

AC 72224

Army Field Manual

Urban Operations



ARMY

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Foreword

Over half of the world's population today lives in an urban area, with growth accelerating particularly in the developing world. Operations in and around urban centres are certain: towns and cities are not only centres for people, but also economic activity, critical infrastructure, logistics, and governance, and therefore will have political and psychological significance for all parties. It is where populations are concentrated and where they are most connected, internally and to wider diasporas.

In recognition of its importance, its complexity and the cost of getting it wrong, the Executive Committee of the Army Board directed that the Army must hone training, equipment and doctrine for urban operations. This publication tells the reader how the British Army intends to fight from and in urban areas. Importantly, it draws on operational research, historical analysis and lessons from contemporary operations, including Ukraine, Iraq and Nagorno Karabakh.

Army Field Manual (AFM) *Urban Operations* is aimed primarily at battlegroup commanders and above, but Chapter 1 - Understanding, should be read and understood by all, at every level. Urban operations must be a combined arms and multidomain endeavour. To look at an urban operation through the lens of a particular cap badge or capability is the route to disaster. It is only in understanding how capabilities can be effectively combined that we can hope to win in this most demanding environment, where civilian and military casualties can be disproportionately high. So please read this important AFM, digest it, understand it, and incorporate into your training and operations.

I commend it to you all.

Commander Field Army

February 2023

Preface

This Army field manual (AFM) replaces Doctrine Note 15/13, *Operations in the Urban Environment*. Drawing on the experience of the British Army, as well as allies and partners, it exploits three years of urban experimentation¹ and reflects lessons from contemporary operations and current conflicts, including the war in Ukraine.

It is not a standalone document, but complements the wider AFM portfolio, addressing the nuances posed by the urban environment. While not exclusively so, the focus has shifted from stabilisation and counter-insurgency to conventional warfighting operations against a peer or peer+ adversary.²

The *Urban Tactical Handbook*, which should be read in conjunction with this publication, concentrates on tactics, techniques and procedures for company level and below.

This publication is structured into four chapters:

- **Chapter 1 - Understanding the urban environment.** The context of urban operations, the dimensions (physical, human and information) and effects on military operations.
- **Chapter 2 - Operations in the urban environment.** How and why military operations at the battlegroup and formation levels (brigade and division) are conducted and key considerations.
- **Chapter 3 - Capabilities and planning considerations.** Describes combined arms capabilities, their employment and optimisation for urban operations.
- **Chapter 4 - Tactical activities for urban operations.**

¹ Conducted during the URBAN LION series of battlegroup and brigade wargames.

² Modelled on the current and pacing threats (Russia and China respectively) - Defence in a competitive age, presented to Parliament by the Secretary of State for Defence, March 2021.

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CHAPTER 1

Understanding the urban environment

Introduction

- 1-01.** The fundamental question facing a commander considering operations in the urban environment is whether doing so will create a position of advantage over the enemy. The answer framed by the manoeuvrist imperative is based on three considerations:
- a. **Military advantage.** Human settlements are immobile logistic hubs; as such, their control may be critical to an opponent's military strategy. The seizure and control of roads, railways, and crossings, and the denial of key terrain or vital ground in and around towns and cities may critically undermine an enemy's plans. Exploitation of advantage aims to create ever greater freedom of manoeuvre, leading to operational success by creating an irresistible momentum; failure to do so risks allowing the enemy to recover.³
 - b. **Political advantage.** Although often secondary to its military significance, a town or city, particularly a capital⁴ city, has a political significance which may justify the time and resources needed to take or hold it. Capturing and controlling a centre of political activity may deliver a significant psychological advantage⁵ over an enemy.
 - c. **Economic advantage.** The denial or capture of key industrial and commercial infrastructure and institutions will degrade an enemy's ability to wage war. The seizure and retention of the means of finance, production, and distribution may prove pivotal to the enemy's ability to prosecute conflict.
- 1-02.** Generating freedom of manoeuvre in this most challenging of operating environments is paramount. It generates the space for commanders to use their initiative to seize and retain an advantage over the enemy. Advantage is temporary in nature and must be exploited to be effective - an unexploited advantage is no advantage at all.⁶ These positions of advantage, as explained in ADP *Land Operations, Part 2: The Application of Land Power*, can be psychological, temporal or physical, and are a result of effective combined arms manoeuvre.⁷ A thorough understanding of friendly force capabilities, those of the enemy, and the environment is critical to military success. Prior to, and indeed during, operations, a comprehensive intelligence preparation of the environment⁸ should be conducted to understand the physical, human and information dimensions which represent the component parts of any environment.

3 Doctrine Note 22/02, *Freedom of Action in the Application of Land Power*.

4 Clausewitz states that "the enemy's capital is his centre of gravity".

5 The failure of the Russians to take Kyiv gave the Ukrainian government a huge boost in international support and raised the morale of both the Ukrainian armed forces and the wider population, while simultaneously denying the Russians the political advantage of capturing the seat of government.

6 Doctrine Note 22/02, *Freedom of Action in the Application of Land Power*.

7 Defined as the orchestration of task-organised capabilities in combination to target and exploit an opponent's weaknesses.

8 As detailed in the *Planning and Execution Handbook* and the *Battlegroup Engineer Handbook*.

- 1-03.** Having established the requirement to fight for, from and around an urban area, there is the question of how to approach the battle. The practical advantages in paragraph 1-01 are balanced against consequences, leading to hard strategic, operational and tactical decisions. It is too simplistic to polarise the brutality of the Russian urban warfare (isolate, cordon, constrict and annihilate) against the preferred western approach, which focuses on minimal destruction to win the population and a swift return to normality - save the city to win the city. The answer is not binary, approach depends on context: a balance of threat, environment (human, physical and information dimensions) and the freedoms or constraints (military, political and legal) which define the operation.
- 1-04.** It is important to remember that the enemy will always have a vote; the situation may determine a softer approach is neither desirable, nor practical. Russia's approach to urban warfare, and civilian populations, is highly pragmatic, context-dependent and driven by specific operational needs.⁹ Levelling cities is the least palatable option for Russia politically, although the destructive sieges of Aleppo, Grozny or even the cities of Ukraine show that the Kremlin is far from squeamish. The Spetsnaz operation in Kabul to assassinate and replace the Afghan Leader, Hafizullah Amin, on 27 December 1979 (Operation STORM-333) is perhaps the inspiration for the failed attempt to cause a Ukrainian government collapse in Kyiv. The ensuing debacle forced a rethink in Russian tactics and a reversion to type in Mariupol. The vignette below illustrates why forces may choose, or be forced, to fight in the urban environment.

The Battle for Mariupol, Ukraine, 24 February to 16 May 2022



Russian incendiary attack on the Azovstahl Steel Works, Mariupol

⁹ Royal United Services Institute - Russian Urban Warfare and the Assault on Kyiv - Lance Davies, 2 March 2022.

Lessons:

- **Military advantage.** Logistically, Mariupol was vital ground for Russia; all the major road and rail supply routes which link the Crimea to the Donbas and Russia run through the city. Operationally, the battle for Mariupol fixed 12 Russian battalion tactical groups and bought crucial time to prevent the encirclement and destruction of the bulk of the Ukrainian regular Army in the Donbas.
- **Economic advantage.** The port of Mariupol is vital to Ukraine; it is the only deep berth facility in the Azov Sea.
- **Political advantage and disadvantage.** After the failure of Russian ground forces (RGF) to capture Kyiv, the fall of Mariupol presented the Kremlin with a propaganda victory to galvanise support at home. However, the Russian victory in Mariupol was pyrrhic; the brutality of the siege galvanised international support for Ukraine.

In April 2022, after failing to capture Kyiv, decapitate the Ukrainian government and achieve a rapid victory, Russian objectives contracted to the 'liberation and denazification' of the Donbas. Consequently, military efforts were refocused on the Central and Southern Army Groups. Mariupol was a port city of just under half a million inhabitants before the war, home to one of Ukraine's largest Russian speaking populations and the largest urban settlement in the so-called Donetsk People's Republic. It is also part of Vladimir Putin's vision of "Novorossiya" - a territory stretching across eastern and southern Ukraine along the Black Sea coastline that is viewed by the Kremlin as "historically Russian lands". Mariupol has **strategic significance** from military, diplomatic, economic and information perspectives.

Military and economic significance

The Donets railway network is one of six systems owned and operated by Ukrainian Railways and represents 47% of Ukraine's rail capacity. It is a Russian gauge network linking the Donetsk, Luhansk, Zaporizhzhia, Kharkiv, Dnipropetrovsk oblasts to the Russian Caucasus and Volga regions through seven border crossings. Junctions in Mariupol and Kherson, which was also seized by Russia in the early stages of the invasion, connect these rail services to ports on the Sea of Azov and networks in central Ukraine.

Highway M14 is an international route connecting the major ports of Odessa and Mariupol to the Russian border, where it continues into Russia as the B180. Along with the M16, it connects to two major European routes, the E95 and E105.

Revised Russian objectives sought a secure ground corridor between Russia, the Crimea and the Russian separatist regions in the Donbas. It was vital to secure Mariupol where these rail, road and sea links converge. Bypassing Mariupol was simply not an option for the RGF.

For Ukraine, the loss of the city was a blow to national morale. The capture of Mariupol greatly increased Russia's ability to strangle the Ukrainian economy, and to deny vital sea trade to the rest of the world. The city is home to critical national infrastructure: the largest deep berth port in the Azov Sea - vital for Ukrainian exports and heavy industry in the form of iron and steel works. The capture of the city enabled Russian control of the entire north shore of the Azov Sea and 80% of Ukraine's Black Sea coastline, effectively isolating it from the rest of the world.

Information/narrative

The Russians made much of the fact that Mariupol is home to the Ukrainian Azov Regiment, a special operations forces component under command of the National Guard (part of the Ministry of the Interior). Azov forms only a fraction of Ukraine's fighting forces, but have been a useful propaganda tool for Moscow, playing to the home audience in Russia and supporting Putin's narrative that Russian forces are fighting in Ukraine to rid their neighbour of neo-Nazis. Russia claimed Azov fighters were responsible for killings of civilians and destruction in Mariupol. While evidence to the contrary is overwhelming in the free press and on social media, the message was aimed at Russia's domestic audience whose information comes almost exclusively from state media. Internationally, this narrative landed reasonably successfully in some African countries which traditionally see Russia as an ally in their liberation struggles. It also resonated with non-aligned countries; India, Brazil for example are receptive to the Russian narrative of the preservation of a balance of power to challenge US/western hegemony.

For Ukraine, Mariupol is a defeat which has been skilfully reframed as a symbolic 'David and Goliath' story; a source of intense national pride which strengthens confidence in victory against huge odds. Russian forces pushed hard to secure the city by the 9 May, to coincide with the Soviet victory in 1945 over the Nazis but were denied a propaganda coup by the defenders who fully appreciated its symbolic importance to their enemy.

Diplomatic significance

For Russia, Mariupol can be argued to be a pyrrhic victory; the human cost was heavy, and damage done to its international standing was significant. The Red Cross described the situation as "apocalyptic", and Ukrainian authorities accused Russia of engineering a major humanitarian crisis, with city officials reporting that about 22,000 civilians had been killed. The United Nations confirmed the deaths of 1,348 civilians but said the true death toll was "likely thousands higher" and international condemnation of Russia is strong. The brutality of the siege of Mariupol will feature heavily in an investigation into Russian war crimes - on 25 February a referral to the International Criminal Court was backed by 39 nations; it is the largest in its history and funded by the European Union.

For Ukraine, the battle for Mariupol demonstrated to the west that the strength of resistance had been seriously underestimated. Against a backdrop of mounting evidence of Russian war crimes, including the alleged shelling of humanitarian evacuation corridors out of Mariupol, President Joe Biden, announced on 26 April that the US would "move Heaven and Earth" to help Ukraine win the war. Almost immediately, the volume and sophistication of western military aid substantially increased.

At the operational level

The Russian Army has been described as an artillery army with lots of tanks; it fields fewer logistical battalions than NATO and replenishing a brigade artillery group requires up to 90 trucks per volley. RGF rely heavily on rail, and struggle to resupply units at distances greater than 90 miles from a railhead. Once corridors have been secured, they can construct temporary oil and water pipelines, but they are vulnerable to air attack and sabotage. Seizing rail hubs, which are mostly located in built-up areas, is critical for RGF logistics.

For Ukraine, the loss of Mariupol ceded a deep-water port and its transport links to the RGF. Russian heavy equipment, materiel and ammunition flooded in, and supply to the front lines

in the Donbas increased dramatically. Outraged and in the face of overwhelming firepower, Ukraine was forced into a punishing withdrawal, losing control of Luhansk and most of the Donetsk oblast.

At the tactical level

Mariupol forced a change in **Russian** urban tactics: isolate, cordon, constrict and annihilate. The catalyst was the appointment of a new commander, Col General Mikhail Mizintsev, also known as the 'Butcher of Aleppo', and latterly as the 'Butcher of Mariupol'. The city was besieged on the 2 March and subjected to heavy bombardment which destroyed 95% of its buildings. By 22 April, the remaining Ukrainian forces had retreated to the Azovstal Iron and Steel Works; a sprawling defender's paradise, laced with a network of tunnels, ducts and cold war bunkers.

For Ukraine, the stubborn and skilled defence of Mariupol by the Ukrainian 36th Marine Brigade and the Azov Battalion was critical to buy time to bolster Ukrainian defences, and for international military aid to arrive in country. The last Ukrainian pockets of resistance held out until the 16 May when desperately short of food, water, and ammunition, and harbouring up to 400 civilians and wounded soldiers, they surrendered on orders from President Zelensky.

The aftermath

With Mariupol secured, **Russia** could free up combat power to send north-east, for an attempted encirclement and destruction of Ukraine's most capable regular units in the Donbas; west to push towards Odesa (Ukraine's last remaining major port on the Black Sea) and north-west towards the city of Dnipro.

Ukraine traded space and forces in Mariupol for badly needed time to reinforce the Donbas in preparation for a Russian offensive; the defence fixed 12 of the 76 Russian battalion tactical groups in Ukraine. Ukrainian forces were able to conduct a fighting withdrawal from the industrial cities of Sverodonetsk and Lysychansk, and to preserve the combat power of their most experienced units. The defenders inflicted considerable delay until western long-range rocket artillery systems (GMLRS and HIMARS) could be brought into action. The Ukrainians learned well from Mariupol and have so far managed to fight off repeated Russian encirclement attempts.

Physical dimension

- 1-05. **Topography.** The urban environment is complex, but the considerations for intelligence preparation of the environment echo those of rural environments. Many urban settlements were founded on coastlines, significant waterways or trade routes. The topography is complex and less forgiving, with sometimes stark limitations for observation, manoeuvre and fires. Terrain limitations apply equally to an opponent.
- 1-06. **Urban terrain zones.** The urban environment is three-dimensional; supersurface, surface, subsurface (Figure 1-1). There are eight typical urban terrain zones to consider:
 - a. **Historical centre/old town.** Large, older buildings with thick walls providing good cover and protection. Avenues and roads are usually narrower constricting mobility of larger vehicles, especially when the area is congested with rubble. They typically have high population density. Normally it is where historical, cultural and religious buildings are concentrated.

- b. Financial/business centre or modern city centres.** Many of the buildings in these areas are multistorey and of modern glass and steel construction. Routes may be wider and afford access for larger vehicles. Taller buildings offer good observation and present elevation challenges for weapons systems, particularly armoured vehicles. Multistorey buildings often contain covered and subterranean car parks. Population density is lower, especially at night.
- c. Industrial.** Heavy industrial areas are generally on or along major rail and road networks routes, and light industry often sits on the outskirts of cities or districts. Both typically contain factories and warehouses. Structures range from steel framed with lightweight cladding to older brick buildings which provide better protection from small arms fire. Population density is low and there are potential hazards from toxic industrial chemicals.
- d. High-density residential.** Buildings range from standard one and two stories to tower blocks with a high population density. Roads between buildings are likely to be relatively narrow, often with alleyways between buildings. Tower blocks are often separated by open areas with more weapons range and fewer obstacles. Communications, particularly over VHF will be difficult.
- e. Low-density residential.** Suburban locations of detached, semi-detached and terraced dwellings providing residential sprawl and contain a high concentration of population. Suburbs are typically composed of single or double-storey housing, usually with gardens which offer covered approaches.
- f. Slum/shanty areas.** These areas are very complex, with little or no mapping, and include tight streets and alleys, flat roofs, and parapets. Constructions are often cheaply built and temporary. Typically, population density is very high.
- g. Subterranean.** Underlying the other seven terrain types and ranging from sewer systems to underground railways, car parks and shopping centres. These may offer covered lines of communication and avenues of approach, and spaces for command, logistics or medical facilities. Navigation can be difficult and communications almost non-existent. They may also be used as shelter by the civilian population. Subterranean operations are covered in Annex A.

