements within the Ukrainian high command led to debates about whether to hold Bakhmut, with reported advice from the U.S. urging withdrawal to minimize casualties and avoid encirclement. General Syrski argued for Bakhmut's defence, emphasizing that it was a useful way of attriting enemy forces. Similarly, the Russians believed they could fix and destroy Ukrainian forces there. For Ukraine, the town became a means of inflicting casualties on the Russians, resulting in a favourable exchange rate where Russia lost 4.5 to 7 soldiers for every Ukrainian casualty. In light of the Ukrainian counter-offensive and the Wagner mutiny, the decision to hold Bakhmut and use it as a way of inflicting casualties on the Russians seems to have been sound.

In contrast to the battle of Kyiv, where approximately 3,000 Ukrainian troops, aided by armed civilians and irregulars, successfully repelled about 15,000 Russians, the fighting in Bakhmut saw the convergence of much larger forces. The Ukrainians eventually deployed about five brigades into the town and its environs, totalling about 20,000 troops. The Russians outnumbered them, likely deploying 30,000 to 40,000 soldiers onto the front at any one time. In March, American General Mark Milley claimed that the Wagner Group had deployed 6,000 professionals and 20,000 to 30,000 conscripts. There was heavy and constant fighting inside Bakhmut itself from November 2022 to May 2023. That noted, the substantial size of the forces made it impractical to confine the fighting solely within the town, especially considering its location in the bottom of a valley. As a result, lines extended outward from town, especially to the hills in the north, where there was intense fighting. It was crucial for the Ukrainians to prevent an encirclement of the town. Notably, on 24–25 October,

it was reported that the Wagner Group had incurred 55 percent of all its casualties in October when its attacks to the east of the town failed. In December 2022, approximately 1,000 Wagner fighters were killed around Bakhmut.²⁴

While regular Russian troops, including airborne forces, were deployed in Bakhmut, fighting primarily on the flanks of the town, the bulk of the fighting was conducted by the Wagner Group. Indeed, they were guilty of grotesque atrocities, including decapitating Ukrainian soldiers and murdering their own members with hammers. In the course of the battle, the Wagner Group was divided into two separate forces. The first force consisted of its skilled and trained fighters, while the second element comprised conscripted criminals, recruited from Russian prisons. Yevgeny Prigozhin, Wagner's former commander, employed those troops in different ways. The conscripts were employed more or less as cannon fodder, reputedly in human wave attacks. They were not sent forward *en masse*, but in small, expendable groups. Those bloody advances wore the Ukrainians down and revealed their positions.²⁵ Only then would the skilled, trained Wagner fighters be sent forward in deliberate attacks. Those skilled troops developed their tactics during the battle, especially for the fighting inside Bakhmut. They formed themselves into combined arms storm detachments of approximately 50 soldiers, with two assault groups, one fire support group and a reserve. The Russians used large numbers of UAVs to support those attacks, as did the Ukrainians to repel them. The Wagner groups fought both around the flanks of Bakhmut, trying to seize the high ground, and inside the town itself, gradually reducing Ukrainian fortified positions within it. Those attacks were supported by significantly heavy artillery fire: initially 152-mm howitzers, followed by 122-mm or 120-mm mortar fire.²⁶ Following those intense bombardments, the Wagner Group mercenaries, sometimes alongside airborne troops, advanced.

In the town, the Wagner troops relied heavily on massive artillery bombardments to take the east bank of the river in December and January, and then, from February 2023, the western part of the town. From late 2022, the disputes between Prigozhin and Russian generals centred on artillery support, reflecting the Russian reliance on firepower to break down Ukrainian defences. General Surovikin had initially favoured Prigozhin and his Wagner Groups in their assaults on the town, but from February, regular Russian forces were given the priority. Perhaps due to the elevated terrain or the town's topography, the battle of Bakhmut saw limited involvement of tanks, but both factions deployed numerous infantry fighting vehicles. In May 2023, the Wagner Group and the Russian military declared victory, having secured the town from which the Ukrainians were forced to withdraw. However, the victory came at a high cost, with reported casualties of 20,000 Wagner mercenaries and President Biden

claiming 100,000 Russian casualties in Bakhmut.²⁷ It is difficult to ascertain the exact total of Russian casualties in the battle, but it was notably high. As demonstrated by the Wagner mutiny in June 2023, the battle put the Russian command structure under intense pressure.

The Russo-Ukrainian War suggests that because land operations have become urban-centric, the traditional advantages of manoeuvres have given way to the priority of urban defence.²⁸ In this way, contemporary warfare is returning to a pattern observed in the early modern period when battles in the field occurred regularly but siege warfare, not open battle, was the dominant and most common form of warfare. Additionally, campaigns were organized around fortresses and fortified cities.²⁹ The Russo-Ukrainian War has been shaped by a comparable geometry, with a primary emphasis on position and defence anchored in urban areas.

GLOBALIZATION

As forces have contracted, they have necessarily converged on key objectives, almost inevitably located in urban areas. In Ukraine, both sides have been compelled to fight for, and in, urban areas, where a series of inner-urban micro-sieges have developed. The combat has localized in and around urban centres. Yet this is by no means the entire story of urban warfare in the twenty-first century, or of the war in Ukraine.

In the twenty-first century, cities have expanded and become more interconnected and heterogenous. Urban areas have become complex transnational entities. As aptly noted by Ash Amin and Nigel Thrift, "So extensive have the city's connections become as a result of the growth of fast communications, global flows, and linkage into national and international institutional life that the city needs theorization as a site of local-global connectivity."³⁰ While cities have historically engaged in trade with one another, contemporary cities are deeply integrated into global networks of finances, services and people. Urban settlements have been drawn into an intensifying transnational nexus of informational connectivity and social interconnections. As a result of these global flows, cities have become ethnically heterogenous. In the twentieth century, cities typically contained a majority population and some minority communities; after all, the first "ghetto" was the Jewish quarter in medieval Venice.³¹ Yet, today, cities do not merely include ethnic minorities; they are often radically diverse.³²

The modern urban landscape in the twenty-first century may seem a long way from the Russo-Ukrainian War but, in reality, globalization and the rise of transnational urban ethnic connections have been significant features of contemporary conflicts. In the Syrian civil war and the war against ISIS, even as combatants struggled for



Source: dsns.gov.ua

control of urban areas, they actively sought to engage with diasporas across the world. ISIS provided the most striking example of this process. At the time when ISIS was being defeated in Mosul in 2017, terrorist groups launched a major military operation occurring some 5,000 miles (about 8,000 km) away in the southern Philippines at Marawi on the island of Mindanao. The ISIS-affiliated Abu Sayyaf Group, led by Isnilon Hapilon, and its allied Maute Clan attacked Marawi, seizing important buildings in the centre of the city on 23 May 2017.³³ In hindsight, the attack was seen as a global counter-strike for ISIS in response to the attacks on Mosul—and the group’s imminent defeat there. Supporters of ISIS sought to unite two urban battles in a global campaign through strategic communications: graffiti in Marawi, photographed and uploaded onto social media, optimistically declared “An Islamic State of the World.”³⁴

During the Russo–Ukrainian War, neither Russian nor Ukrainian forces have initiated military operations in cities located in third countries. Nevertheless, the conflict has

reverberated out across a global urban network as evident in the mobilization of political supporters and ethnic diasporas in other cities. Acts of sabotage and several assassinations have occurred in towns and cities not directly involved in the conflict. Since June, there have been a number of attacks on Russia. For instance, Daria Dugina, the daughter of a prominent Russian nationalist, was assassinated by a car bomb in Moscow on 5 October, apparently by Ukrainian agents. The U.S. disavowed the attack and reprimanded the Ukrainians for it.³⁵ There have also been several attacks on the Russian railway system, including one at Novozybkovo in the Belgorod region.³⁶ In an apparent response, the Russians mounted a cyber-attack on the Deutsche Bahn, Germany’s national railway company, on 8 October, disrupting its services.

In 2023, Ukraine intensified its attacks on Russian cities, with the so-called Russian Resistance Volunteers mounting a series of raids across the border around Bolgorod in May, including the Bryansk Raid in Bolgorod. Most strikingly, the Ukrainians began to target Moscow itself. Major General Kyrylo Budanov, a senior military intelligence officer involved in covert operations against the Russians, has orchestrated many of the attacks. Leaked documents reveal that he had planned an attack on Moscow on the anniversary of the invasion which the CIA denied.³⁷ It seems likely that he may have subsequently ordered a UAV strike against the Kremlin on 3 May 2023 which is now widely attributed to Ukraine, even though it has never admitted responsibility. Two Ukrainian UAVs, likely Mugin 5’s, attacked the Kremlin at night, causing minimal physical damage but symbolizing the potential vulnerability of Russian air defences and bringing the war home to Russia. On 29 May, Ukraine mounted its first large-scale UAV attacks on Moscow with about 30 UJ-22 UAVs targeting the city. Most were intercepted, but some exploded in residential neighbourhoods in southeastern Moscow, injuring some residents. With these attacks, Ukrainians are transnationalizing the war, drawing Russian cities into the conflict in retaliation for the bombardment of their towns and cities.

Physical attacks like the Bolgorod raid or the UAV attacks on Moscow have been small and infrequent. However, both Russians and Ukrainians have conducted systematic information campaigns. Amidst the ongoing battles in and for Ukrainian towns and cities, both sides actively strive to address, engage, mobilize and recruit support from the global urban archipelago. Russia and Ukraine have conducted extensive information operations across Europe and worldwide to advance their objectives. The Ukrainian government, armed forces and people have been very successful in these operations. From the very beginning of the war, they have conducted a sophisticated information operation, seeking to generate and sustain Western support. The tweet posted by @Ich_Bryan about

the Battle of Rubizhne on 2 May can be seen as part of this transnational strategy. The Ukrainians have been adept at releasing footage highlighting Russian defeats and atrocities, while carefully concealing their own casualties.

Significantly, Ukraine's strategic communications have primarily targeted Western governments. However, they have also sought to address Western citizens and activate the Ukrainian diaspora across Europe. This approach has effectively linked the war in Ukraine's cities with cities across the continent. The sanctioning of Roman Abramovich, in London, while the Battle of Kyiv was raging in Ukraine, was an example of these trans-urban interconnections. London has long been a preferred refuge for Russian oligarchs since the fall of the Soviet Union, thanks to lenient financial regulations. Financial regulations in Britain were liberal, even lax, and successive British governments failed to investigate the origins of Russian capital or the political affiliations of Russian plutocrats. Consequently, Russian elites invested in the city, purchased property in London, and, in some cases, moved to the city. In many cases, Russian elites used the City of London to launder criminal money. Although moderate in comparison with some of his peers, Roman Abramovich, who amassed substantial wealth by "buying" a former Russian state oil company, was a close ally of Putin. Putin had also appointed him as the governor of Chukotka in Siberia between 2004 and 2008. In 2003, he bought Chelsea Football Club, investing millions of pounds of his personal wealth into the club. Following the Russian invasion, the British government finally took action against Russian elites in London.³⁸ Many assets were frozen; and Abramovich himself was sanctioned. He was forced to sell Chelsea Football Club in March 2022, as the Battle of Kyiv was reaching its conclusion.³⁹

While the Abramovich situation may seem insignificant compared to the conflict in Ukraine, it is intimately connected to the Russo-Ukrainian War and should be viewed as a part of the same conflict. It illustrates the unlikely interconnection between two capitals, Kyiv and London. In the first phase of the war, even while the Ukrainian government was physically defending Kyiv, its Western allies were repulsing Putin's supporters from their own cities. The processes of military ejection in Ukraine and legal expulsion in Europe were plainly different. Yet they formed part of a transnational defence of Ukraine centred in urban areas in which lucrative urban enclaves in western Europe had finally been fortified against Russian elites.