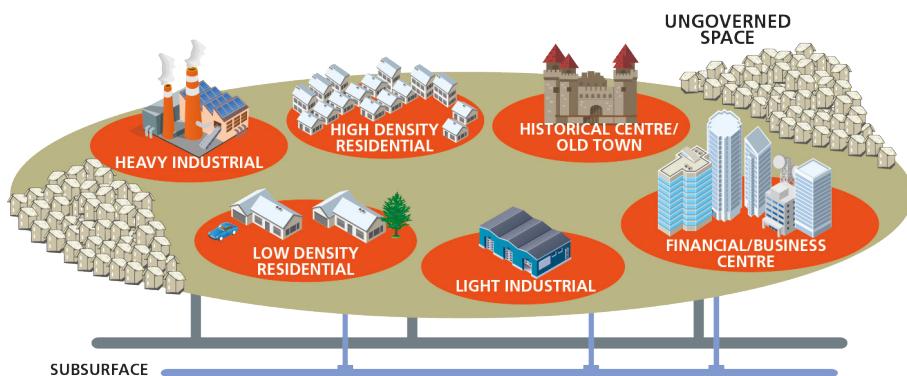


Figure 1-1. Urban terrain zones

- 1-07. Structures.** Building construction is covered in *Military Engineering, Pamphlet Number 2, Field Fortifications*. Tactical commanders must develop an understanding of the nature of the buildings within their area of operations.
- 1-08. Infrastructure.** Civil infrastructure permits people to function in an urban environment by providing power, water, transport, fuel and communications. It also includes healthcare, access to markets and commerce. Ports, industrial complexes and nuclear facilities may not necessarily be sited within a city but are classified as urban areas. Rapidly growing cities often lack the infrastructure to deliver basic services, eroding security among the poorest parts of the population who live on the margins. Impacts to infrastructure, particularly key infrastructure, invariably cause second and third order humanitarian problems.
- a. **Critical national infrastructure.** Those critical elements of infrastructure (namely assets, facilities, systems, networks or processes and the essential workers that operate and facilitate them), the loss or compromise of which could result in: major detrimental impact on the availability, integrity or delivery of essential services (including those services, whose integrity, if compromised, could result in significant loss of life or casualties, taking into account significant economic or social impacts) and/or significant impact on national security, national defence, or the functioning of the state. The importance of critical national infrastructure is described in Figure 1-2.

| Category | Consequence description |
|----------|---|
| 5 | This is infrastructure the loss of which would have a catastrophic impact on the country. These assets will be of unique national importance whose loss would have national long-term effects and may impact across a number of sectors. Few are expected to meet category 5 criteria. |
| 4 | Infrastructure of the highest importance to the sectors should fall within this category. The impact of loss of these assets on essential services would be severe and may impact provision of essential services across the country . |
| 3 | Infrastructure of substantial importance to the sectors and the delivery of essential services , the loss of which could affect a relatively large geographic region . |
| 2 | Infrastructure whose loss would have a significant impact on the delivery of essential services leading to loss, or disruption, of service affecting whole counties or provinces . |
| 1 | Infrastructure whose loss could cause moderate disruption to service delivery, most likely on a localised basis. |
| 0 | Infrastructure the impact of the loss of which would be minor and local in nature but may be important to the mission . |

Figure 1-2. Importance of critical national infrastructure

- b. **Mission vital infrastructure.** Host/partner nation or deployable infrastructure upon which the force relies, and/or the destruction or disruption of which makes the mission untenable (equivalent to vital ground).
- c. **Key infrastructure.** Host/partner nation, or deployable, infrastructure necessary for the functioning of the host/partner nation and/or force and delivery of essential services which they depend on. The destruction or disruption of which, either singularly or collectively, provides a significant threat to the mission (equivalent to key terrain).

- 1-09. Infrastructure assessment.** This is a decision support process to assess infrastructure networks, interdependencies, criticality, vulnerability, force protection, targeting and reconstruction. It should be undertaken prior to Question 0 and iteratively throughout the estimate process. Analysis should be conducted by trained military engineer personnel, with specialist support as required. Hasty infrastructure assessments are covered in the *Urban Tactical Handbook*.
- 1-10. The urban three-dimensional engagement space.** All engagement spaces are complex, but the urban engagement space is often significantly more congested than some others.
- Air.** Buildings and other constructions create obstacles to the trajectory of many munitions. They restrict aircraft lines of sight and limit low altitude manoeuvrability, while increasing vulnerability to small arms and man-portable air defence systems. The lower airspace could be cluttered with friendly, adversary, and potentially civilian uncrewed aircraft systems.
 - Surface.** The urban area canalises movement, reduces visibility and arcs of fire, but also provides cover and concealment. Urban waterways are both obstacles and potential lines of communication.
 - Supersurface.** Includes the internal floors and levels of buildings and vertical structures which provide cover and concealment. Buildings enhance or limit observation and arcs of fire. Flat roofs may also provide helicopter landing sites. Tall buildings may provide tactical advantage and therefore merit consideration as key terrain, depending on the situation.
 - Subsurface.** Subterranean features, such as underground galleries, cellars and car parks, offer force protection and material storage, while sewage systems, tunnels and underground transport spaces afford covered and concealed routes for troops, supplies and casualties.

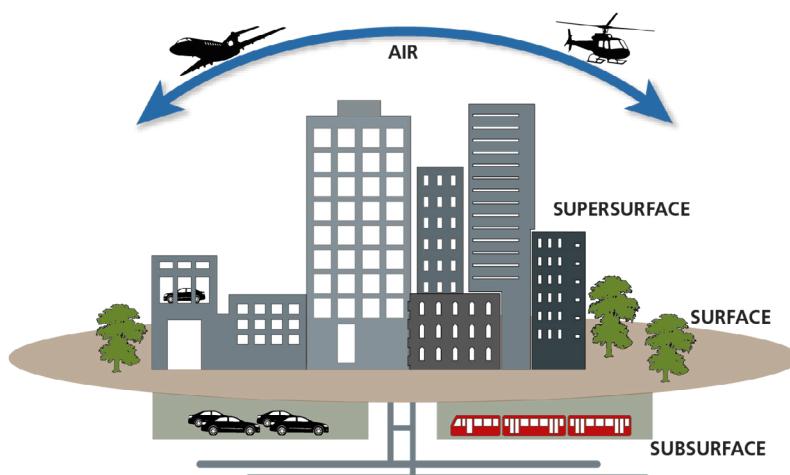


Figure 1-3. The three-dimensional battlespace

- 1-11.** Cultural, historical and religious sites. The urban environment is likely to contain cultural, historical and religious sites, which must be protected, in accordance with the law of armed conflict. Measures for identifying and protecting such sites should be integrated into planning from the outset, with systems for risk mitigation in place. Doctrine Note 19/05, *Cultural Property Protection* contains the full range of considerations with which commanders must be familiar.

Human dimension

- 1-12.** The urban environment, its physical and information dimensions, is a product of the people who live, or have lived there - the human dimension. Understanding the human dimension is an important part of understanding the urban environment and its system of systems. However, a commander cannot hope to ever truly understand the human environment unless they have experienced it and understand the culture of those who make it up - something not likely to happen in expeditionary warfare. As well as analysis from other government agencies, there are several tools which have been developed, or are being developed,¹⁰ to analyse the human dimension, but none can replace the local knowledge of a trusted partner force.
- 1-13.** Civilian populations are diverse and ill-defined. Their attitude may range from supportive, through permissive to belligerent. In many cases, there will also be competition between different groups. In the urban environment the density of civilians may influence freedom of manoeuvre, particularly in peace support operations where the attitude of the population may be a critical factor. Diasporas are remote effectors which can seriously influence political will and the conduct of operations. A tactical problem can rapidly be spread and amplified by the international diaspora, so they must be considered and constantly re-evaluated as part of the human dimension.
- 1-14.** To understand the human dimension, the commander should consider audiences, actors, and adversaries, think laterally, and ask deep questions that consider human security factors and cross-cutting themes,¹¹ for example:
- a. Are districts marked as 'belonging' to a group (a) solely populated by that group, (b) have majority population from that group, or (c) that group is the largest population in the wider area?
 - b. Understand social control and control by armed actors within each area.
 - c. Recognise that demographic makeup and control are dramatically affected by conflict and will shift rapidly.
 - d. Understand that government-designated districts may (a) not correspond to population boundaries, and (b) may differ from the district boundaries used by the population and/or by armed actors.
 - e. Understand the diaspora and the effect it can have at strategic, operational and tactical levels.
 - f. Recognise the difficulty in choices of distinction between civilian non-combatants and

¹⁰ ASCOPE (area, structure, capabilities, organisations, people, events), PMESII (political, military, economic, social, infrastructure, information) or the experimental 'vector-based approach'.

¹¹ JSP 985: *Human Security in Defence*. Volume 1, December 2021.

those supporting operations at every level from active participation to simply making useful social media posts. Theatre rules of engagement and standing operating instructions will need constant review to reflect risk appetite and military necessity while remaining within the boundaries of the law of armed conflict (explained in Chapter 2, paragraph 2-07).

- 1-15. Patterns of life.** It is important to understand the rhythm and timing of population activity. Rush hours, markets, social or religious gatherings tend to follow a routine. Understanding patterns of life is essential for planning and the foundation of threat assessment (recognising the absence of the normal or presence of the abnormal).
- 1-16. Population needs.** Concentrations of non-combatants complicate military activity. If not directly threatened, populations are understandably reluctant to leave urban areas and may place a burden on the force for governance, medical support, restoration of services and infrastructure. Displaced persons present challenges to security, manoeuvre and logistics. In either case, attending to the needs of a civilian population, which may be non-discretionary under the law of armed conflict, will absorb fighting power.

Threats - adversaries

- 1-17.** The full range of adversaries from peer and near-peer state adversaries, non-state actors to violent extremist organisations¹² may exist in the urban environment. Their aims may include:
 - a. Securing and holding urban centres, critical national infrastructure, and sympathetic enclaves.
 - b. Winning the narrative, eroding security, generating popular resistance, and disrupting economic activity. This includes fomenting an insurgency to fix, shape or constrain the force.
 - c. Initiating political and social change including the establishment of alternate means of governance (shadow governance), law enforcement, dispute resolution, taxation and aid.
 - d. Undermine will and consent to continue operations locally, regionally, in the UK home base or the diaspora.

The conventional enemy¹³

- 1-18.** Battalion tactical groups. A battalion tactical group is a motorised rifle or tank battalion of between two and four companies formed from a garrisoned brigade. Attached are anti-tank guided missile, artillery, reconnaissance, engineer, and rear support platoons making a self-sufficient ground combat unit. Russia's modernisation reinvigorated the battalion tactical group as the primary tactical manoeuvre organisation. They are modular and agile, drawing personnel and assets from their parent brigade or regiment, and can be augmented with further assets from its higher formations to achieve their mission. Their major weakness for urban operations is a lack of infantry mass.

¹² As described in ADP *Land Operations, Part 1: Competition and Conflict*, Chapter 1.

¹³ Land Intelligence Fusion Centre's [How Russia Fights](#) remains the authoritative interpretation of Russian doctrine.

The irregular enemy

- 1-19.** The irregular enemy may include state and non-state actors, characterised by informal structures, the latter may be subject to rapidly changing allegiances. Irregular forces typically seek to control areas for popular support, resources, wealth and power. Irregular tactics are contained in the *Enemy and Adversary Handbook*, which is available on the Army Knowledge Exchange website.

Other threats

- 1-20.** Civil disorder. Group acts of violence and disorder may be initiated by an adversary, as a by-product of a breakdown of law and order, or the deterioration of conditions, especially when these are blamed on the governing power or occupying forces. This is likely to be exploited by irregular forces and criminal elements and may undermine the success and/or the legitimacy of the mission. Crowd violence can take the shape of close quarter attacks on security forces, demonstrations, and roadblocks, use of human shields (JSP 383: *Joint Service Manual of the Law of Armed Conflict* refers) and the protection or concealment of adversary forces.
- 1-21.** Chemical, biological, radiological and nuclear (CBRN). A CBRN attack in an urban area is likely to have a catastrophic effect on an unprotected civilian population. The physical effects are enhanced in restricted spaces where agents degrade or dissipate less easily. Land forces might be required to deal with the aftermath, including survey and tracking of the CBRN threat. Events in Syria have highlighted the potential for mass panic when the threat of release is prevalent, regardless of the actual degree of risk. CBRN threat assessment and combined, joint, inter-agency, intergovernmental and multinational response, should be considered during the urban planning process.
- 1-22.** Toxic industrial hazards. Where dangerous chemicals and industrial waste are present, there is a threat of accidental spillage or deliberate use as a weapon. Where threats exist, appropriate warnings should be provided, and contingency plans drawn up in case of contamination. Consideration should be given to the deployment of specialist CBRN troops.
- 1-23.** The insider threat. Deterrence and force protection measures are described in full in the *Stability Tactics Handbook* at Chapter 21.

Information dimension

- 1-24.** Information is a product of the human dimension; it allows every aspect of the urban environment to function. Networked, and increasingly ‘smart’ information systems underpin services, transport, energy, healthcare, water and waste. It is impossible to exercise complete control of this dimension - information will always flow in, around and out of an urban area.
- 1-25.** Media. The urban environment is transparent; operations are conducted under persistent formal and informal media scrutiny which reaches vast audiences (internal and external) in near real time, 24 hours a day from across the battlespace. Social media can be used by actors in urban environments to plan, mobilise coordinate and inform. It can also be used to spread disinformation, or ‘fake news’ rapidly.

- 1-26.** Cyber.¹⁴ Cyber is currently defined as 'relating to the characteristic of information technology, the internet and virtual reality'. It should not be confused with the electromagnetic warfare.¹⁵ The connected and evolving nature of cyber exposes the land forces to the possibility of multiple threats, including espionage, sabotage and subversion. Sources of threat include state actors (operating directly or through proxies), non-state actors (such as criminal networks, terrorists, and 'hacktivists') and 'insiders' (those who have authorised access to our systems and use that access for unauthorised purposes or who act in a careless manner). The high tempo of associated technological developments means that the character of the threat is evolving quickly, with significant implications for the maintenance of a coherent defensive posture. Cyber is of particular concern in the urban environment due to the density of information communications technology and reliance upon it.
- 1-27.** Word of mouth. Information, disinformation, or misinformation is frequently taken at face value and can spread quickly in an urban population. Whispering campaigns can be used to shape perceptions and attitudes. It is particularly difficult for a foreign force, of either side, to understand or influence what is said or believed in a population which is culturally different and disconnected. Host-nation forces are crucial to bridge this gap.

Urban systems

- 1-28.** The larger an urban area, the more complex, and sometimes fragile, its systems may be. It is important to understand how these systems function, what they contribute to the needs of the population, and how they might be used to create advantage. There are six key systems: national and local government, communications and information, transport and distribution, economics and commerce, administration and services, and cultural (Figure 1-4).
- 1-29.** National and local government. Urban areas are home to elements of local and national government and other leaders who may be allied, neutral or opposed to our own forces and objectives. All are likely to be motivated by the attainment and retention of power. Understanding their aims, objectives and allegiances (human terrain analysis) will be crucial.
- 1-30.** Communications and information. These are the systems which are used to distribute information. Interrupting them will have an impact on the civilian population. If taken under control, they facilitate command and control, surveillance and information activities.
- 1-31.** Transport and distribution. This system provides the physical link to all other services; it moves people and resources. Transport and distribution infrastructure should be considered as potential avenues of approach or lines of communication as part of intelligence preparation of the environment.
- 1-32.** Economics and commerce. This system meets the needs of a legitimate and viable economy.
- 1-33.** Administration and services. These systems support governance, law and order.
- 1-34.** Cultural. Cultural and religious sites have significant value to local audiences beyond the immediate urban terrain. While they may have no intrinsic military value at the tactical level, the protection or defence of such sites may contribute to regional or domestic support for the mission.

¹⁴ For more information see Doctrine Note 23/01, *Cyber* (due for publication in 2023) and *Cyber Primer 2022*, JDP 0-50, UK Defence Cyber and Electromagnetic Doctrine, and *Cyber and Electromagnetic Domain Operating Concept* (CyEMOpC 2022).

¹⁵ Electromagnetic warfare is defined as military action to exploit electromagnetic energy to provide situational awareness and achieve offensive or defensive effects - Annex A to CyEMOpC 2022.



Figure 1-4. The urban system of systems

The impact of the urban environment on operations

- 1-35. Combined arms manoeuvre - attacking an opponent's weakness through shaping understanding, undermining the will to fight, shattering cohesion and mission command are as important in the urban as in any other environment.

Command

- 1-36. The complexity of the urban environment tends to increase the fog of war and forces a decentralisation of command; it drives the need for mission command. Control measures such as operations boxes, restricted and no fire lines, boundaries and limits of exploitation should be clear and visible, and based on prominent buildings and features (noting that these may change over time).
- 1-37. The subunit has a particular utility in the urban environment if reinforced to create a combined arms grouping. Subunit commanders should become comfortable with forming smaller task-specific teams at platoon/troop level, section level, or in ad-hoc groups. This requires flexibility, adaptability, and above all, training.
- 1-38. Physical barriers, such as buildings, degrade communications. Communications between neighbouring forces, sometimes even on parallel streets, may be limited and sporadic. The own station position and reporting function in Bowman will significantly degrade as global positioning system satellite reception fluctuates. Considerable effort must be made both during planning (where robust communications plans and secondary methods of communications are established) and during operations when commanders at all levels must 'fight for comms'. The potential mitigation methods are discussed in Chapter 3.

Intelligence

- 1-39. Intelligence, surveillance and reconnaissance coverage may be degraded and patchy due to a combination of factors including limited line of sight, poor connectivity, and poor communications.
- 1-40. Access to human intelligence will be more limited in 'warfighting' than 'operating'.
- 1-41. Feeds of open-source intelligence may appear to offer a rich source of information but acting upon open-source intelligence demands healthy scepticism and caution.
- 1-42. Subterranean systems are difficult, but not impossible to detect. Capabilities to detect underground systems are covered in Chapter 3.

Manoeuvre

- 1-43. Obstacles, whether emplaced or part of the built fabric, are virtually guaranteed in the urban environment. Engineer or assault pioneer support must be prioritised and properly resourced.
- 1-44. The urban environment is a three-dimensional manoeuvre space: covered approaches using gardens, mouse-holing through buildings or subterranean routes are some of the options to consider.
- 1-45. Depending on the threat, the lower airspace can be used to move troops to key objectives with potential landing sites available on rooftops or in open ground.

- 1-46.** The ability for the civilian population to disrupt operations should not be underestimated.

Fires

- 1-47.** In general, direct fire ranges are shorter than in the rural environment. Taller buildings offer longer line of sight/range but will still have blind spots where enemy movement is concealed. Engaging adversaries in taller buildings is made difficult because of limitations in weapons elevation and stand-off (Figure 1-5). Remote weapon stations, hand-held systems and artillery in the direct fire role provide options for engaging targets at elevation.

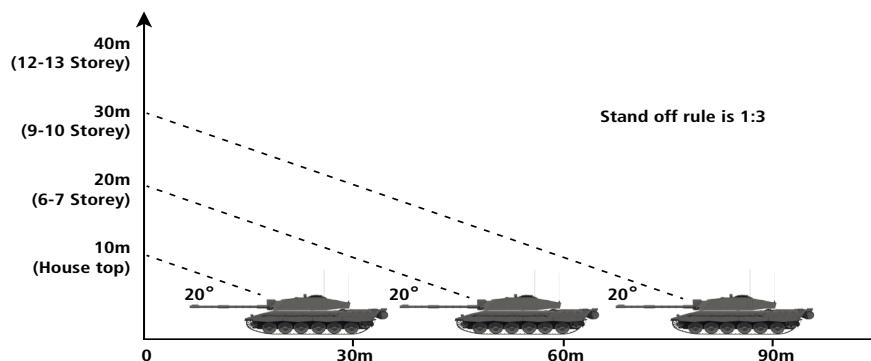


Figure 1-5. Engaging at elevation

- 1-48.** The ability to spot and adjust indirect fires may be affected by a lack of intervisibility. Buildings also interfere with indirect fire trajectories, and mortars fare better than artillery in this respect.
- 1-49.** Air defence fires sited on roofs will have good views of the lower airspace but may be unable to fire at targets below them.
- 1-50.** The size and proximity of the population will affect the use of fires under the law of armed conflict and rules of engagement.

Information activities

- 1-51.** Access to greater volume of non-military information systems may assist in information activities.
- 1-52.** Given the greater concentration of population, messaging may potentially reach a greater proportion of the population than in rural areas.

Protection

- 1-53.** Buildings provide cover from view and the more substantial ones, cover from fire. This protection requires a proportionately greater concentration of fires to deliver a similar effect on the enemy. Static units/headquarters may benefit from the use of underground facilities.

- 1-54.** The siting of military units will need to take into consideration human security considerations and the law of armed conflict.
- 1-55.** Military communications systems are easy to identify in the electromagnetic spectrum and do not necessarily 'hide in the clutter' of an urban environment. If military communications are used in an urban environment, the same force protection measures apply as in a rural environment.

Sustainment

- 1-56.** Urban operations greatly increase the consumption of combat supplies.
- 1-57.** Logistical movement may be constrained by obstacles and damage. Logistic units, casualties and captured persons will need protection both when moving and static.
- 1-58.** Understanding the availability and capabilities of friendly or host-nation facilities may alleviate a lack of logistic mass, however this must be balanced by the needs of the civil population.

CHAPTER 2

Operations in the urban environment

Introduction

- 2-01.** Land forces operate across the continuum of competition, but the way they do so is determined by the circumstances of their deployment. Although they are listed separately, any combination of these themes may be carried out at the same time and in the same campaign, and potentially within the same town and city simultaneously. This is occasionally described as the 'three block war'.¹⁶
- a. Conventional warfare.
 - b. Irregular warfare.
 - c. Stability and peace support operations.
 - d. Engagement.
 - e. Humanitarian assistance and disaster relief.
 - f. Homeland resilience.
- 2-02.** Each of the six military activities¹⁷ is dictated by the presence and attitude of the population, the sophistication and level of the opponent and the rules of engagement. The complexity and challenge of urban operations will vary, even within the scope of a single activity.
- 2-03.** Tasks for land forces in urban terrain are likely to involve:
- a. Defeating opposing land forces and seizing and securing terrain.
 - b. Evacuating, protecting or assisting the civilian population and/or UK and other nationals.
 - c. Providing intelligence support, combat support and combat service support for (potentially partnered) local national or proxy security forces.
 - d. The provision of military assistance, mentoring and advising local security forces; a requirement that may extend to partnering.
 - e. Defending, controlling, running or refurbishing vital facilities.

¹⁶ A concept described by US Marine Corps Maj Gen Charles Krulak to illustrate the complex spectrum of challenges likely to be faced on the modern battlefield. In Krulak's example, soldiers may be required to conduct conventional warfare, stability and peace support operations and humanitarian assistance and disaster relief within the space of three contiguous city blocks.

¹⁷ As outlined in each of the respective operational-themed Army field manuals.

- 2-04.** None of the activities listed above are likely to be conducted in isolation and may actually take place concurrently and in close physical proximity to one another. Key deductions include:
- Future operations require an understanding of all aspects of the urban environment.
 - Operations in the urban environment encompass all the operational themes across the full spectrum of conflict; the ‘three block war’ is a reality.
 - Given that all towns and cities are based in the land domain, urban operations will be led by land forces but will be supported by space, air and, where the cities are littoral based, by the maritime domains.¹⁸
 - The urban environment may offer a force some opportunities to negate technological advantages (typically intelligence, surveillance and reconnaissance (ISR) and fires). It may enhance the effectiveness tactics, techniques and procedures through concealment, deception, dispersion and emission control for all protagonists.
 - Urban operations will inevitably take place, to varying degrees, among the population. They demand careful coordination to minimise civilian casualties and collateral damage.
 - Proliferating information and communications technology ensures that operations will be open to international scrutiny.

Urban operations

- 2-05.** Prior to undertaking urban operations commanders must ask themselves three contextual questions: why, what and how? These questions complement the estimate process described in the *Planning and Execution Handbook*.
- Firstly, why are operations being conducted in this urban area at the strategic, operational and tactical levels?
 - Is it because it is vital to the campaign effort or simply because it has a concentration of enemy within it, or threatening it?
 - Can that enemy be persuaded to vacate the city by a turning movement or threat of encirclement?
 - Can the defence of a city be conducted on its approaches rather than fighting inside the city itself and avoid causing destruction and civilian casualties?
 - Secondly, what is the aim of the operation at the strategic, operational and tactical levels?
 - Is it to clear an enemy from a particular settlement, or to simply exert or retain control (in its entirety/key terrain/vital ground)?
 - If so, what does control mean? What force ratios¹⁹ will it require and for how long to achieve the required effect?

¹⁸ Noting that in littoral-based cities, especially around ports, initial operations may be conducted by maritime forces.

¹⁹ See Chapter 4, paragraph 4-04, on force ratios required in the attack.

- c. Finally, how should the urban operation be conducted?
 - (1) By forcing a way in and fighting street by street to clear it, or will an investment followed by precision strikes and raids achieve the same result?
 - (2) If required to occupy the urban area, what forces are needed, and for how long?
 - (3) Will the population be compliant or hostile? What will it mean for the conduct of the operation and the measurement of success?
- 2-06.** Initially not all these questions can be answered fully, but commanders must be clear about the circumstances which will force a review of the situation, and which require a change in approach to achieve the mission.
- 2-07.** Law of armed conflict. When operating in an urban environment UK armed forces must do so in accordance with the laws of armed conflict as set out in JSP 383: *Joint Service Manual of the Law of Armed Conflict*. The laws of armed conflict are based on four key principles:
 - a. **Military necessity.** UK forces may only use force which is controlled, lawful and directed towards achieving the complete or partial submission of the adversary at the earliest possible moment with the minimum expenditure of life and resources. Targeting in the urban environment must be conducted in accordance with JSP 900: *UK Full Spectrum Targeting Policy*.
 - b. **Distinction.** Civilians and civilian objects may not be attacked. In the urban environment there is a much greater probability of civilian infrastructure being used by an adversary for military use.
 - c. **Proportionality.** Military objectives must not be attacked if the expected civilian casualties or damage to civilian objects would be excessive in relation to the expected military advantage to be gained from the attack.
 - d. **Humanity.** The concept of humanity forbids the infliction of suffering, injury or destruction not actually necessary for the accomplishment of legitimate military purposes.

Human security

- 2-08.** It is impossible to fully separate the population from the effects of conflict, particularly in the urban environment where population density is greatest. UK doctrine lists seven principal sources of human insecurity including: physical, political, economic, cultural, health, food, environment and information. The UK approach to achieving human security and to mitigating the effects of conflict and instability in these areas is explained in Doctrine Note *Human Security* (due for publication in 2023).
- 2-09.** The moral component of fighting power places both a moral and legal obligation upon UK land forces to ensure the security of the civilian population during operations. In circumstances whereby the rule of law and security of the populace is compromised due to a degraded or absent indigenous host-nation police force, and/or lack of judicial processes, reinforcement or replacement may be required in the provision of stability policing. Stability policing (further detail available in *Military Police Handbook, Part 2: MP Tactical Doctrine* and AJP 3.22, *Allied Joint Doctrine for Stability Policing*) should only be conducted where mandate allows, and the principle of host-nation primacy employed

wherever able. Military police can advise and lead on stability policing operations under the remit and guidance of the force provost marshal.

- 2-10.** In an armed conflict, UK land forces have an obligation under laws of armed conflict to spare the civilian population, and civilian objects, when conducting military operations. When planning or conducting an offensive operation, all feasible precautions must be taken in the choice of means and methods of attack to avoid, and in any event, minimise incidental loss of civilian life, injury, and damage to civilian objects. Other precautions when conducting attacks include effective advance warnings to the civilian population that may be affected, where circumstances permit this. They must also direct attacks exclusively against military objectives and must not conduct indiscriminate attacks. Land forces must also, to the maximum extent feasible, remove the civilian population under their control from the vicinity of military objectives. They may therefore need to facilitate the movement of large numbers of civilians or support other agencies in this task. This could include the sharing of information, the securing and marking of routes, screening and checkpoints and the provision of basic life support.
- 2-11.** Where the civilian population is unable or unwilling to move, then commanders must take every precaution to ensure that civilians are protected from the effects of military operations as far as feasibly possible. This will place particular emphasis on effective intelligence to determine the location of civilians warning civilians of attacks in their vicinity. The targeting process must ensure that proportionality, distinction and military necessity of any attacks is applied. Such an approach will present additional challenges for troops in direct combat and particularly on the use of anti-structure munitions.

Forms of manoeuvre

- 2-12.** Forms of manoeuvre are described in AFM *Conventional Warfare*. Their application in the urban environment is described in the following paragraphs.
- 2-13. Turning movement.** A turning movement may be used to threaten an adversary's communications and convince them to abandon the urban area, thus avoiding the need for major combat operations. It may also force them to fight in the open to reopen their lines of communication. This manoeuvre is unlikely to be successful against an irregular adversary who may not be dependent on external support and may be determined to draw in a technologically superior force.



Figure 2-1. Turning movement

2-14. Encirclement. Urban encirclement is an offensive manoeuvre in which the attacking force passes around the urban area to trap a force and to prevent it from breaking out. It allows the manoeuvring force to invest the city by establishing control over the perimeter of the urban area and by holding access points, allowing some control over those entering or departing the urban area. Either a whole town or small city can be encircled or a single district within a larger city.



Figure 2-2. Encirclement

2-15. Penetration. Penetration seeks to reach the depth of an adversary's position on one or a number of narrow axes. Penetration on a relatively narrow front is likely to be the most successful method of breaking into an urban defence and should ideally be made at the narrowest part of a defended position. A defended position is only defeated when it has been penetrated to its full depth.



Figure 2-3. Urban penetration

2-16. Infiltration. Infiltration aims to secure objectives within the urban area without having to fight to reach them. Infiltration is most effective when facing a neutral or supportive population and when conducted at night.



Figure 2-4. Infiltration

Shaping operations

- 2-17.** Shaping operations create the conditions for decisive action. They are particularly relevant for operations in urban environments where advantageous force ratios may be difficult to achieve, and an attritional approach to combat is unlikely to be acceptable or desirable. They seek to dislocate, overwhelm and confuse opponents. In urban environments, shaping operations are as much about degrading the will and cohesion of opponents as they are about the physical destruction of equipment and personnel. Shaping operations include investment, raids and precision strikes, supported by information activities.

Investment

- 2-18.** Sieges were historically conducted when an attack on a city or fortification was considered too costly or impossible until a breach was affected. Alternatively, the defenders could be starved into submission. In the modern context, while laws of armed conflict do not prohibit sieges per se, laws that regulate the conduct of hostilities and protect civilians, such as the principle of distinction and the prohibition on causing unnecessary suffering may render siege warfare unlawful. Furthermore, deliberate starvation of civilians as a method of warfare is not permitted.
- 2-19.** The investment of an urban area is a tactical task that requires a force to seal all or part of it to isolate an enemy, both physically and psychologically,²⁰ to prevent reinforcement or resupply and to deny freedom of action. An investment is achieved either by envelopment or encirclement. The aim is to completely or partially isolate and trap the enemy. It should be considered if a turning movement is unlikely to or has failed to dislodge the defending force.
- 2-20.** The investing force creates blocks on all ingress and egress routes preventing reinforcement or supplies reaching the encircled force. Where the perimeter being held is very long or the force provided inadequate to cover the entire perimeter, blocking positions should be established on the main routes and the gaps covered by ISR and patrols. A mobile force will be required to counter any attempt to exit or resupply/reinforce the city.

Evacuation of civilians from the combat zone

- 2-21.** The population should be allowed to leave via recognised and notified routes to reduce the potential for civilian casualties. Controlling access and egress to the urban environment also offers a valuable means for land forces to collect intelligence from the population as well as enhancing their protection. In certain circumstances, humanitarian aid may need to enter the city.
- 2-22.** When a force is in control of a city, cordon operations can be used to seal off areas of the city for targeted operations. These could also be a precursor to a more permanent *cordon sanitaire* or the installation of walls or barriers²¹ to separate belligerents or to deny opponents freedom of movement.

²⁰ Noting that with modern communications, it is impossible to prevent all methods of communications in and out of a city.

²¹ Examples include the 'peace line' in Belfast or the erection of concrete barriers in Sadr City in 2008.