CONCLUSION

The Russo-Ukrainian War is an ongoing conflict that is expected to persist for months, possibly years, and could even descend into an enduring standoff as characterized by the war in the Donbas after 2015. It would be premature and inadvisable to draw any final conclusions from it at this point. However, two years after the invasion of Ukraine,

the war is deeply instructive and offers valuable insights. The Russo-Ukrainian War may exemplify the character of land warfare in the twenty-first century. It has involved a leading military power, employing its most sophisticated weapons, against an increasingly capable one, intimately supported by the West. It has become a war between two major state forces. By August 2022, the Ukrainian armed forces had become a sophisticated, very well-equipped state military. The Russo-Ukrainian War therefore provides extensive evidence about the character of inter-state war today.

The geometry of this war has perhaps been unexpectedly intriguing and surprising. Despite the extensive use of precision weaponry, digital targeting systems, UAVs, cyber and electronic warfare, the war has been defined by a series of attritional battles in and around the town and cities of Ukraine. Those sieges seem more reminiscent of medieval warfare than the visions of autonomous, algorithmic, remote warfare which many had proposed. This is a war fought at glacial and not hypersonic speed.

As urban battles have played a significant role in the Russo-Ukrainian War, the conflict is not primarily defined by rapid, machine-assisted strike and manoeuvre but rather by slow, attritional operations. Ukrainian forces have defended urban strongholds, while Russian forces have attempted to displace them, leading to a series of gruelling urban battles. The literature predicted an increase in urban combat because of the expansion of cities and the asymmetric advantage they offer non-state forces. Despite advanced communication, command, and targeting systems, as well as precise weaponry, battles in urban areas have turned into bitter struggles for territory, with sieges becoming the norm. Surprisingly, high-intensity warfare, as seen in Ukraine, is characterized by slow, grinding, destructive campaigns, challenging the idea of rapid, frictionless, precision strikes and manoeuvre. If Ukraine is any indication, the future of warfare will involve positional urban battle.

The Ukrainian counter-offensive, which began on 4 June 2023, has progressed slowly, with the Ukrainians reclaiming some territory but facing challenges in penetrating Russia's main defensive lines. It is possible that the Russian forces will collapse again, but it seems less likely than what was previously anticipated. The Russians had months to prepare defensive positions. It is almost certain that Ukrainian forces will have to re-take an urban area from Russian troops determined to hold their positions. In the coming times, Ukrainians will likely have to capture a significant urban target currently held by the Russians—a place like Svatove, Luhansk, Tokmak, Melitopol or Mariupol. Ukrainian commanders will surely have recognized the importance of urban hubs in their defensive systems, especially as they will be confronted with the same operational problem as the Russians have been for the last year. At this point, it will be difficult to reproduce the startling manoeuvre that they executed brilliantly in the

autumn of 2022. The tanks the Ukrainian Army is requesting are more likely to be used for breaking down Russian urbanized defences than for the sweeping armoured manoeuvres which typified the twentieth century.

In 2024, the Russo–Ukrainian War is likely to affirm the trajectory and pattern of land warfare it has already demonstrated. The future battles of this war are likely to involve attritional battles for position in and around key towns and cities. Just as in 2022 and 2023, the war is likely to be defined by the siege. This war underscores the idea that despite the remarkable digital technologies with which military forces are now equipped, combat itself has become localized into a series of attritional urban fights, which simultaneously resonate out across a global archipelago. The Russo–Ukrainian War illustrates the dual nature of warfare in the twenty-first century—localized yet globalized. 🍁

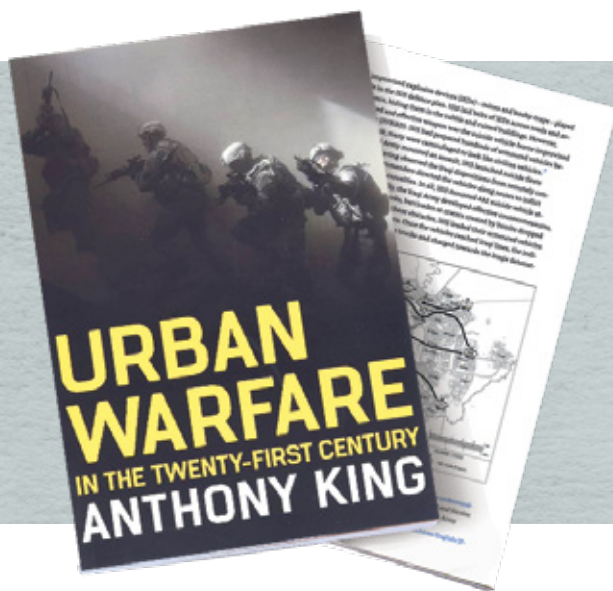
ABOUT THE AUTHOR

Anthony King is Professor of Strategic Studies and Director of the Strategy and Security Institute at the University of Exeter. His most recent book, *Urban Warfare in the Twenty-First Century*, was published by Polity Press in 2021. A second revised edition will be published in 2024. He currently holds a Leverhulme Major Research Fellowship and is writing a book on artificial intelligence and military transformation for Princeton University Press which will be published in 2025.