Raids

- 2-23.** Investment can be accompanied by raids and precision strikes which are conducted against the defending forces. The purpose of a raid is to:
- Destroy discrete elements of the enemy force.
 - Fracture the cohesion of the enemy defence by defeating critical capabilities.
 - Provide intelligence for future operations.
 - Demonstrate land forces effectiveness, while minimising civilian casualties and collateral damage.
- 2-24.** Raiding can have both a physical and psychological effect. The neutralisation of an enemy commander or destruction of key equipment can degrade the ability of an adversary to fight. Raiding demonstrates freedom of action, achieves surprise and keeps opponents off balance by retaining the initiative. When integrated with information operations, raiding can be effective in undermining the will of an opponent to resist, as well as improving situational awareness and maintaining an offensive spirit. The conduct of an urban raid is considered further in Chapter 4.



Figure 2-5. The urban raid

Precision strikes

- 2-25.** Precision strikes can be employed to degrade and disrupt key constituents of the opponent's network. They can reinforce a narrative or message to attack enemy will and cohesion. Targeted strikes by artillery, air, raiding ground forces and electromagnetic warfare should be fully integrated with information activities.
- 2-26.** Battle damage assessment is supported by ISR and human intelligence. In urban environments, disproportionate collateral damage from lethal fires should be anticipated, particularly where fluid or mobile operations are taking place and situational awareness

is incomplete. Opponents will often seek to base their operations within, or adjacent to, sensitive sites for protection or to force a mistake. Commanders must judge the risk against the reward of each action according to in delegated freedom of action, rules of engagement and the laws of armed conflict.

Deception, demonstrations and feints

- 2-27.** Deception activities can create cognitive overload and uncertainty in the minds of the enemy.²² Opportunities to deceive opponents in the urban environment will be challenged by the proximity of neutral and hostile observers. Achieving genuine surprise can be difficult and a robust deception can mitigate some of the risk. Examples include, masking a concentration of forces in routine military traffic, moving at night, a demonstration and the release of misinformation (psychological operations).

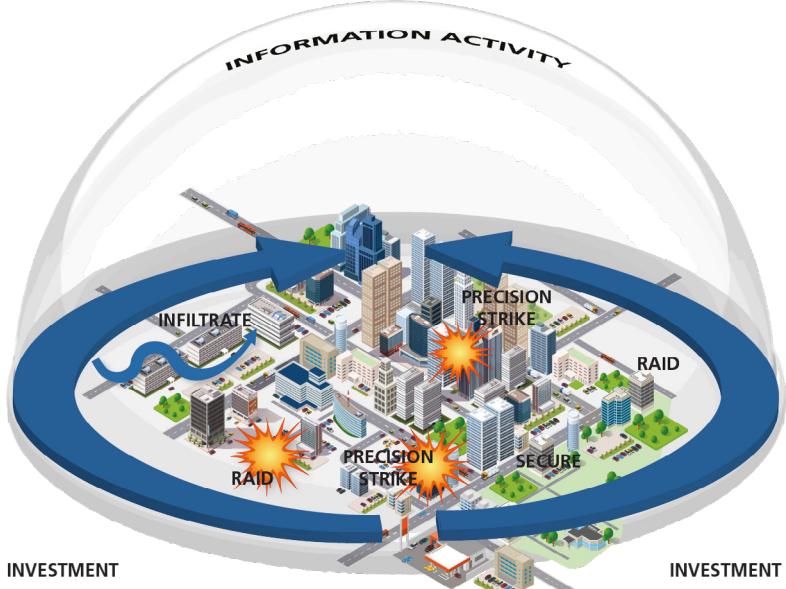


Figure 2-6. Shaping operations

²² Prior to the Battle for Berlin in 1945, Red Army commanders sought to keep the German defenders in a constant state of anticipation and sleep deprivation. Feint attacks into the city and sporadically launched artillery attacks, degraded the ability and will to fight of the defenders, undermining resistance in preparation for the main attacks.

Investment - Basra 2003



Lessons:

- **Shaping operations.** A combination of tactical patience, air strikes, infiltration of special forces and psychological operations.
- **Investment by cutting key routes** was achieved by a small force, but still had the effect of preventing enemy reinforcement.
- **Combined arms raids** were able to determine likely resistance and presented opportunities to exploit. Principally these raids were successful because the enemy was disorganised and did not have a coherent anti-armour defence in place.
- **Plan the transition.** Despite efforts to return the city to normality, looting and a breakdown of security rapidly followed the capture of the city. Reducing troop levels resulted in a security vacuum.

The ground attack began during the night of 20/21 March 2003. The start of week two of the operation saw 1st (UK) Armoured Division tightening its grip on Basrah in what was beginning to look like a siege. Iraqi opposition was collapsing; their ability to command and control their forces had been rapidly eroded by coalition air assault. The British attempt to isolate the city depended on the need to control five bridges over the Shatt Al Basrah waterway. The Iraqis launched several counter-attacks that were beaten back. The fighting for Bridge Four, that carried the main route into the city, was particularly intense. Control of the bridges was complicated by the number of civilians that were using them to flee the city; the Iraqi army and irregulars (Ba'ath militia) often targeted these civilians and often used them as cover. At this point, the mast that served the local television station was felled by tank fire. Blacking out local television and radio was a controversial decision as the facilities would be needed to aid the state's recovery after the war. The decision was justified by the wane in support for the Ba'ath militia almost immediately after its destruction.

After the bridges had been secured, the main approaches into the city were also occupied to isolate it from Baghdad. A number of informers and agents had been infiltrated into the city who were able to pass vital information back to the divisional headquarters. Once the cordon was in place these were supplemented by special forces. Although the British presence around the city was described as a siege, force levels were inadequate to completely invest such a large city. Civilians could leave and some Saddam regime militants slipped away, but no more were allowed to enter. The British forces worked hard to avoid a humanitarian disaster. The civilians were spoken to and given leaflets; often they would give useful information about the state of the Iraqi army and conditions within the city.

Iraqi mortar bombs fell on fleeing civilians, fired from small courtyards and directed by mobile phones. Iraqi diehards hidden in empty buildings posed similar threats with assault rifles and rocket propelled grenades. They also had to be removed, with minimal damage to civilians, their homes and cultural sites. This was often achieved by precision fires from attack helicopters.

Before approaching Basrah, fears had been voiced that urban operations would cause the sort of casualties other armies had suffered in Stalingrad or Berlin, but good tactics and high-quality equipment, kept British losses to a minimum. There was no timetable to take the city; Major General Brims told the media: "I'm a very patient man".

The city was clearly too large and the force levels too low to launch a single offensive assault to capture it. Consequently, combined arms raids were used to move into the city, strike an identified target, gain information or disrupt Iraqi forces, and then to withdraw back over the secure bridges. These raids wore down the defenders, however, hopes that the population would rise against the Ba'ath regime did not materialise.

The British were faced by small teams armed with RPGs and individual tanks, but the Iraqi forces were unable to defeat the combined arms teams of armour and armoured infantry. The British were increasingly able to take and hold ground while the Iraqi forces were unable to seriously challenge them. These shows of force and their powerlessness to oppose them, frightened off many of the regime's fanatics. Iraqi soldiers were seen discarding their uniforms and disappearing.

The raids confirmed the growing British domination and, early on 6 April, the divisional commander ordered a three-pronged attack on the city.

Before these operations, leaflets and posters were distributed and messages broadcast, testing the mood of local civilians and resistance fighters. As darkness descended, the raiders stayed put instead of withdrawing and although the irregulars attempted some small attacks, thermal sights gave the British an immense advantage over their opponents who had no sophisticated night-fighting capability. Light infantry were used to clear areas where armour could not manoeuvre down narrow streets. The enemy withdrew before them without firing a shot although their advance was often held up by cheering crowds.

The greatest resistance was centred on the university which was occupied by about 300 militia. The armoured infantry had to fight their way through building after building, room after room, using grenades and rifles for three hours until all resistance was overcome.

By midday on 7 April, Basrah had fallen. Soon afterwards, a programme to raise a new Iraqi police force was managed by the Royal Military Police and within a week of the fall of Basrah, the first joint UK-Iraqi police patrols began. The war had caused relatively little damage to the city's infrastructure, although the army failed to stop the looting that followed the fall of the

regime. Coalition forces were swift to make contact with local tribal chiefs, civic leaders and clerics to distribute water and food and begin the process of reconstruction. Royal Engineers teamed up with their Iraqi counterparts to get power and sewage plants, water and oil pumping stations up and running again. Medical teams encouraged doctors and dentists to return to their practices and explosive ordnance experts dealt with the numerous weapons, explosives and booby traps that had been left behind by the retreating regime militia. In mid-April the railway was reopened and by mid-June the port had been handed back to its Iraqi management.

However, despite all these efforts to return the city to normality, the truth is that the initial looting continued, followed by a rising crime rate, resulting in a complete collapse of the city's infrastructure and, as troop levels were reduced, there were insufficient to protect the city resulting in a security vacuum.

Decisive operations

- 2-28.** Combat operations may leave no option but to seize key terrain or vital ground inside urban areas. Decisive operations to seize urban objective are preceded by a period of shaping and investment to identify and weaken the enemy's defence. There are two methods of entry into a defended urban area: penetration or infiltration.

Penetration

- 2-29.** Penetration is designed to concentrate overwhelming force at a decisive point (s) to fragment the defence, overcome the perimeter forces and swiftly seize key terrain or vital ground. It is often quicker than attacking on a broad front, which dilutes the force and requires a methodical clearance. It should be conducted with supporting depth fires and, if possible, on multiple axes to prevent the attacking force becoming encircled.

- 2-30.** Deep penetration aims to seize or destroy specific objectives in depth and to shatter cohesion and force a collapse in the defence. A full clearance may still be required to clear pockets of resistance.
- 2-31.** Objectives for a penetrating force may be military, such as a headquarters or strategically important bridge, or vital civilian infrastructure such as the seat of government. The force will have to secure the route(s) of entry to allow sustainment and casualty evacuation. The conduct of an attack is considered further in Chapter 4.

Infiltration

- 2-32.** Infiltration seeks to avoid defended locations using stealth, deception and surprise to occupy positions often in the rear or depth of the adversary's defence. Objectives could include enemy headquarters, key defended points or vital infrastructure. The Nagorno-Karabakh vignette below illustrates the value of infiltration.
- 2-33.** A well-conceived and resourced deception plan is necessary to mask an infiltration. The larger the force the more difficult it will be to avoid detection, and armoured infiltration is only likely to be contemplated in a large city in which the adversary is poorly established and the population supportive to the attacking force. Ideally, infiltration should be attempted in poor visibility or darkness and consideration should be given to the following:

- a. A well-resourced and carefully executed ISR plan will be crucial to ensuring the success of an infiltration.
- b. Control. Control of movement is important. Each subunit should use its own infiltration 'lane'. Depending on the way the built-up area is laid out, each infiltration lane may need to be 500m to 1,500m wide.
- c. Movement. The infiltrating subunits should advance on foot, maximising stealth, cover and concealment. Mortar and artillery fire can be used to mask the infiltration.
- d. Anti-armour protection. Anti-tank weapons can be positioned to cover likely avenues of approach. Reconnaissance should provide a screen for flank protection.
- e. Flank protection. Subunits moving into the built-up area must secure their own flanks. Protective subunits may be placed along the route to warn of a flank attack. Engineers can provide counter-mobility support. Adversary positions should be avoided, but locations reported.
- f. Security. Infiltration is unlikely to be successful where the population is supportive of the adversary.
- g. Action on the objective. Infiltrating companies should proceed at best speed to the objective. On arrival, they should establish mutually supporting defensive positions. Infiltrating forces may have to hold the positions for some time until reinforced or relieved, so need to hold sufficient combat supplies and have a robust casualty evacuation plan.

Infiltration - Nagorno-Karabakh 2020



Lessons:

- **The importance of infiltration.** Covered approaches and unguarded routes allowed the infiltration to succeed.
- **Isolation by route denial.** Once inside the city, it could be isolated by blocking positions on major routes as well as the destruction of key bridges.
- **The utility of light forces.** Light forces were able to establish strongpoints and used ambush tactics to destroy enemy armour and called upon artillery support to break up counter-attacks.

The key city of Shusha sits astride the main mountain pass that links Armenia to Nagorno-Karabakh. As well as being the capital of the Armenia-backed and self-proclaimed Republic of Artsakh it is also culturally significant for both Armenians and Azeris. The city is also a formidable natural fortress. Steep cliffs drop off from the edges of the city on three sides and a lone major road passes north to south along the western edge of the city.

At some point between 28 and 30 October, Azerbaijani special operations forces deployed to isolate Shusha and disrupt the city's defence. 400 soldiers divided into four groups approached the city from different directions and headed toward different objectives. Marching for five days through the forests and ravines, they were especially careful to avoid the heavily guarded Lachin corridor and surrounding villages. On approaching Shusha some groups infiltrated the city, climbing steep cliffs to do so, while other established blocking positions and ambush sites around the city to prevent the Armenians from being reinforced or resupplied. Combined with the destruction of a key bridge over the Hakari River, by 5 November Shusha had been invested.

The Armenian forces inside the city were reported to comprise over 2,000 troops, along with armoured vehicles and heavy artillery. The Azerbaijani light forces destroyed several tanks and BMP infantry fighting vehicles using rocket-propelled grenades and portable anti-tank guided missiles. They also used heavy fires, reportedly including multiple-launch rocket systems and artillery pieces that were at this point relocated closer to the city's boundaries.

On 7 November, foggy weather struck the area, limiting Azerbaijani forces' use of aerial observation and strike assets that had given them such an advantage throughout the war. The inclement weather enabled Armenian forces to maximise the use of their armoured vehicles, T-72 tanks, and BMP-2 infantry fighting vehicles, for counter-attacks inside the city.

Despite this development, the Azerbaijani light forces held their ground, and repulsed three Armenian counter-attacks. By now the Azerbaijani main forces had arrived and began a systematic clearance of the city. By 8 November Shusha had fallen and two days later a peace treaty had been signed with Armenia in which the whole of Nagorno-Karabakh was ceded to Azerbaijan.

Subterranean operations

2-34. Subterranean systems present opportunities and threats to both an attacking and a defending force. They provide manoeuvre space, protection and a means of resupply and casualty evacuation. Considerations for operating in the subterranean space are described in Annex A.

Seize and hold key terrain²³

2-35. As well as offering a tactical advantage, key terrain may be designated for its centrality to the systems that sustain and enable the activities of the population. Key terrain may therefore include centres of government, markets, radio and television broadcast centres, and fuel, water or power distribution centres.

2-36. Where insufficient forces are available to hold an entire urban objective, it may be necessary to prioritise key terrain over other areas and use fires and raiding to disrupt or degrade opponents elsewhere. This is discussed further in nodal defence below.

Defence

2-37. The defence of a town or city requires commanders to understand what they are defending, against what, and for what purpose. A defence may be wholly or partially situated in an urban area. Orthodox thinking suggests that urban terrain generally favours the defence because the infrastructure enhances the combat power of defending forces by offering physical protection, concealment and natural obstacles. With the minimum of preparation these advantages can be greatly enhanced, and defensive strongpoints can be developed (although these may be vulnerable to an adversary with access to thermobaric and precision weapons). The execution of the defence is described in detail in Chapter 4.

2-38. The principles of defence²⁴ apply to actions within the urban environment. Defensive actions should be aggressive, have mobile elements and exploit depth. The defender should concentrate on retaining the initiative, particularly in their capacity to move forces and locate those of the adversary to counter adversary penetration. In some cases, a defender may allow penetration to expose the adversary to fires, counter-attack or ambush, throughout their depth. The defender should seek to disrupt and frustrate adversary intentions in every phase of battle.

²³ Vital ground is ground of such importance, the loss of which makes the defence untenable. Key terrain is any ground that offers a marked tactical advantage to either side.

²⁴ AFM Conventional Warfare, Chapter 3.

- 2-39. Early warning of an intention to defend a built-up area will enable task organisation and positioning of engineer resources and combat supplies.
- 2-40. Concealment and cover will be plentiful, but observation will be difficult. Intelligence, surveillance, target acquisition and reconnaissance should be sited to cover possible enemy infiltration approaches. Where mutual support is difficult to achieve, then depth should be maximised. The nature of the terrain will lead to close quarter combat.
- 2-41. Defensive measures may include the barricading of streets and the employment of short-range direct fire weapons. Frontages are likely to be much reduced; an infantry company may be restricted to 300m to 600m or inside a multistorey building. The density of buildings, sizes and heights, construction materials, rubble and street patterns will dictate frontages and arcs of fire. As arcs are unlikely to be overlapping, the surveillance and target acquisition plan will require careful coordination to ensure gaps are covered. Consideration should be given to using trenches in urban areas, as well fighting from as buildings which are obvious targets for indirect fire.
- 2-42. Preparation of the battlespace is essential and includes combined arms defensive planning.²⁵ Although not an exclusive list, consideration should be given to clearing fields of fire, strongpoints, explosive and non-explosive obstacles, concealed surface and subsurface routes, shaping enemy approaches, protection of (civilian and military) communications and utilities.
- 2-43. Identification of key terrain allows the defender to select defensive positions and assists in determining the adversary's likely objectives. It may include bridges, dominating building complexes, political centres, public utilities, or even open areas.
- 2-44. Preventing investment. The enemy will attempt to isolate a defending force, so the urban battle will extend beyond the built-up area and is part of a wider battle at the tactical and operational level. Reserves, with release authorities held at the appropriate, not the highest, levels are critical. Contingency plans in case of encirclement for reliving the defence, breakout, exfiltration or withdrawal need to be in place and rehearsed. These are covered in detail in AFM *Conventional Warfare*.
- 2-45. Countering infiltration. Enemy infiltration is a considerable threat, exacerbated by the closeness of the urban terrain. A well-resourced and coordinated surveillance and target acquisition plan may be required. Remote sensors are of particular use, with varying degrees of differentiation between adversary and civilian activity. Consideration should also be given to the use of existing security and surveillance infrastructure, such as closed-circuit television and traffic cameras.

Delay

- 2-46. Delay aims to trade space for time, reducing the adversary's momentum while inflicting damage without becoming decisively engaged. This is most often effective as part of the disruption battle. The urban environment is ideal for achieving this if an attacking adversary can be drawn into it. An urban area can also provide the hinge around which the adversary may be forced to manoeuvre, and subsequently channelled, into an area favourable for their destruction. Imposing delay in an urban environment can be an effective force-multiplier. With engineer support, a combined arms force can delay and disrupt a much larger enemy.²⁶

²⁵ Planning and Execution Handbook, Chapter 7.

²⁶ This may allow light forces to have a greater impact than in open or rural terrain.

2-47. An urban area is well suited to support delay for the following:

- a. A covering force during a withdrawal.
- b. An advance guard when encountering superior forces or in response to an adversary counter-attack.
- c. A fixing force in mobile defence.

Night operations

2-48. Operating at night in the urban environment can be challenging but very effective against a less capable enemy, particularly for light forces and infiltration. Night operations are examined in more detail in Annex B.

Sustaining

2-49. Operations in the urban environment create sustainment challenges: increased consumption rates and casualty rates, transport difficulties and the 360-degree threat. Enduring operations require intimate close support, characterised by task-organised logistic groupings to provide first-line support.

2-50. Sustainment planning should anticipate the temporary isolation of elements and units within the urban terrain, increased consumption rates, as well as an increased burden on the medical and captured persons chains. Combat supplies and enhanced medical and equipment support should be held forward in sufficient quantities to allow for this, and alternate means of delivery and evacuation of casualties should be considered, for example by helicopter (subject to air defence threat) or tunnels.

2-51. Logistic lines of supply should ideally be cleared and stabilised before committing to high-intensity operations in urban terrain. This could include ground-dumping of non-essential supplies, the clearance of casualties from role 2 and 3 medical facilities and the use of existing hospitals and ceasing all non-essential equipment repair and maintenance work.

2-52. Supply areas adjacent to and within the urban environment will need to be carefully sited and protected. The movement of combat supplies to the fighting echelon can be restricted by the terrain and 360-degree threat.

2-53. Soft-skinned logistic vehicles will often be constrained to main supply routes and vulnerable to close quarter attack. The delivery of combat supplies forward may therefore be conducted as deliberate operations, employing reconnaissance forces, flank guards and combat engineers to facilitate manoeuvre support. Demand may be reduced by utilising local resources such as food, water and power, where these can be agreed and assured, and their distribution controlled.

2-54. All equipment should be repaired forward where possible and procedures for armoured vehicles to recover vehicle casualties out of the direct fire zone to an equipment collection point should be readily applied. The use of all rear moving vehicles to carry casualties with non-life-threatening injuries should also be considered.

Local resources and capacity

- 2-55. Utilising local resources and infrastructure forward can be attractive, but also a double-edged sword. While adopting this approach can reduce the stress on the supply chain, consideration must be given on how this will affect the local population. Understanding the impact of the use of local resources on the population, and the security of supply, are key considerations for the tactical commander.

Maintenance of routes

- 2-56. The clearance and maintenance of routes will become important especially if there is prolonged fighting and streets become cratered or rubbleised. Route clearance and counter-explosive ordnance measures will have to be considered commensurate with the threat and appetite for risk.

CHAPTER 3

Capabilities and planning considerations for use in urban operations

3-01. This chapter will detail the capabilities and planning considerations for urban operations using the tactical functions - command, intelligence, manoeuvre, fires, information activities, outreach, protection and sustainment.

Command and control

3-02. Command in the urban environment presents a unique series of challenges. Line-of-sight disruption on command and communication and information systems, and the impact of terrain on movement mean that units may be operating remotely for long periods of time. The complexity of the urban environment readily exposes weakness in command. Mission command and robust application of the principles of command: unity, continuity, chain and integration are vital for effective urban operations.

3-03. Operations in the urban environment will strain the command, control, communications, computers, information and intelligence, surveillance and reconnaissance (ISR) capabilities; flexibility and innovation on the part of commanders and staff is important. Data is likely to be severely limited by reduced high-capacity data radio range. Subject matter expert input to understand mass communications facilities (including radio, television and telephone networks such as landline and mobile options) may be critical to the urban battle.²⁷ Relatively low levels of damage to urban infrastructure can cause serious problems to communication infrastructure.

Communication challenges include:

- a. Disruption to radio frequency propagation and multipath due to the nature of the terrain.
- b. Congested bandwidth caused by high density and mobility of nodes and users.
- c. The lack of stationary communications infrastructure.
- d. Interference due to multiple users and radio frequency sources.
- e. Radio equipment interoperability challenges with partner nations.
- f. Security (transmission security, communication security).
- g. The limitations to power supply where infrastructure has been damaged.
- h. Competition between high bandwidth applications (real-time video, etc).

²⁷ There are country-wide infrastructure booklets available from the Defence Intelligence Services or other military sources.

- i. Mobile routing.
- j. Frequency management.
- k. Network management in mobile, urban environments.

- 3-04. Where possible, and noting possible security implications, consideration should be given to using civilian communications (which have been specifically designed for the environment), utilising efficient waveforms and different techniques to deal with the problems of multipath, fading, and intentional and unintentional interference coming from other systems.
- 3-05. Communications between neighbouring forces, even on parallel streets, may be limited and sporadic. Significant improvement in coverage can be gained by operating relay stations from airborne platforms or on high ground/buildings.
- 3-06. Ground combat communications networks are usually operated in the VHF frequency band. Lack of available frequencies can limit the use of radio relays to overcome masking and interference. Electromagnetic spectrum management is critical to success in urban operations.

Overcoming urban effects on communications

- 3-07. The effects of the urban terrain on communications can be mitigated by:
- a. A comprehensive understanding of the command and control states to help build resilience and proactive planning.
 - b. Establishing and protecting tactical satellite dishes and rebroadcast stations on high-rise buildings or dominating ground, placing armoured vehicles at nodal points and employing helicopters and uncrewed aircraft systems to rebroadcast or relay transmissions, depending on the air defence threat.
 - c. Using alternative means of communication including messengers, field signals, line and civilian telephone systems.
 - d. Using existing surveillance infrastructure for military purposes, for example closed-circuit television, traffic cameras and hand-held radio scanners.
 - e. Ground manoeuvre forces must be prepared to reconnect to combat net radio networks when emerging from buildings, tunnels or dead spots, and optimise short-range personal radios and word of mouth to maintain situational awareness within the subunit or platoon.
 - f. Maintaining the ability to switch to reversionary modes of battle monitoring and planning within headquarters.
 - g. Using spot maps, which are quicker to use than grid references, to relay own and adversary locations over combat net radio.
- 3-08. UHF is less susceptible to electromagnetic interference than VHF. If VHF must be used, then the upper end of the VHF band and high-power are options to improve coverage but they come with increased risk of enemy detection.
- 3-09. It may be necessary to establish a communications network based on commercial radios, satellite telephones or a mobile phone network via permanent, protected rebroadcast stations, if the available communications infrastructure cannot support information exchange requirements.

- 3-10. Rebroadcast stations.** Urban terrain disrupts VHF tactical communications and thus makes synchronisation of combat power difficult. One solution is the use of rebroadcast stations which may be either static or mobile (vehicle-borne). It should be noted, however, that the co-location of a key asset with a rebroadcast station will increase its risk of detection. The advantages and disadvantages of each are:
- Static** - Can elevate antennas by climbing buildings, relatively slow into action and slow movement between sites. Are more vulnerable to enemy action.
 - Rolling** - Rolling mobile rebroadcast stations keep in range of dismounted troops with less powerful radios and then rebroadcast outwards on a higher power.
- 3-11.** Global positioning system satellite reception difficulties will significantly degrade the own station position and reporting function in Bowman. Dismounted force elements are particularly affected as they move into and through buildings; consideration should be given to turning own station position and reporting off to de-stress the system.

Setting the conditions

- 3-12.** Units and staffs must prepare for and mitigate the communication problems in urban areas by:
- Training in and use of rebroadcast sites and equipment, and the use of reversionary means such as runners and link personnel.
 - Airborne command posts, satellite communications, high-frequency radios, and other spare/available communication platforms and systems.
 - Careful positioning of commanders, command posts and antennas to take advantage of urban terrain characteristics.
 - Detailed communications analysis for deconfliction and movement between units operating in close proximity to each other.
 - A resilient primary, alternate, contingency and emergency plan including rehearsed reversionary modes.
 - Training and preparation for a zero-communications scenario where lower levels must employ mission command and act on the commander's intent.

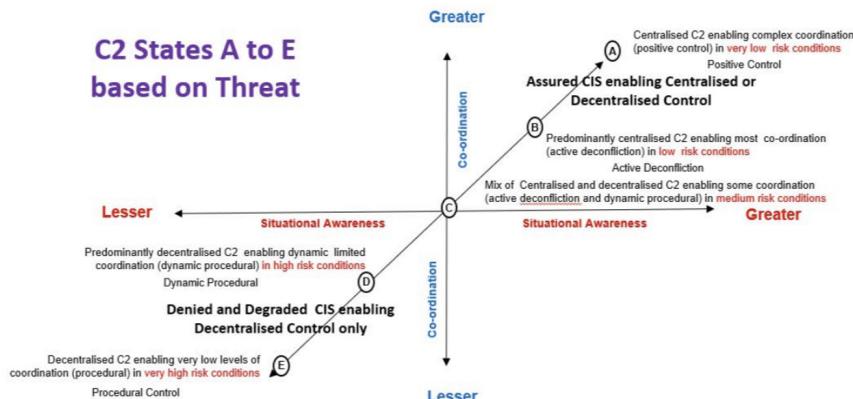


Figure 3-1. Command and control

Battlegroup-level communications

- 3-13.** Commanders must allow for intermittent or complete loss of communications in urban environments and place greater emphasis on simple plans, clear boundaries and mission command based on a clear, simple intent. Non-line-of-sight, VHF manpack distances of 200m to 1,500m should be anticipated.
- 3-14.** Without tank telephones and personal role radios compatible with vehicle radios, communications to vehicles may be restricted to the busy company/squadron net. Consideration should be given to using platoon/troop nets if frequencies are available.

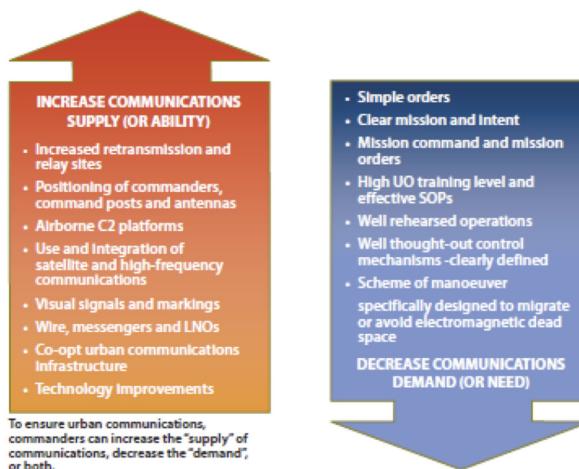


Figure 3-2. Overcoming communications challenges

Intelligence, surveillance and reconnaissance

- 3-15.** The complexity of the urban environment requires careful intelligence, surveillance and reconnaissance (ISR) management. Existing ISR doctrine²⁸ recommends multiple, layered intelligence and collection assets which can cross-cue each other for optimal coverage. Detection in the urban environment is often at close range; the observe, orientate, decide and act loop is reduced, reaction times shortened. The ability to effectively conduct dynamic targeting and exercise mission command are key to success in this environment.
- 3-16.** ISR provides the means to understand the terrain, actors, objects and events within the battlespace, to protect and warn the force of threats and enable the accurate and effective employment of effects. Massing and layering increases resilience and redundancy in a contested environment where ISR is likely to be a key target. The urban environment presents unique challenges and opportunities for the employment of ISR.

Challenges:

- a. Urban clutter and terrain masking render stand-off sensors ineffective.
- b. Electromagnetic signal attenuation is poor. More electronic warfare and signals intelligence sensors are required to cover smaller areas, often in closer proximity to potential targets than usual. Geolocation of emitters is problematic due to signal multipathing.
- c. Reduced sightlines require higher sensor density for acceptable area coverage.
- d. High-rise urban structures increase look angles and require predictable and lower-level cover from overhead capabilities, which increases the threat to airborne platforms.
- e. Physical urban clutter, high levels of human activity and concentrated use of the electromagnetic spectrum in key areas raises the noise floor making it difficult to identify specific targets, objects and events, and to identify patterns and anomalies.
- f. A large proportion of the battlespace is located inside buildings, which are inaccessible to most sensing modalities.
- g. Targeted reconnaissance operations are often required in the built-up area to fill gaps in routine surveillance.
- h. The more discreet the target, the greater concentration of ISR required to detect it.

Opportunities:

- a. The relatively density of urban terrain makes concentration of limited ISR easier.
- b. Civilians present opportunities for human intelligence exploitation.
- c. Cities are increasingly interconnected and 'smart'. They constitute a sensor in their own right; closed-circuit television, biometric security systems, utility monitoring and traffic control systems can all be used to gain insight into the operating environment and the actors in it.

Manoeuvre

Armoured forces

- 3-17. Typical tasks for armoured forces in the urban environment:
- Mobile reserve.
 - Fire support.
 - Protected mobility and resupply.
 - Mutual support for anti-tank weapons.
 - Covering obstacles by fire.
 - Casualty evacuation.
 - Flank protection.
 - Counter or spoiling attack.
- 3-18. The armoured infantry brigade combat team is particularly useful in both the investment and the break-in where it can use its firepower to achieve a penetration and conduct armoured raids, depending on the threat. However, it lacks infantry mass, for any subsequent clearance operation. Engineer mobility assets are crucial in maximising its offensive potential.
- 3-19. Armour/infantry cooperation. Both infantry and armour are vulnerable when operating in isolation in the urban environment. Infantry lacks firepower and protection, while armour is constrained in mobility and is vulnerable to hand-held anti-armour weapons, particularly at high elevation. When used in mutual support, and supported by fires and engineers, armour and infantry complement each other's capabilities and mitigate their vulnerabilities. The psychological impact of armour on the adversary should not be underestimated, but its use must be balanced against the collateral damage it can cause.
- 3-20. The powerful, high-velocity gun that is mounted on tanks provides the infantry with heavy, direct, precision fire support. The tank, using high-explosive squash head rounds, provides effective direct fire against buildings. The wall and fortification breaching effects of the tank gun are major assets in the close battle.
- 3-21. The smoke, dirt and dust generated by a tank main armament firing can obscure the target for several minutes. Infantry can use this period to reposition, move or advance unseen by the adversary and tanks can move to positions in cover. The infantry needs to be fully conversant with the safe areas when the tank fires main armament; overpressure forward of the muzzle can be fatal to dismounted troops. Training for both dismounted infantry and armoured fighting vehicle crews must include tank-target indication.
- Considerations for armour in the urban environment:
- Tanks are equipped with powerful thermal sights that can be used to detect personnel and weapons hidden in shadows and behind openings. Dust, fires, thick smoke and atmospheric conditions significantly degrade these sights.
 - Burning particles from turret-mounted smoke grenade launchers can cause uncontrolled fires and are hazardous to dismounted infantry near all armoured fighting vehicles. Their use should be coordinated between the infantry and armoured vehicle commander.