ENDNOTES

1. Jonathan Landay, "U.S. intelligence assesses Ukraine war has cost Russia 315,000 casualties – source," Reuters, 12 December 2023, <https://www.reuters.com/world/us-intelligence-assesses-ukraine-war-has-cost-russia-315000-casualties-source-2023-12-12/>.
2. Anthony King, *Urban Warfare in the Twenty-First Century* (Cambridge: Polity, 2021).
3. See Amos Fox, "The Russo-Ukrainian War and the Principles of Urban Operations," *Small Wars Journal* (11 October 2022), <https://smallwarsjournal.com/jrnl/art/russo-ukrainian-war-and-principles-urban-operations>.
4. Ibid.
5. For example, John Spencer and Liam Collins, *Understanding Urban Warfare* (Havant: Howgate, 2022); Alice Hills, *Future Wars in Cities: Re-Thinking a Liberal Dilemma* (London: Frank Cass, 2004), 16–26; David Kilcullen, *Out of the Mountains* (London: Hurst and Company, 2013); Russell Glenn, *Combat in Hell: A Consideration of Constrained Urban Warfare* (Santa Monica, CA: Rand Arroyo Centre, 1996), 2; Gregory Ashworth, *War and the City* (London: Routledge, 1991); Michael Desch "Why MOUT Now?" in *Soldiers in Cities: Military Operations on Urban Terrain*, ed. Michael Desch (Carlisle, PA: Strategic Studies Institute, 2001); Sean Edwards, *Mars Unmasked: The Changing Face of Urban Operations* (New York: Rand, 2000); Louis DiMarco, *Concrete Hell: Urban Warfare from Stalingrad to Iraq* (Osprey, 2012); Alec Wahlman, *Storming the City* (Denton, TX: University of North Texas Press, 2015), 1–2.
6. Kilcullen, *Out of the Mountains*; Frank Hoffman, "Complex Irregular Warfare: The Next Revolution in Military Affairs," *Orbis: A Journal of World Affairs* 50/3 (Summer 2006), 395–411.
7. Defense Manpower Data Center, Department of Defense, 30 September 2023, accessed on 18 November 2023, <https://dwdm.dmdc.osd.mil/dwp/app/dod-data-reports/workforce-reports>.
8. International Institute for Strategic Studies, *The Military Balance 1991*; International Institute for Strategic Studies, *The Military Balance 2020*.
9. Fox, "The Russo-Ukrainian War and the Principles of Urban Operations."
10. Mykhaylo Zabrodskyi, Jack Watling, Oleksandr Danylyuk and Nick Reynolds, *Preliminary Lessons in Conventional Warfighting from Russia's Invasion of Ukraine: February–July 2022*, Royal United Services Institute, 35.
11. Ibid., 13–14.
12. Gustav Gressel, "The second year of Russia's war: Scenarios for the Ukraine conflict in 2023," European Council on Foreign Relations, 7 February 2023, <https://ecfr.eu/article/the-second-year-of-russias-war-scenarios-for-the-ukraine-conflict-in-2023/>.
13. Luke Harding, "Has the Ukrainian counteroffensive begun in its war with Russia?" *The Guardian*, 5 June 2023, <https://www.theguardian.com/world/2023/jun/05/has-the-ukrainian-counteroffensive-begun-in-its-war-with-russia>.
14. Ellie Cook, "Is Ukraine's Army Now the Best in the World? Major Countries Compared," *Newsweek*, 01 April 2023, <https://www.newsweek.com/ukraine-army-best-world-compared-russia-us-military-china-1791441>.
15. Zabrodskyi et al., *Preliminary Lessons in Conventional Warfighting*, 35.
16. Fox, "The Russo-Ukrainian War and the Principles of Urban Operations."
17. Asher McShane, "Russian Convoy Blitzed near Kyiv by Ukrainian Troops Armed with Brit Anti-Tank Weapons," *LBC*, 2 March 2022, <https://www.lbc.co.uk/news/russian-convoy-blitzed-by-ukrainian-troops-armed-with-brit-anti-tank-weapons/>.

18. Timothy Thomas, "The 31 December 1994–8 February 1995 Battle for Grozny," in *Block by Block*, ed. William Robertson (Ft Leavenworth, KS: US ACGS College Press, 2003); Pavel Baev, "Russia's airpower in the Chechen war: Denial, punishment and defeat," *Journal of Slavic Military Studies* 10(2) (1997), 1–18.
19. Agence France-Presse, "Mariupol Mayor Says City '90 Percent' Destroyed Following Siege of over a Month," *The Times of Israel*, 4 April 2022, <https://www.timesofisrael.com/mariupol-mayor-says-city-90-percent-destroyed-following-siege-of-over-a-month/>.
20. Verity Bowman and Roland Oliphant, "Ukrainian Troops Forced to Retreat from 'Smashed to Pieces' Severodonetsk," *The Telegraph*, 24 June 2022, <https://www.telegraph.co.uk/world-news/2022/06/24/ukrainian-troops-forced-retreat-smashed-pieces-severodonetsk/>.
21. Бои за Рубежное. Как это было [Battles for Rubizhne. How it was], *Live Journal*, 26 April 2022, <https://leon-spb67.livejournal.com/1457295.html>, accessed on 19 December 2023.
22. John Spencer, "The Battle of Bakhmut," *Modern War Institute*, 17 March 2023, <https://mwi.westpoint.edu/the-battle-of-bakhmut/>.<https://mwi.westpoint.edu/the-battle-of-bakhmut/>.
23. Kateryna Stepanenko, "The Kremlin's Pyrrhic Victory in Bakhmut: A Retrospective on the Battle for Bakhmut," Institute for the Study of War, 24 May 2023, <https://www.understandingwar.org/sites/default/files/A%20Retrospective%20on%20Bakhmut%20PDF.pdf>
24. Ibid.
25. Jack Watling and Nick Reynolds, *Meatgrinder: Russian Tactics in the Second Year of its Invasion of Ukraine* (London: Royal United Services Institute, 2023).
26. Ibid.
27. Stepanenko, "The Kremlin's Pyrrhic Victory in Bakhmut."
28. Amos Fox, "The re-emergence of the siege: an assessment of the trends in modern land warfare," *Association of the US Army*, 3 July 2018, <https://www.ausa.org/publications/reemergence-siege-assessment-trends-modern-land-warfare>; Amos Fox, "'Cyborgs at Little Stalingrad': A Brief History of the Battles of the Donetsk Airport 26 May 2014 to 21 January 2015," Institute of Land Warfare, May 2019, <https://www.ausa.org/sites/default/files/publications/LWP-125-Cyborgs-at-Little-Stalingrad-A-Brief-History-of-the-Battle-of-the-Donetsk-Airport.pdf>.
29. Christopher Duffy, *The Fortress in the Age of Vauban and Frederick the Great, 1660-1789, Volume II* (London: Routledge and Kegan Paul, 1985); Christopher Duffy, *Siege Warfare* (London: Routledge and Kegan Paul, 1979); David Chandler, *The Art of Warfare in the Age of Marlborough* (Staplehurst: Spellmount, 1990); Jamel Ostwald, *Vauban Under Siege* (Boston: Brill, 2007); Anke Fischer-Kattner and Jamel Ostwald (ed.) *The World of the Siege* (Leiden Boston: Brill 2019), 1.
30. Ash Amin and Nigel Thrift, *Cities: Reimagining the Urban* (Oxford: Blackwell, 2001), 26.
31. Louis Wirth, *The Ghetto* (Chicago: University of Chicago Press, 1956).
32. Neil Brenner and Christian Schmid, "Towards a new epistemology of the urban?" *City* 19, 2/3 (2015), 170.
33. Charles Knight and Katja Theodorakis, *Special Report: The Marawi Crisis – Urban Conflict and Information Operations* (Barton, ACT: Australian Strategic Policy Institute Ltd, 2019); James Lewis, "The Battle of Marawi: Small team lessons learned from the close fight," *The Cove* (26 November 2018).
34. King, *Urban Warfare in the Twenty-First Century*, 130; Robert Postings, "Passport to Jihad: European foreign fighters joining ISIS in Philippines," *Defence Post*, 18 September 2018, <https://www.thedefensepost.com/2018/09/12/philippines-isis-foreign-fighters-europe/>.
35. Julian E. Barnes, Adam Goldman, Adam Entous and Michael Schwirtz, "U.S. Believes Ukrainians Were Behind an Assassination in Russia," *The New York Times*, 5 October 2022, <https://www.nytimes.com/2022/10/05/us/politics/ukraine-russia-dugina-assassination.html>.
36. Michael Drummond, "Russian Anti-War Group Blow up Rail Track in Attempt to Derail Ukraine Invasion," *Sky News*, 27 October 2022, <https://news.sky.com/story/russian-anti-war-group-claims-rail-track-sabotage-part-of-attempt-to-derail-ukraine-invasion-12730720>.
37. "The unspooked spook," *The Economist*, 24 June 2022, 30.
38. Foreign, Commonwealth & Development Office, "Government Announces Sanctions against Russian Oligarchs Alisher Usmanov and Igor Shuvalov," *Government of the United Kingdom*, 3 March 2022, <https://www.gov.uk/government/news/government-announces-sanctions-against-russian-oligarchs-alisher-usmanov-and-igor-shuvalov>.
39. "How Abramovich Was Forced to Sell Chelsea in Fall from Grace," *The Independent*, 26 May 2022, <https://www.independent.co.uk/news/world/americas/roman-abramovich-ap-todd-boehly-london-vladimir-putin-b2088016.html>.



Urban Warfare in the Twenty-First Century

BIBLIOGRAPHICAL INFORMATION:

KING, Anthony. Cambridge, Polity, 2021, 288 pages.

ISBN: 978-1-509-54365-6

ISBN: 978-1-509-54366-3

Reviewed by Amos C. Fox, Ph.D. Candidate, University of Reading

INTRODUCTION

Following in the footsteps of other British war studies luminaries, such as J. F. C. Fuller, B. H. Liddell Hart, and Michael Howard, Professor Anthony King delivers a modern classic in *Urban Warfare in the Twenty-First Century*. King's treatise, published in 2021, adroitly cuts through the chafe found in much of the contemporary writing on urban warfare. Professor King eloquently delivers a penetrating account of how modern war is waged, why urban environments are so prevalent in today's conflicts, and how the character of urban battle can be defined. King's work relies on useful examples to illustrate the history of urban warfare and how changes in military force structures have been one of the largest drivers for urban battle in the post-Cold War era.

King's balance of qualitative narrative and quantitative data creates a rich empirical study of urban warfare, yet does not oversaturate the reader with laborious amounts of statistics. Beyond that, King's arrayal of information, lively writing style, and excellent selection of case studies keeps the reader's attention, making the book challenging to put down.

SUMMARY

Professor King provides an empirical look at the rise of urban battles in the context of armed conflict. King's research finds that, since the end of the Cold War, urban warfare is disproportionately represented in armed conflict when analyzed with respect to other eras of war. In short, King rightly asserts that urban battles and urban warfare—near constants in war since 2000—are both dominant and defining features of modern armed conflict.

King contends that the interplay of weaponry, cities, and forces is the key to understanding urban warfare. Moreover, King asserts that appreciating the urban

warfare phenomenon requires operating beyond the bounds of disciplinary thought, and clearly understanding urban warfare requires an interdisciplinary mindset.

Warfare

King provides a set of changes in modern warfare that help explain why urban warfare has become much more prevalent in the post-Cold War period, but the three most useful are increased range and lethality at lower echelons of organization, swarming, and sieges. King argues that increased lethality and precision fire weapons at lower levels of organization, that is, the platoon, section, and squad level, has caused combatants to seek parity, not in comparable arms, but in offsetting those advantages. The city—a great neutralizer of weapon system asymmetry—is thus one of the leading features that combatants use to give themselves a chance against a numerically and technologically superior opponent.

Swarming is another adaptation in warfare that is seeing a resurgence. Swarming, in the context of urban battle, is the result of weaker actors relying on urban areas to help offset the strength of more powerful adversaries. King notes that in Grozny in 1994, for example, small swarms of Chechen fighters routed superior Russian forces. The Chechens, far more familiar with the three-dimensional urban geography of Grozny than the average Russian soldier, deftly moved from one location to the next, eliminating Russian tanks and mechanized infantry vehicles, before disappearing like ghosts and coalescing at another pivotal place of battle.

Sieges and micro-sieges are the final adaptation in warfare that King explores. King rightly notes that sieges are back in fashion because of the parity that urban battlefields deliver. As a result, actors not looking to engage in street fighting tend to conduct sieges. However, given the diminishing size of modern forces, coupled with the increased size of



Source: Combat Camera

cities, fully encircling a city is often out of the question. Resultantly, micro-sieges take the place of full-scale sieges. Micro-sieges, like the US Army's encirclement of Baghdad's Sadr City during Operation IRAQI FREEDOM, become common place. King states that as cities continue to grow and land forces continue to constrict, micro-sieges will increasingly become a feature of urban warfare.