- c. The size and protection of armoured vehicles can provide dismounted infantry with cover from direct fire weapons and fragments. If properly coordinated, and commensurate of the threat from anti-tank ambush, tanks can provide moving cover for infantry advance across streets, alleyways and open areas. A well-placed anti-tank round will result in the loss of the platform and the infantry that are using it for cover.
- d. Some tanks (normally one per squadron) can be equipped with dozer blades (bulk earth-moving attachment) which can be used to remove rubble barriers under fire, breach obstacles, or seal exits. Dozer blades take approximately one hour to fit or jettison.

3-22. The limitations on the use of armour in urban terrain include:

- a. Weight and size constraints; particularly important over bridges, subways and in narrow streets.
- b. Restricted elevation of main armament.
- c. Limited vision when closed down is exacerbated by the poor fields of observation, restricting situational awareness and making it vulnerable to shoulder launched anti-armour weapons.

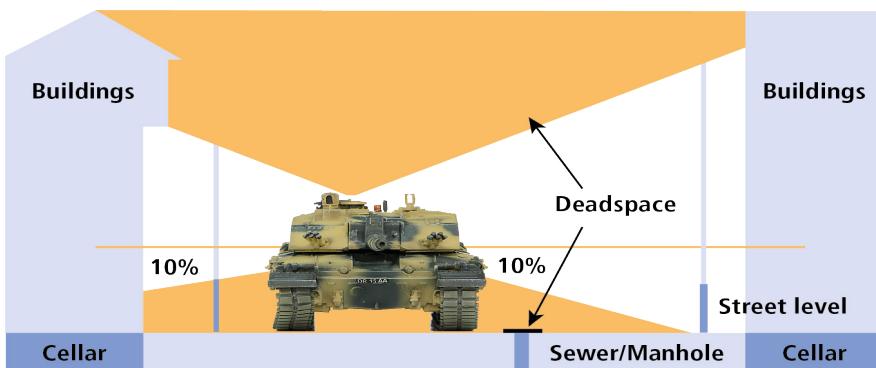


Figure 3-3. Limited vision of armour

- d. Secondary effects of firing the main armament, especially on friendly dismounted infantry and civilians.
 - e. Collateral damage caused by both armament and bulk.
- 3-23.** In stability operations, armour can be intimidating and counterproductive, but may equally provide reassurance - understanding the human dimension is important. Armour may usefully be employed as a quick reaction force or reserve outside the built-up area.

3-24. Armoured infantry. Tracked armoured fighting vehicles, such as Warrior enjoy good mobility, protection and communication and information systems. Equipped with thermal sights, they can operate despite a range of battlefield obscurants by night and day. Armoured infantry blends mounted and dismounted close combat capability from section to battlegroup level. Armoured fighting vehicles are vulnerable to the same threats as other armoured vehicles and must be protected by dismounted infantry.

- 3-25. Mechanised infantry.** Mechanised forces complement armoured forces in the urban environment, by providing mass; but they do not have the survivability, lethality or mobility of armoured units. Wheeled armoured personnel carriers, such as Boxer, will provide a mobile protected platform capable of transporting infantry to the fight and protection against small arms and fragmentation. It must be protected by dismounted infantry inside the urban environment. Remote weapon stations provide some direct high elevation firepower.

Armoured cavalry

- 3-26.** The relatively light protection of armoured cavalry may make it vulnerable to anti-tank weapons. Its sensor systems may be degraded by the environment, but armoured cavalry can still play an important role in urban operations. Local situational awareness cameras and the high angle elevation of the main armament (up to 75 degrees), with versatile ammunition natures (kinetic energy, high explosive airburst and high explosive point detonation) are beneficial. Armoured cavalry may, however, be effectively employed on the edge of urban areas to support investment and isolation, provide a screen, guard force flank protection or in depth.

Mounted light forces

- 3-27.** Light mechanised forces are highly mobile, capable of operational and tactical manoeuvre. They are well suited to the infiltration, investment and defence of an urban area. They lack heavy firepower and are not ideal for the break-in battle, but are useful for subsequent clearance operations, especially if supported by tanks.
- 3-28.** Light mechanised infantry can support armoured forces in the urban environment. Their lighter vehicles²⁹ lack protection but are agile in narrow streets and can navigate a cluttered environment which is not denied by obstacles, or where the battlespace is more permissive.
- 3-29.** Light cavalry. Light cavalry is mounted in open architecture vehicles (Jackal) which offer good situational awareness, but very little protection. They are agile, low-profile and mobile, but vulnerable to small arms fire. Light cavalry can provide reconnaissance from depth, mounted on the rural-urban fringe, and close target reconnaissance dismounted.

Light and air assault infantry

- 3-30.** Light infantry is vital to operations in the urban environment, where closing with the enemy is likely to take place in confined areas where vehicles cannot manoeuvre. Light infantry has a low signature; it can easily move between and through buildings unseen but is vulnerable in the open.
- 3-31.** Light infantry is ideal for the defence of an urban area and are well suited for anti-armour ambushes and mobile defence in dense urban terrain. Offensively, light infantry is ideal for infiltration, raiding and subterranean operations.
- 3-32.** Air assault infantry provides similar capabilities to light Infantry, as well as the use of battlefield helicopters for air manoeuvre, if the enemy air defence threat, particularly man-portable air defence, has been mitigated.

²⁹ Vehicles may be moved to a Zulu muster and guarded once the infantry have dismounted.

Aviation

- 3-33.** Battlefield helicopters offer three key capabilities - **lift, find and attack** - as part of the urban combined arms battle. These capabilities are enabled by the five endorsed battlefield helicopter roles of offensive action; control and direction of firepower; ISR; command support; and tactical mobility. All five roles have clear utility within urban operations, but the employment of battlefield helicopters will be balanced against the adversary's ground-to-air capability. Furthermore, the presence of battlefield helicopters has a clear deterrence effect and can limit an adversary's willingness or ability to exploit rooftops. Attack helicopter offensive action is examined under joint fires.
- 3-34.** ISR. Battlefield helicopters make excellent airborne ISR platforms. Aircrew, together with their observation and surveillance devices and communication systems, deliver valuable real-time information directly to commanders and troops on the ground, responding to rapidly evolving requirements as the tactical situation develops.
- 3-35.** Command support. Battlefield helicopters can provide a command support capability to cover a range of tasks including provision of vital communication links and communication through both secure voice and data rebroadcast (which will usually require line of sight). This can be particularly valuable in the hostile communications environment of urban operations. Aviation needs to be included in the communications plans at the earliest stage.
- 3-36.** Tactical mobility. Notwithstanding the potential vulnerability of battlefield helicopters when operating in the urban environment, aviation can still be employed in the tactical mobility role. Battlefield helicopters offer the ability to tactically insert and extract teams and/or supplies to rooftops or confined areas by day and night.

Manoeuvre support

- 3-37.** The complexity of the urban environment demands mobility support to freedom of manoeuvre. Engineer support will be at a premium in the urban environment and there will never be enough sappers to go around; engineer units and subunits will routinely be task to support divisional and brigade priority tasks. Assault pioneers and armoured assault troopers are vitally important organic manoeuvre support assets at battlegroup level and should not be misemployed on other tasks.
- 3-38.** Engineers are responsible for the following:
- Engineer intelligence and information. Understanding the nature of the physical environment and conducting infrastructure assessments to support planning. It fuses intelligence preparation of the environment and ISR collection to inform engineer effort in support of the plan. Support from geographic and Specialist Teams Royal Engineers is crucial for understanding the practical elements of the buildings and services networks that support the urban environment. Early warning of likely tasks and information on availability of local materiel is essential. Diving teams can also provide key information on bridges, waterways and subsurface systems including sewers and underground water systems.
 - Mobility. Mobility support enables manoeuvre by breaching obstacles, bridging, route reconnaissance and maintenance, counter-explosive ordnance and explosive methods of entry.

- (1) Trojan is an armoured engineer vehicle based on Challenger 2, which has a mechanical arm and can be fitted at the front with a full-width or track width mine-plough or bucket for excavation. It can conduct mechanical and explosive breaching (Python). It is a capable platform with the ability to operate closed-down, with the aid of on-board cameras. Python is extremely destructive, it is a rocket-launched system with 1T charge of high explosive, and very unlikely to be used in an urban area.
 - (2) Terrier is an armoured engineer vehicle which has a limited remote-control capability. It is more lightly armoured than Trojan but is very capable and can undertake many of the same tasks. Its role is to operate in a hazardous environment, but out of the direct fire battle, just behind Trojan, with soft-skinned plant supporting rear areas. It is very useful for route clearance and maintenance but, in common with all armoured vehicles, requires close protection in the urban area.
 - (3) Titan is an armoured bridge-layer with a 24m gap crossing capability. It can be fitted with the bulk earth-moving attachment and full/track width mine plough if necessary, allowing it to clear mines and some ditch/earth obstacles. In defensive operations Titan fitted with a bulk earth-moving attachment can create 'A' vehicle pits and deliver force support mobility with the provision of better and wider routes through the urban environment, generally out of the contact zone.
 - (4) Counter-explosive ordnance enables both mobility and protection force protection. The task of locating, confirming and disposal of explosive ordnance will vary according to the operational environment and risk appetite of the commander. In high-intensity warfighting, 'mark and avoid' is the preferred tactic technique and procedure, but could include destruction by direct fire or blowing in place by assault pioneers or combat engineers. As the intensity of the fighting diminishes and ability to conduct more deliberate and managed operations develops, the task will increasingly fall to specialist explosive ordnance disposal and search personnel. Wherever possible, and in accordance with the theatre standing operating instruction, the highest level of capability should be used.³⁰ Detailed employment and capabilities of explosive ordnance disposal and search are covered in JSP 364: *Joint Service EOD and Search Manual*.³¹
- c. Infrastructure.** The provision, repair and maintenance of infrastructure may need to be undertaken by land forces in the absence of other agencies to maintain the consent and support of the civilian population, enable tactical activity and set the conditions for post conflict reconstruction.
- d. Close and force support.** Close support engineers will be focused on combat but can undertake a range of general support engineering tasks, including limited restoration of essential services, route maintenance, camp infrastructure and captured persons facilities. They will be supported by force support engineers for more complex and deliberate tasks.
- e. Geographic support.** Geographic includes the provision of geospatial information, geographic products, data collection and terrain analysis. Geographic capability is

³⁰ Doctrine Note 20/02, *Protection*.

³¹ The authoritative policy and doctrine document for the conduct of military explosive ordnance disposal and search.

situated within brigade, division and corps headquarters with resources allocation dependent on the size of the headquarters. Digital geographic facility, controlled by G3 staff, is widely used for producing terrain information, traces or mappings.

- f. Engineer logistics.** Engineer support requires significant quantities of heavy or bulky materiel. Some is issued for consumption, for example construction materials, while other materiel, such as bridging, which is emplaced and recovered is not. The engineer logistics chain relies in part on the standard supply chain and exclusively support sapper requirements. Note that defence stores are all-arms assets and are not held by the engineer logistic chain. Engineer units also have a local purchase capability which can be employed if the threat permits.
- 3-39. Organisation and employment.** In an urban operation, close support engineers may be task-organised to combat units at platoon or section level. During the battle for Basra in 2003, infantry platoons had embedded close support engineer sections to identify and neutralise explosive obstacles or conduct explosive entry to buildings. It is essential therefore that combat engineers can fight effectively and are afforded the same degree of protection and mobility as the mounted/dismounted combat arms they support. Similarly, larger engineer tasks in the urban environment will require the force protection, unless undertaken in a benign environment.
- 3-40. Command and control.** Engineer staff at formation level (usually provided by a close support engineer regimental headquarters) must have the ability to cope concurrently with warfighting, peace support and humanitarian assistance tasks. Within the battlegroup, the battlegroup engineer will remain with the battlegroup headquarters providing advice and coordinating the effect delivered by the allocated squadron. Support to the civil-military cooperation and reconstruction work at formation and battlegroup level requires the integration and engagement of the relevant specialists from the engineer works group or Specialist Team Royal Engineers supporting operations.

Fires

Field artillery and mortars

- 3-41.** The roles and tasks of artillery and naval fires do not change in the urban environment, but their application must be carefully considered. Precision-guided munitions are particularly useful in reducing collateral damage. Well-aimed dumb munitions are also important, and a significant number of targets can be prosecuted without resorting to precision-guided munitions, which are expensive and in limited supply.
- a.** The proximity of buildings and other obstacles affects manoeuvrability and can create a significant cresting problem. The deployment of guns can also be complicated by the proximity of the local population and the security of ammunition. Unless there is a significant requirement for concealment, where possible, consideration should be given to deploying artillery outside dense urban areas.
 - b.** Naval gunfire support planning will balance threats to warships and the provision of fire support to troops ashore. The range inland for naval gunfire support will depend on the position of the gun line at sea. Warships can have an unsettling and deterrent effect on the enemy, presenting multiple dilemmas and threats to which they must commit resource.

- c. Battlespace management. Careful planning and integration of fires is crucial in the urban environment. The lower airspace is congested, fighting dispersed, situational awareness difficult and civilians ever-present. Battlespace management is challenging, but vital to ensure that fires are effective, and that collateral damage and fratricide are kept to the minimum.
- d. Constraints. All fires, guided or unguided, are likely to cause collateral damage. Artillery planning must use the principles of the law of armed conflict and minimise collateral damage as much as possible. Destruction of buildings is almost inevitable in high-intensity warfighting, but it must be limited to targets of military necessity: in 2017, precision-guided munitions destroyed nearly 70% of the built-up area in the Iraqi city of Mosul during a nine-month battle by Iraqi and coalition forces to dislodge ISIL insurgents.
- e. Ammunition. Collateral damage will be considered during the when matching ammunition natures and fusing to desired effects on target ('weaponeering'). For example:
 - (1) Airburst is effective against rooftops and produces less damage to structures.
 - (2) Illumination and smoke rounds have an increased incendiary effect.
 - (3) Point detonating is effective against surfaces.
 - (4) Delay fuses allow penetration of structures, which contain the blast, increase lethality inside and reduce collateral damage or risk to personnel outside.
- f. Engagement ranges. Experience has shown engagements occur at reduced range in the urban environment. This affects the employment of artillery and naval gunfire support in support of forces in close contact with the enemy. Trajectories require special consideration to reduce risk to friendly forces and civilian areas.
- g. High/low-angle fire. High buildings create 'dead zones' behind buildings which low-trajectory fire cannot reach (Figure 3-4). This artillery 'dead space' can provide areas of refuge for the adversary. It can be overcome by careful integration of mortars or high angle fire.³² Naval gunfire support trajectories have steep descent angles at longer ranges.

³² While mortars can fire almost vertically, guns have a maximum elevation of 1,244 mils/70 degrees.

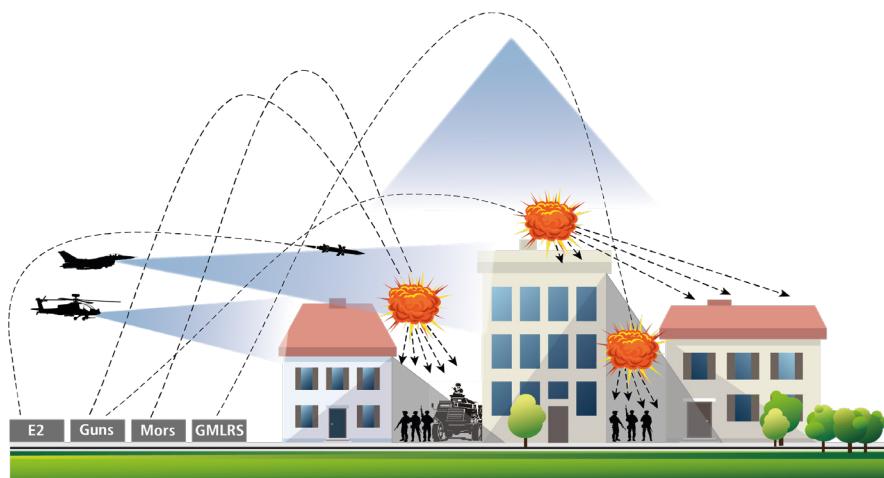


Figure 3-4. Fires engagement limitations in urban environment

- h.** Direct fire. If well protected, artillery in the direct fire role can be extremely useful against strongpoints or where there are targets above the elevation of tank main armament. Self-propelled artillery provides a degree of protection from small arms and shrapnel. With less armour, self-propelled artillery is more vulnerable than a tank and requires the same protection from dismounted troops against the anti-tank threat.
- 3-42.** Mortars. Mortars are useful for engaging rooftops and for firing into the deep spaces between building blocks. Mortar lines positioned behind buildings will be difficult for the adversary to locate and even more difficult to hit.
- 3-43.** GMLRS-U. Depending on the fitted fuse type, GMLRS-U can be employed against targets close to friendly forces, and may fit the requirements of the law of armed conflict more easily than other munition types.
- 3-44.** Exactor. Exactor can accurately hit a target (static or moving) at range by day and night, but it is a challenging system to operate, even under ideal circumstances. Critical to the selection of Exactor is a clear flight path; if not available then other weapon systems such as guided missile launch should be considered.