Cities

Professor King states that one of the leading reasons for the increasing frequency of urban warfare is that the world's cities are growing at an incredible rate. This growth makes cities that were already large even bigger. Further, modern urban growth has caused small towns and villages to gradually morph into bigger cities. Therefore, where in the past it was possible to move through much more passive open terrain, today's physical space is less restrictive because cities are much larger than they were in the recent past. Urban growth, therefore, has a relatively deterministic effect on today's combatants, luring them into the urban areas based on geography and the need to survive.

Forces

Professor King persuasively argues that the pervasiveness of urban battles is the result of land forces that are significantly smaller than those of previous generations. In the past, notably in World War I (WWI), World War II (WWII), and the Korean War, armies were extremely large and operated along fronts, or on a massive swath of land that was heavily populated with soldiers and formations both laterally and in great depth. Army fronts consumed everything within their boundaries. The army front's size made urban combat less pronounced and less noticeable because of the scale of the fronts, the size of the forces at play, and the smaller size of urban areas in relation to today. However, King asserts that as troop numbers in armies decrease and cities grow, it is all but impossible for armies to overwhelm urban areas and their neighborhoods, and therefore weaker combatants use urban warfare to offset adversary strength.

RECOMMENDATION

King's *Urban Warfare* is the pinnacle of urban warfare studies. The book's versatility is perhaps its most respectable quality. Many books on armed conflict tend to focus either entirely on policy implications, or on tangible insights for the practitioner. *Urban Warfare*, however, is a rarity in that it adroitly combines useful implications for both policymakers and practitioners. For the policymaker who might be considering armed conflict as a solution to a political problem, the book recasts glowing predictions of lightning war into the praxis of reality: wars are won through hard attritional slogs, which today cannot be separated from the urban battlefield. Further, *Urban Warfare* serves as a cautionary tale for policymakers, pointing to a future of lengthy wars of attrition based on the decreasing size of modern armies, and the parity urban areas provide to partisans and hostile non-state actors.

Likewise, *Urban Warfare* provides practitioners with realistic considerations that must be accounted for when contemplating the reality of urban warfare. For the practitioner, at all levels of war, King provides tangible considerations for force employment, force development, and concept and doctrine development based on the realities of the urban battlefield. For instance, practitioners will likely face sieges and micro-sieges on future urban battlefields. Moreover, urban environments suboptimize airpower and other precision-based capabilities, thereby thwarting short-war dreams. Perhaps most apropos, King asserts that urban warfare rapidly nullifies the prospect of sanitary battles, but instead sharply increases the likelihood of stalemate, civilian casualties, collateral damage, and turning armed conflict into grinding wars of attrition.

Professor Anthony King's *Urban Warfare* is a fantastic contribution to the study of war and warfare. *Urban Warfare* should be atop the reading list for anyone studying modern armed conflict because it is an excellent primer on the character of modern war and because it provides a traceable line to the future of warfare. As King argues, urban warfare is not a fad or the result of bad tactics; instead, urban warfare is a permanent condition within modern and future armed conflict. Anyone with a passing interest in understanding modern armed conflict, advocates for international humanitarian law in war, or defence experts looking to glean the most relevant insights into post-Cold War conflict must start their examination with Anthony King's *Urban Warfare in the Twenty-First Century*; it is, hands down, a classic in the study of modern warfare. 🍁



The Battle of Marawi

BIBLIOGRAPHICAL INFORMATION:

YABES, Criselda. Davao City: Philippines, Pawikan Press, 2021, 278 pages.

ISBN: 9786219630108

Reviewed by Major Jayson Geroux, CD, guest editor for the CAJ Urban Warfare editions 21.1 and 21.2.

William L. Shirer's *The Rise and Fall of the Third Reich* remains one of the best books on the history of Nazi Germany before and during the Second World War (1939–1945). Mark Bowden's books, *Black Hawk Down* on the Battle of Mogadishu (3–4 October 1993) in Somalia, and *Hué: 1968* on the Battle of Hué (31 January–2 March 1968) in South Vietnam, are a mainstay on most military history bookshelves. Thomas E. Ricks wrote a searing, provocative review in *Fiasco: The American Military Adventure in Iraq* only a few years after the United States involved itself even further in the affairs of the Middle East. Before Christie Blatchford passed away in 2020, her book on Canada's involvement in Afghanistan, *Fifteen Days: Stories of Bravery, Friendship, Life and Death from Inside the New Canadian Army*, became a national bestseller.

There is a central theme to these books: they were written not by military historians but by journalists. In fact, scan any military history bookshelf and you may very well find that a number of well-known publications are written by news correspondents. When investigating why such publications are found in libraries, the reasons become clear: reporters are often sent to the world's battle zones to chronicle and/or effectively write on the latest wars. They are able to do so not only by being personal eyewitnesses to events but also because they, by the nature of their job, have become good at interviewing people. By conversing with the war's participants and documenting their personal experiences, journalists can produce popular firsthand accounts of what occurred during battles.

Criselda Yabes is the latest correspondent to enter this group of journalists-turned-military-history-writers with her book *The Battle of Marawi*. Yabes has followed in the footsteps of Bowden and Blatchford in particular, having gone to great lengths to find and interview military personnel—in this case, the Armed Forces

of the Philippines (AFP) soldiers, aviators and marines—who fought in this extremely violent urban battle from 23 May to 23 October 2017.

She begins by discussing the experiences of those AFP personnel involved in the planning and execution of the challenging raid that attempted to capture ISIS leader Isnilon Hapilon, which in turn triggered the larger urban battle. From there, she continues by writing on the involvement of senior leaders directing the fight while also integrating battalion/company commanders, individual junior officers and enlisted soldiers and their particular combat actions—where they fought and what they personally faced. Occasionally, senior enemy insurgents—Hapilon and the Maute group—who were involved in leading the ISIS part of the battle are examined. Most of these are standalone stories in that they focus just on particular individuals and what they experienced at the tactical level without discussing higher plans, and it is here where urban warfare close-quarter fighting and tactics are sometimes discussed. Other portions of the book occasionally focus on the larger picture and what was occurring with senior officers making decisions and executing plans at the strategic and operational levels. Periodically, diagrams and maps are injected throughout so that readers can understand the AFP chain of command, the movement of military units and which areas of the city or urban terrain they were attacking. Smartly, in the book's last portion, Yabes has placed other standalone stories related to the battle, which would have been out of place if they had been forced into the beginning or middle sections.

During and after reading *The Battle of Marawi*, I immediately saw similarities between Yabes' publication and Bowden's two popular books. The first is that, by interviewing individual military personnel, both journalists are able to move the reader through the battles they discuss by citing



Source: Wikipedia, Lawrence Ruiz

singular stories of its participants as the fight progressed hour to hour, day to day, week to week, and/or month to month. The second is that, like Bowden, Yabes is occasionally able to pull back and show the reader the higher schemes of manoeuvre or movement of larger units, either through discussions with senior officers and their planning and direction and/or through the visual use of city maps, thus sporadically giving the reader a sense of the larger battle. This format means that the reader is not given the battle in its entirety; instead, Yabes (and Bowden) uses these individual stories and occasional “bigger picture” discussions, giving the reader snapshots of the continuing battle from start to finish. In essence, if the reader is hungry to know about this particularly violent city fight, Yabes gives enough small and big portions of the story that will leave the reader satisfied to understand the battle’s basics without them feeling mentally bloated by having to consume the entirety of the battle’s finer details.

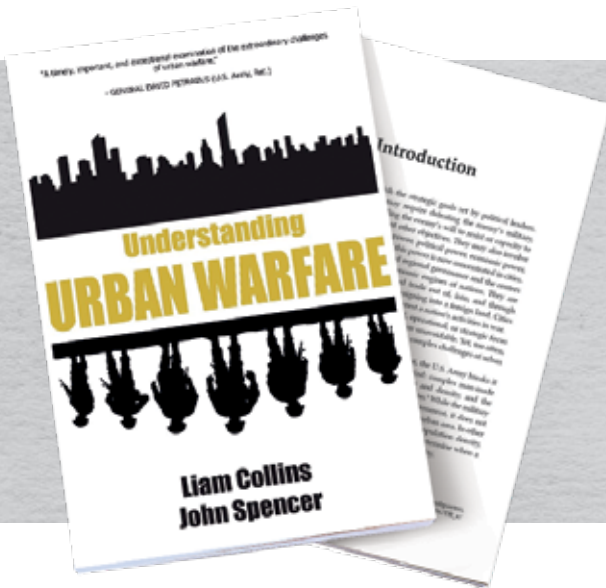
This works for most journalists and their readers, except if you are a military historian like me who wants to know the entirety of the battle. Suppose you are the latter and you want to research and write an extremely thorough case study on Marawi’s urban fighting. In that case, this book will be useful as a start state to give you what some of its participants experienced and a general sense of the overall battle. However, to understand the entirety of it, the historian will need other resources to fill in the gaps and greater details. Regardless, Yabes’ *The Battle of Marawi* is a recommended read.

Certain constraints are imposed on an author when writing a military history book. Usually, a certain period of time must pass (this could sometimes be decades) before a military operation’s documents are made unclassified. It could also take a considerable amount of time before a battle’s participants are comfortable and willing enough to come forward to discuss what they experienced. Historians must also wait for enough official and biographical resources to



Source: Wikipedia

be created to discuss a battle or war. Clearly, Yabes did not want the factor of time to limit her ability to publish this book. However, she had another constraint: the Filipino government and the AFP are extremely conservative organizations that do not proactively communicate with other nations/people outside their country and do not like to discuss/advertise their actions to external audiences. To prove that, and with the exception of the general officers who were in command, task force (brigade), battalion and company commanders are anonymous throughout *The Battle of Marawi* but are given one-word nicknames—Razor, Jackal, Sultan and Hellcat are examples—as their identifiers. Given these challenges, it is impressive that Yabes was allowed to interview these military participants in the first place and then produce a book with accompanying maps and diagrams on this battle only four short years after the fighting ended. Thus, her hard and swift work is to be commended for allowing readers to have an early glimpse into the individual personal challenges and general overview of this intensely violent urban battle. 🍁



Understanding Urban Warfare

BIBLIOGRAPHICAL INFORMATION:
 COLLINS, Liam. and SPENCER, John. Hampshire:
 Howgate Publishing Limited, 2022, 392 pages.
 ISBN: 1912440350

Reviewed by Warrant Officer Peter Vandoremalen, a member of Princess Patricia's Canadian Light Infantry. He served in the Urban Operations Cell at CFB Gagetown as an instructor and officer in charge of the cell.

Urban operations have become a much-discussed subject throughout the international defence community as of late, as the events unfolding in Ukraine have shown that 21st-century warfare has an exceedingly large urban component. Despite the growing salience of urban warfare in the contemporary world, modern armies have not given these complex operations the time, energy, study, and training that they deserve. Liam Collins and John Spencer address a range of critical issues in *Understanding Urban Warfare*. Part 1 of the book, “Understanding the Complex Operational Environment,” has six chapters that effectively attune the reader to the intricate complexities that a modern soldier/leader must be cognizant of in the urban battle space. Part 2 supports the precepts laid down in Part 1 with fifteen modern urban case studies captured in interview form with subject matter experts who, more often than not, participated in the battle.