Attack helicopters

- 3-45.** The proliferation of man-portable air defence and layered air defence systems which can be employed by regular or supported proxy enemies is an acute threat to attack aviation. If freedom of manoeuvre for aviation is secure, then attack helicopter is extremely effective against a wide range of targets, particularly where there is a requirement to positively identify and avoid collateral damage.
- 3-46.** Offensive action. Offensive action is focused on the delivery of firepower in combat or combat support missions. One of the principal offensive actions is aviation close fire support - the provision of integrated fires to ground forces - which has direct utility

during urban operations. Aviation close fire support can be called for by ground forces using either the close combat attack³³ or close air support³⁴ procedure. Such missions are delivered primarily by attack helicopters, at distances up to 8km, using the precision fires capability offered by Hellfire in the urban environment. Wildcat crews may also have a limited close fire support capability. Attack helicopters can also provide reconnaissance and fire control capability.

- 3-47.** Suppression of adversary air defences may be undertaken by fast air, attack helicopters or, more probably in urban terrain, ground forces, to establish and maintain air manoeuvre corridors. Clearance patrols, the positioning of observation posts and the weapon-locating radar are all means of achieving this.

Air assault to secure Antonov Airport - 24 February 2022



The Russian VDV assault on Antonov Airport. Inset: Ka-52 HOKUM attack helicopter reportedly damaged by a Ukrainian SA-9 'IGL9K39 'Igla' man-portable air defence and forced to make an emergency landing.

Lessons:

- **Man-portable air defences (MANPADs) are very easy to hide in the urban clutter.** Multiple synchronised launches of MANPAD (SAMBUSH) can be an effective tactic to overwhelm defence aid suites (DAS). Western DAS and tactics, techniques and procedures are more effective than those observed in use by the Russians, however, this remains a real and significant threat.
- **The importance of layered air defence** which effectively integrates electromagnetic, space, air and land assets.

³³ Close combat attack is used by non-specialist observers.

³⁴ Employed by qualified forward air controller/joint terminal attack controllers only.

- **All-arms air defence.** Tracer and heavy small-arms fire can deter or channel enemy aircraft into MANPAD killing areas, however, it is worth noting that aircrew will rarely know they are being engaged in this way unless they see tracer or are very close to the ground.
- **For air/aviation, the importance of basic fieldcraft:** night, low level with basic intelligence preparation of the environment to understand radar and infrared threats.
- **The importance of multidomain suppression/destruction of enemy air defences, offensive counter-air, airborne command and control.**
- **The importance of electromagnetic warfare and deception.**

Antonov Airport is located in the town of Hostomel, on the outskirts of Kyiv and is approximately 10km from the centre of the Ukrainian capital. It was central to the Russian plan for a swift coup de main operation to rapidly seize Kyiv and decapitate the Ukrainian government in the early hours of the invasion. The Russian plan was similar in many ways to the Soviet invasion of Afghanistan in December 1979; a massive air operation into Kabul involving 280 aircraft, three airborne (VDV) divisions, a special forces (Spetsnaz) operation to assassinate the president and a ground assault to secure Kabul and install a puppet government. But conditions in Ukraine were very different...

On the morning of 24 February 2022, the first wave of the Russian air assault left Luninets in Belarus, approximately 150km from Hostomel, and flew along the Dnipro River, arriving at approximately 0800hrs. Forty-five troop-carrying Mi-8 helicopters, escorted by Ka-52 HOKUM attack helicopters were on target within 30 minutes. They were engaged by ground fire and MANPADs en route but managed to achieve tactical surprise, despite the Ukrainians having advanced warning. The initial assault wave of 300 VDV troops from the Russian 11th and 31st Guards Air Assault Brigades, were disembarked and rapidly moved to secure the airfield, overwhelming the defenders with the speed of their attack.

Opposing them was a unit of Ukrainian National Guard from the 4th Rapid Reaction Brigade - 350 defenders in all, of which 200 were raw conscripts. They were lightly armed, with some T-64s, but able to call on indirect fire and equipped with MANPADs. They managed to destroy or damage a number of Russian aircraft. Detail is still emerging, but estimates vary between four and six Russian helicopters destroyed, and two forced to land. Ukrainian air defence and troop positions were engaged effectively and with some precision, which has raised speculation that a Russian intelligence source was also active.

The second wave was to have been a rapid air landing of over 2,000 VDV troops and armour, once the runway was secure. Eighteen Il-76 transport aircraft, each capable of carrying 130 paratroopers, took off from Psokov, 800km away in Russia for the two-hour flight to Kyiv, but turned back. Ukrainian sources claim two of these aircraft were shot down by Su-27 fighters and ground-based air defence, but these reports are unconfirmed, and are denied by the Russians.

A Ukrainian combined arms counter-attack, supported by air, drove Russian forces back to woodland on the airport fringes by nightfall. The following day, Russian mechanised ground forces, advancing from Belarus, combined with another air assault by the VDV, retook the airport after penetrating Ukrainian defences at Ivankiv.

The battle exposes seams between the domains, particularly air and land, and highlights the importance of effective shaping to pull off a successful air assault. The lack of air support, poor intelligence, and an inability to counter a combined arms attack ultimately doomed the operation and allowed the Ukrainians to render the airfield inoperable, meaning the VDV failed

in its overall objective. Despite the limited success of the first wave, it was eventually wiped out and the operation was an unmitigated disaster for the Russian airborne forces. Russian mechanised and airborne forces suffered heavy losses during the fighting, and in the battles for Irpin and Bucha which followed. By 28 March, the Russians abandoned Hostomel and by 2 April had withdrawn from Kyiv altogether.

Counterfires

3-48. Advanced sound-ranging programme will detect acoustic events using ground-based microphones. Accuracy may be degraded by buildings which can significantly affect acoustic wave propagation.

3-49. Counter-battery radar. There are two systems in service with UK armed forces. Both are active systems and vulnerable to enemy detection; tactics, techniques and procedures, careful siting and dispersal are key to their battlefield survivability:

- a.** Mobile artillery monitoring battlefield radar. Obscuration from buildings generates dead spots for radar. Therefore, it is possible for well-sited enemy fire to remain undetected. The ideal deployment for mobile artillery monitoring battlefield radar is outside an urban area observing into it but sited at height.
- b.** Lightweight counter-mortar radar is more portable, smaller and easier to site than mobile artillery monitoring battlefield radar. It can also track indirect fire, especially mortars.

3-50. Where opponents operate in close proximity to civilians, non-lethal weapons or techniques may be required to force separation. This could include high-volume noise, smoke, negotiation by loud hailer or use of intermediaries.

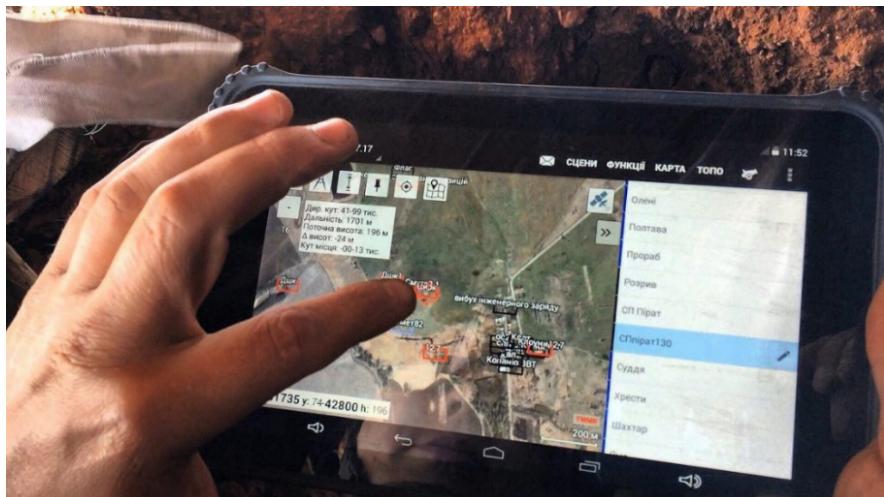
Protection

Counter-ISR

3-51. Adversaries may employ electromagnetic warfare surveillance and attack capabilities. Military systems are secure, but occupy niche bandwidth and are easy to detect, recognise, identify and locate for a capable enemy. Static units with relatively high transmission rates, such as headquarters, are especially vulnerable. Headquarters should be small, move regularly and, where possible sited with protection from indirect fire as a priority; subterranean structures such as basements or underground car parks, with remoted antennae are ideal.

3-52. Operational security and good fieldcraft, such as full spectrum camouflage and concealment, decoys and dummy positions, will increase survivability in an increasingly transparent battlespace. Personal electronic devices are vulnerable to detection and exploitation, but carefully managed civilian or commercial communication systems, such as cloud-based applications can blend into the electromagnetic clutter of an urban environment more easily than military systems.

Kropyva: cloud-based commercial applications, Ukraine



Lessons:

- **Military communications systems have recognisable electronic signatures.** Even in the urban clutter, they can be easily identified and targeted by a capable peer or peer+ enemy.
- While the situation in Ukraine is unique, it shows **the potential utility of adapting commercial, cloud-based systems for military use.**
- The expertise and technology to develop **novel systems** is increasingly available to smaller nations.
- The vast flow of information permeating the urban environment makes the **modern battlefield virtually transparent.**

Kropyva³⁵ (Stinging Nettles) is a Ukrainian home-grown, cloud based, commercial command and control system in widespread use in the current conflict. It is an all-arms application which is capable of secure point-to-point communication and uses widely available tablets. Ukraine, with international support, has managed to preserve internet and mobile phone coverage across much of the country. Kropyva uses civilian bandwidths and is indistinguishable from civilian electronic clutter, especially in urban areas and when compared to military systems, which have distinct electronic signatures. The Ukrainian government developed and distributed apps at the start of the Russian invasion which allow civilian mobile phones to feed information on the enemy through a gateway to Kropyva. Innovative use of technology and communication systems has effectively made every Ukrainian citizen a potential sensor linked directly to the Ukrainian command structure. Kropyva has proven itself to be extremely resilient to Russian cyber-attacks and electromagnetic warfare and has survived several attempts to take it offline.

³⁵ <https://logika.ua/en/automation-systems/>

Counter-mobility

- 3-53.** Counter-mobility tasks involve the creation of obstacles to disrupt, turn, fix or block the enemy in accordance with the intent of the tactical commander. They are designed to disrupt or slow the enemy manoeuvre plan by denying the use of terrain, be it open, close or urban, and so channel and retain the enemy in areas where it can be defeated or destroyed. It is particularly important that the possible deployments of friendly force reserves be considered during planning.

Survivability

- 3-54.** Close support engineers have a limited knowledge of structures and weapon effects but can draw on specialist advice from Specialist Team Royal Engineers. Static defensive positions in the urban environment will usually require development, while units employing a mobile defence can be advised on the use of existing structures to offer enhanced survivability. Field fortifications increase the survivability of potential targets including strongpoints, observation posts and vehicle checkpoints. Evidence from recent conflicts indicates that the enemy will carry out significant shaping activity on an urban objective using fires before engaging in the close battle. Defensive positions must be constructed to withstand the effect of these fires. Detailed force protection engineering advice is essential to defensive planning and is available at formation level.

Ground-based air defence (GBAD)

- 3-55.** Over an urban environment, it is the lower airspace that offers the greatest freedom of movement for fighter ground attack aircraft and combat aviation, as low flying aircraft are harder to detect, track and engage. Furthermore, the prevalence of uncrewed aircraft systems, in an intelligence, surveillance, target acquisition and reconnaissance and/or offensive role, have added to the complexity of the modern GBAD target set. GBAD does not operate in isolation, and in the complex urban environment it is essential that GBAD is fully considered in the intelligence preparation of the environment. In close, cluttered urban areas - where enemy infiltration is a risk - consideration should be given to providing GBAD with additional force protection. Against a capable enemy, static GBAD is always at risk from electromagnetic warfare and indirect fire - it should remain mobile and dispersed. GBAD experts should be intricately involved in planning from Question 0 of the combat estimate.
- 3-56.** Structures and buildings present challenges for GBAD sensor and shooter systems to detect, track and engage targets. The denser, more cluttered and high-rise the operating environment, the more difficult GBAD operations will be. A degree of mitigation can be achieved by deploying systems on high points, but only where the buildings, threat, capabilities and human factors allow. Consideration should be given to deploying GBAD assets outside or on the fringes to engage hostile aircraft before they reach the urban area. This will also reduce the risk of causing collateral damage in the event of an engagement over a populated area.
- 3-57.** Short-range air defence. The high-velocity missile system is optimised to defeat rotary wing aviation. It is a passive system and is well suited for conducting 'ambushes' of helicopters or uncrewed aircraft systems. It can be dismounted and fired from the shoulder or from the lightweight multiple launcher, which gives it greater flexibility to deploy in urban areas.

- 3-58.** Contingent medium-range air defence. The Sky Sabre system will likely be a theatre asset to protect G4/C2 nodes. Careful siting medium-range air defence is to ensure sensor and effector line-of-sight is important. Depending on the threat, it may need short-range air defence protection within a layered air defence bubble.

Outreach

- 2-59.** Outreach involves engagement and liaison to builds understanding and relationships. It gains influence or sets the conditions for future activities; it aims to persuade an actor or audience to behave in a way aligned to our objectives. Outreach is described in greater detail in AFM *Engagement*. Outreach in support of urban operations includes:
- Civil-military cooperation allows land forces to benefit from host-nation and allied civilian resources, and to help protect the local population. In the longer term it will contribute to military assistance operations.
 - Civil-military interaction. Civil-military interaction provides an understanding of the operating environment through establishing relationships and information exchange. This will increase the land forces understanding of the urban environment and may leverage additional information and intelligence.
 - Military assistance operations develop the capacity and capability of a partner force with the aim of undertaking activities aligned to our objectives. This may provide, for example, the combat mass for urban operations.

Information activities

- 3-60.** Information activities are conducted in the same way as for any other environments, but considering the size of the population, access to information systems and the potential glare of the world's media, the urban environment is unique. The major impacts are:
- It is extremely difficult to isolate an urban area completely during the investment. Information will always find a way to get through. This presents both a threat and an opportunity.
 - Operations are conducted in the persistent glare of information systems which are easily and readily consumed by multiple audiences.
 - Deception becomes more difficult.
 - The ability of either side to mobilise resistance within the urban area increases.
 - There is a challenge as to how to handle the huge amounts of data which are generated from an urban area.
 - There is a need to match manufactured content to the audience to achieve credibility.
 - The effects of information operations are not easily confined to one of the tactical/operational/strategic frameworks.

Sustainment

- 3-61.** Sustaining operations in an urban environment presents challenges and opportunities quite different to those for sustaining a force manoeuvring in open terrain. Aside from the nature of the operation itself, the conduct of sustainment activity will be driven by several key factors (see Figure 3-5) will be shaped by the complexity of the environment and the operating situation.
- 3-62.** Sustainment options. Although sustainment activities in built-up areas will follow standard logistics principles, the practices and procedures will need to be adjusted to meet the needs of the specific situation. For example, options for sustaining operations in an urban environment can include:
- Supply.** To address the complexity of the environment and the threat to resupply operations, it may be necessary to position support units as far forward as the tactical situation allows. All forms of resupply, routine, emergency, distribution points, dead letter drops should be employed to ensure combat effectiveness.
 - Dispersal.** Dispersing sustainment nodes may be necessary and must be balanced against the mutually supporting effect of co-location of force elements.
 - Whole force approach.** Sustainment in the urban environment will require an increase in logistic effect to meet increased demands for combat supplies. The supply chain must make use of the whole force capabilities. The use of host-nation support, civil resources, and the existing supply infrastructure (for example road, rail and waterway routes) can be used when authorised and practical.
 - Route selection.** Road movement may be canalised, bottle-necked and restricted by the width and height, cluttered and a target for enemy action including mines and improvised explosive devices. Therefore, a thorough and dynamic intelligence preparation of the environment is required by route planners to understand all routes available. If possible and practical dedicated supply routes and medical evacuation routes reduce congestion and confusion.
 - Self-sufficiency.** Planners should identify resources in the urban environment which can reduce the stress on the supply chain and increase protection. Petroleum, oils and lubricants, water, food, and materiel may be available as well as suitable storage and workshop facilities under cover to evade the persistent ISR threat.