In Part 1, John Spencer interviews leading academics and subject matter experts. With insights from the interviews, the authors frame how the modern battle space must be understood over the course of six chapters. Taking a step back from the urban battle space, a commander must see a city for what it really is: an ecosystem consisting of multiple inputs and outputs that exist in balance. Any disruption to that balance will have a cascading effect with a multitude of first and second order effects.¹ If a city of two million is deprived of garbage removal for several weeks, a major health and safety issue arises. This example is easy to reference, as most North Americans have gone through something of that nature in their lifetimes and can identify with the frustration that it brings forth. Take that example and remove water, electricity, a steady food chain, reliable access to healthcare and what remains is a restive population deprived of basic needs. This critical factor (i.e. how to manage the civilian population before, during and after the fighting), is often

overlooked.² As the authors argue, it is vital in the planning phase to identify critical infrastructure and personnel essential for continuing the services mentioned above.

One of the critical lessons the book delves into is the need to incorporate information operations and civil affairs in all phases of the planning process, but most critically during the initial phases. These are two key enablers that provide inroads and legitimacy to an operation, and the American employment of them in the Second Battle of Fallujah (7 November–23 December 2004) and the Battle of Ramadi (2006–2007) serves as an exemplar.³ A city’s population cannot be relegated to simply one nationality; it is a fabric of many cultural and social dynamics that differ from block to block. The American experience fighting the “three block war”⁴ highlights the imperative to know the “human terrain” of a city.⁵ By front-loading civil affairs/information operations in the planning process, one becomes attuned to the human terrain, allowing these assets to shape the messaging, propagate it, and effectively respond to enemy information operations.⁶ The ground tactical level in an urban fight will be won in the room, but the operational level will be won in the hearts and minds of a city’s population. Failure to address the basic needs of the civilian population and get ahead of the information battle will rapidly turn a population against the military/government’s cause.

The case studies in Part 2 provide an excellent look at the length and breadth of modern urban actions ranging from the Battle of Ortona in the Second World War (1939–1945) to the Battle of Shusha in 2020, representing an 81-year bracket. It would be a challenge to break down and analyze each case study given the space constraints of this review, so what follows is a condensed summary of the lessons learned. As identified in all the case studies, the imperative to utilize combined arms doctrine and operate harmoniously



Source: Combat Camera

at the joint operational level was the critical driver to success. There is a degree of hesitation throughout the defence community to commit armour assets to the urban battle space, as they are vulnerable in closed terrain and deprived of the benefits of standoff, mobility and the full use of long-range optics/weaponry. This can be counterbalanced with infantry, engineer, and armour cooperation. The infantry provides intimate security and force protection to the armour. Similarly, engineers provide support for route clearance, breaching and explosive clearance, and armour provides overwatch and direct fire support.

The urban terrain entails multi-storied buildings in close proximity to one another, power lines, and the civilian population. All these factors act as detriments to the use of indirect fire. The line of sight from the battery to the target is often blocked by buildings, and the risks of collateral damage to the population and infrastructure are high. Because of the confined battle space—usually no more than one side of a street to the next—reaction time must be immediate, making indirect fires impractical. Therefore, the presence of armour providing direct fire support is critical to mission success. The American employment of armour in the Second Battle of Fallujah (7 November–23 December 2004) and Sadr City (26 March–11 May 2008)⁷ set the standard for combined arms operations in the urban battle space. In both of these cases, an enemy insurgent was intimately familiar with the terrain, was well-armed, and fought from prepared positions. In those circumstances, even a few defenders are highly effective and extremely difficult to clear out. Utilizing armour assets and breaking them into smaller combined arms elements (as the Americans did in Sadr City) demonstrated excellent flexibility and interoperability. It is worth noting that a building with fortified fighting positions can hold down a force exponentially larger than itself. This can be overcome with direct fire support from the tanks using their main armament to engage and destroy point targets that are impervious to infantry small arms.

The Armed Forces of the Philippines effectively used their armour in the Battle of Marawi (23 May 2017–23 October 2017) and demonstrated this point. The lengths to which they went to employ their armoured personnel carriers by building ramps onto the second story of a building to get a line of sight speaks to the effectiveness of armour direct fire support.⁸

Understanding Urban Warfare is an essential primer for soldiers and leaders serving in today's ever-evolving operating environment. The book aptly frames how one looks at urban battle spaces and provides fresh perspectives into the crucial components. In conclusion, the authors identified a host of lessons learned that were well supported by the case studies and that leave the reader with some planning guidance and principles to reflect upon.⁹ I highly recommend this book to veterans and novices, as it provides a fulsome, comprehensive and balanced examination of 20th and 21st-century urban warfare. Urban warfare is the past, present, and future of warfare and is as timeless as conflict itself. Given the events and development in Ukraine, the entire defence establishment would benefit considerably from enhancing its understanding of urban operations, and this book is an excellent opportunity to achieve that. 🍀

ENDNOTES

1. Liam Collins and John Spencer, *Understanding Urban Warfare* (Hampshire: Howgate Publishing, 2022), p. 4–5.
2. *Ibid.*, p. 8.
3. *Ibid.*, “The Second Battle of Fallujah” with Lieutenant-General James Rainey, p. 179–201; Chapter 11, “The Battle of Ramadi” with Lieutenant-Colonel (Retired) Louis DiMarco, p. 225–245.
4. Gen Charles C. Krulak, “The Strategic Corporal: Leadership in the Three-Block War,” USMC, <https://mca-marines.org/wp-content/uploads/1999-Jan-The-strategic-corporal-Leadership-in-the-three-block-war.pdf>.
5. Montgomery McFate, Ph.D., J.D., and Andrea Jackson, “An Organizational Solution for DOD’s Cultural Knowledge Needs,” <https://smallwarsjournal.com/documents/mcfate1.pdf>.
6. Collins and Spencer, *Understanding Urban Warfare*, with Colonel (Retired) Leonard J. DeFrancisci, p. 202–224.
7. *Ibid.*, “The Second Battle of Fallujah” with LGen Rainey, p. 179–201; “The Battle of Sadr City,” with LCol (Retired) Robert MacMillan, p. 246–274.
8. *Ibid.*, “The Battle of Marawi,” with Dr. Charles Knight, p. 318–319.
9. *Ibid.*, p. 345–362.