The wider impact of sustainment activities in urban operations

- 3-63.** Sustainment activity can exert effects beyond the provision of support to the fighting force. During urban operations, the relatively high visibility of logistic, medical and equipment support activity can influence the population, opponents and the media through its obvious role, posture, and presence.
- 3-64.** For local inhabitants, sustainment activity provides reassurance, security, and a potential source of humanitarian aid. Sustainment forces provide a 'softer' perception of military activity appearing less threatening than combat forces. Tangible assistance can be delivered through the distribution of aid and the repair of essential civil infrastructure.

Sustainment considerations for operations in the urban environment

- 3-65.** The use of the sustainment planning factors of destination, distance and duration - the '4Ds' - highlight specific considerations for sustainment activity in the urban environment. The key considerations are highlighted in Figure 3-5.

| 4Ds | Consideration |
|--------------------|---|
| Destination | <ul style="list-style-type: none"> ■ Urban clutter ■ Population ■ Movement restrictions (height, width, weight) ■ Protection in urban, including from above ■ Recovery routes ■ Vertical CASEVAC/MEDDEVAC ■ Location of supply sites <ul style="list-style-type: none"> ■ Outside urban area (e.g. location of ammunition due to natures and classifications, BFIs etc) are hard to site within urban environments. ■ Effect on combat supplies and resupply <ul style="list-style-type: none"> ■ Verticality |
| Distance | <ul style="list-style-type: none"> ■ Location or supply sites <ul style="list-style-type: none"> ■ Distance to demand ■ Between echelon distances ■ Vertical distance demand ■ Combat supplies demand variables due to distance |
| Demand | <ul style="list-style-type: none"> ■ Specialist equipment ■ Combat supplies consumption <ul style="list-style-type: none"> ■ Ammunition up ■ Fuel down ■ Mobility support ■ Counter-mobility stores |
| Duration | <ul style="list-style-type: none"> ■ Movement of support areas ■ Vehicle attrition and repair/recovery ■ Alternating resupply routes ■ Effect on operational patient care pathway |

Figure 3-5. Summary of the '4Ds'

Combat service support groupings

- 3-66.** The brigade support group in the urban environment. Given its requirements for space, security and access, the brigade support area could be located on the urban/rural fringe. Where it is necessary to locate the brigade support area in the urban area, established suitable infrastructure (for example industrial zones or business parks) can be used as this will provide cover and will be well served by access routes - although such facilities will be harder to secure and may require additional force protection. Where there is a threat from uncrewed aircraft systems and indirect fire, urban areas offer protected caches/log nodes in subterranean areas and buildings.

Medical support in the urban environment

- 3-67.** Operations in the urban environment present significant challenges and complexities to the provision of health service support:

- Evacuation of casualties.** Time to appropriate care is a fundamental factor in health service support, with the speed and quality of medical care given being proven to reduce mortality and morbidity within patients. This presents the first challenge given that rapid extraction and casualty evacuation within the urban environment can be particularly resource and time intensive.

- b. **High casualty rates.** Evacuation challenges, coupled with the likelihood of substantial numbers of casualties with more complex injuries³⁶ makes achieving the 10-1-2 medical planning guidelines³⁷ difficult without additional resources.
 - c. **Increased disease and non-battle injuries.** Additional challenges may include a higher incidence of disease and non-battle injuries due to injuries sustained from trips and falls, exposure to toxic industrial hazards and vector borne diseases.
- 3-68.** Mitigating these challenges and complexities will require additional medical resources in support. Examples of mitigations available are:
- a. Extra forward medical evacuation platforms to be employed.
 - b. Additional reinforcing medical capabilities (medical reception station, medical emergency response team or ground medical surgical group) to be deployed further forward than usual.
 - c. All units and medical treatment facilities should be prepared to temporarily hold casualties forward due to the likelihood of disruption to forward medical evacuation.
 - d. Use should be made of suitable buildings of opportunity to site medical aid posts and treatment facilities, enabling a better level of care and greater protection.
- 3-69.** Forward medical evacuation, including by aviation, is likely to be constrained by the environment and threat. It will need to be based upon a dynamic system, with the flexibility to rapidly shift between ground and air movement, and from multiple points. This will require battlespace owners to coordinate force protection and medical evacuation capability in concert with the senior tactical headquarters which will control the overall evacuation of patients and the tasking of aviation. The co-location of medical command, control, communications, computers and information capability with the G3 cells in battlegroup, brigade and divisional headquarters is critical to achieving this effect.

Equipment support in the urban environment

- 3-70.** The principles of equipment support remain applicable within the urban environment. When considering where to conduct equipment support effect, commanders should note:
- a. The reduced distances travelled within the urban environment means vehicle losses are more likely to be the result of mobility kills than mechanical failure.³⁸
 - b. The congested and restrictive nature of the environment will result in more vehicle casualties and an increased dependency on recovery; all vehicle crews must be capable of troop and platoon level recovery for all equipment.
 - c. Reduced combat ranges, a quickly changing tactical situation, increased options for cover and hard standing will:
 - (1) Alter where and when to conduct equipment support effect.
 - (2) Allow equipment support echelons to operate over non-standard distances and/or become merged.

³⁶ Multiple gunshot wounds, increased fragmentation and blast injuries, burns and crush injuries from collapsing buildings.

³⁷ *Health Service Support to Land Operations* - ten minutes to enhanced first aid, one hour to enhanced field care, two hours to damage control surgery and acute medicine.

³⁸ Defence Science and Technology Laboratory Report CR79889 Version 2, *Considerations for Combat Service Support when Operating in an Urban Environment*, dated 1 August 2014.

(3) Enable the use of established infrastructure and specialist facilities.

(4) Allow possible use of non-tactical lighting.

Military police support

3-71. Urban operations are likely to require military police support to conduct the following:

- a. Control of displaced persons and refugees in close cooperation with host-nation military and civilian police forces and non-government organisations.
- b. Supporting the lawful detention and handling of captured persons; or provision of advice and support to commanders on captured persons handling in accordance with JDP 1-10, *Captured Persons*.
- c. Supporting evidence-based operations, conducting policing and detention operations and providing advice on the ground directly to the commander in relation to searches of people, property and vehicles, incident control and crime scene security and management.
- d. Sharing and exploitation of police intelligence in accordance with national caveats.
- e. Provision of measures in support to security including policing of rear areas and law/regulatory enforcement.
- f. Stability policing support host-nation security support to the local host-nation police force through the reinforcement/replacement of indigenous forces.
- g. Mobility support.
- h. Investigating allegations of human rights violations and war crimes.
- i. Support to major incidents such as providing a disaster victim identification capability which may be required in the dense urban environment where civilians are present in large numbers.
- j. Liaison (where required) with partners across government and non-governmental organisations, including assistance to humanitarian agencies.

CHAPTER 4

Tactical activities for urban operations

Introduction and context

- 4-01.** The land tactical operation will consist of offensive, defensive, enabling and stability activity. The balance will be determined by the mission and the commander's plan. Tactical activities are listed in Figure 4-1 and are fully explained in AFM *Conventional Warfare* (offensive, defensive and enabling activities) and AFM *Stability and Peace Support Operations* (stability activities). Those marked in red are where the urban environment has the greatest impact and should be read in relation to the other Army field manuals.

| Offensive | Defensive | Enabling | Stability (security/control) |
|---|----------------|---|---|
| Attack | Defence | Security | Protection of essential locations/ Persons/objects |
| Exploitation | Delay | Reconnaissance | Emergency demining |
| Pursuit | | Advance to contact | Route control |
| Raid | | Meeting engagement | Control of movement |
| Ambush | | March | Cordon and search |
| Breakout of encircled forces | | Crossing and breaching obstacles | Disarmament and demobilisation |
| | | Link up | Monitoring and surveillance |
| | | Relief of troops | Evacuation of endangered persons |
| | | Withdrawal | |
| | | Retirement | |
| | | Demonstration and feint | |

Figure 4-1. Tactical activities

Offensive activities

The attack

- 4-02.** The aim of offensive operations is to defeat the enemy and/or seize key terrain. The purpose of the attack is to seize the initiative through destruction of the enemy's

capability, cohesion and will to fight. Shaping the enemy to set the conditions and create a local advantage for the attack are crucial. To have the best possible chance of success, an attack should seek to achieve:

- a. **Surprise** - attack at an unexpected time, from an unexpected direction, or both. Infiltration is an effective way to generate surprise and should be considered wherever practicable. Where possible use deception, feint attacks or demonstrations as an aid to surprise. To be effective these must be credible, and the adversary should be given time to react to the deception.
- b. **Shock** - this is not 'surprise'; but it is enabled by surprise. The effect of shock is to overwhelm the enemy with multiple dilemmas to induce decision/ action paralysis or to force rash decision-making.
- c. **Rapid exploitation** - in depth to cause panic and collapse. It is characterised by a rapid advance against an enemy caught off-balance. Its purpose is to retain the initiative by preventing the enemy from reorganising a defence. Exploitation may create significant confusion and uncertainty, reducing enemy capability to understand the current tactical situation, react properly and may be decisive.

4-03. Some planning considerations for urban attacks (not an exhaustive list):

- a. The direction of the attack should penetrate the full depth of the defence at its narrowest point.
- b. Tempo and momentum. Tempo can keep the enemy off balance and contribute to generating shock.
- c. Reserves. Consider the positioning of reserves and at what level they are released. Opportunities and gaps for exploitation will most likely be identified by commanders on the ground, as low as platoon or even section level. If release authority is held too high up, then fleeting opportunism will be missed and the enemy may escape.
- d. The plan should be simple, and, in the case of a large and well-defended urban area, the objectives limited.
- e. Wherever possible attacks should be delivered from well-selected break-in points, on multiple axes.
- f. Silent or noisy, the break-in can be conducted at night, as an enhancement to security. However, darkness will increase the difficulties of command and control, identification, friend or foe issues for air, aviation and indirect fire controllers and the risk of fratricide.
- g. Combat power must be concentrated for a successful break-in. To maintain momentum, it may be necessary to conduct an early forward passage of lines.
- h. The synchronisation of direct and indirect fire support will be critical.
- i. The integration of engineer support with the assaulting subunits will require detailed coordination.
- j. Medical support needs to be as close as possible to forward units, and safe routes for casualty evacuation identified; consideration should be given to increasing medical supplies forward to prepare for high casualty rates.

- k. The demand for ammunition will be high and stocks will need to be held well forward.
- l. Strict security and control of the objectives seized and of the routes to and between them must be maintained to prevent adversary reinfiltration and counter-attack.
- m. Consideration should be given to securing objectives in daylight when adversary positions can be clearly identified.

4-04. Force ratios. Force ratios are detailed in the *Planning and Execution Handbook*. However, they are a guide and the combat effectiveness of the enemy, their tactics and combat power available to the attacking force will dictate the force ratios required. The vignette below offers food for thought and challenges some of the assumptions about force ratios which have been allowed to develop over time.

Lessons:

In attack

- If the enemy predominantly employs a static defence, then smaller overall ratios will prevail.
- If the enemy employs counter-attacks, then much higher local ratios are required.
- Training and rehearsal for the attacking force is crucial to reduce casualties and to vastly increase likelihood of success.

In defence

- To stand any chance of winning, the defender must employ a predominantly mobile defence based upon a higher proportion of mobile forces and counter-attack whenever the opportunity arises.

Analysis of several historical urban battles - mainly in Europe during WW2 - has indicated that success has tended to lie with the attacker.³⁹ Defenders were proved to suffer significantly greater casualties than the attacking force, particularly in a static defence. The same analysis identified that well-trained troops, who had conducted a minimum of nine urban operations during training and actual combat, suffered approximately 30% less casualties. There are exceptions to this, which should also be considered and offer caveats. During the Warsaw uprising for example, the Polish insurgents never had more than about 500-2,500 insurgents or 4-6% of their force armed at any time. The German force numbered initially around 16,000 and grew as more troops were committed during the battle. The Germans had a monopoly on air and indirect delivered fires. Limited by their battlespace, the Polish insurgents were forced to fight from static positions in a layered defence but managed to hold out for 63 days before they capitulated. This suggests that morale and motivation, treatment by the enemy (executing both insurgents and civilians) and skilful defence all were major factors.

4-05. Information. Comprehensive intelligence preparation of the environment for urban operations will be critical to success and minimising casualties. Information sources include:

³⁹ Summary of Historical Analysis of Urban Operations - Irwin, C - Dstl/WP128624 0.9-28 February 2021-Dstl.

- a. Maps,⁴⁰ town plans, guide books and plans of essential services. Maps⁴¹ should include a building marking system. Mapping will need to be updated regularly to reflect the changing nature of the urban terrain.
 - b. Technical information gathering devices, including Google Earth, uncrewed aircraft systems and unmanned ground vehicles.
 - c. Reconnaissance patrols, standing patrols and observation posts.
 - d. Overhead imagery and electromagnetic warfare including signals intelligence.
 - e. Human intelligence including captured persons, local agencies, including host-nation forces, inhabitants and refugees.
 - f. Social media. Recent conflicts have illustrated the power of social media in presenting near real-time snapshots of activity, albeit unverified in its initial form, in the battlespace.
- 4-06.** Securing objectives. Securing objectives gives the assaulting force control of vital ground and key terrain. Destruction of strongpoints, headquarters or even iconic emblems will erode the defender's will while creating an impression of the attacking force's superiority and success. Consideration should always be given to the retention in strength of intermediate objectives to prevent reoccupation by the adversary. The selection of the final objective should ensure that its capture will make any further defence untenable.
- 4-07.** Battle preparation. Consideration should be given to task-organising fires and manoeuvre support down to the lowest practicable level. At battlegroup level the assaulting force is likely to be organised as follows:
- a. Investment force.⁴² Reconnaissance troops, armour, aviation and indirect fire observers.
 - b. Fire support group. Armour, anti-tank weapons, aviation, general purpose machine gun (sustained fire) and indirect fire observers.
 - c. Assault force. Infantry subunits, engineers, assault pioneers, armour and indirect fire observers with some artillery in the direct fire role.
 - d. Reserve. A reserve should ideally be a third of the total force. It must be a minimum of an infantry subunit with combined arms support.
- 4-08.** Control. Effective control measures including axes of advance, objectives, report lines, fire support control measures and boundaries will be particularly important.

⁴⁰ Electronic mapping will also needed to be distributed in a form and scale that will be useful to users with user data terminals.

⁴¹ There will be a requirement in complex urban operations to show mapping in a three-dimensional manner showing heights above ground, ground level and underground systems.

⁴² If not provided by another unit/formation.

Phases of an attack

4-09. The phases of an attack into, or within an urban area are as follows:

- a. Investment (as a precursor to the attack).
- b. The break-in.
- c. Securing objectives.
- d. Clearance.
- e. Reorganisation.

Investment

4-10. As a precursor to a deliberate attack the urban area, or a portion of it, should be invested. Seizing the key terrain features and dominating the approaches denies the adversary support, prevents their escape and is likely to undermine their morale. The investment is usually conducted by a different force to that conducting the attack.

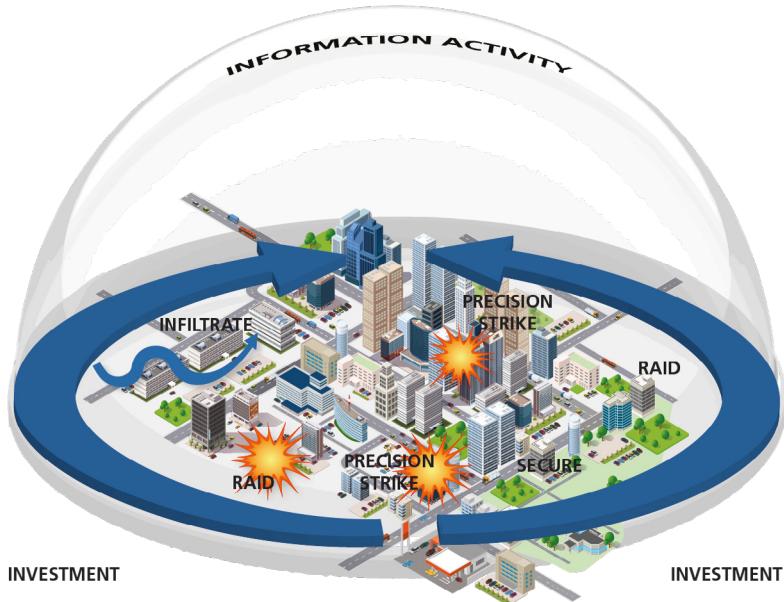


Figure 4-2. Investment

Second Battle of Lyman, Ukraine 10 September - 2 October 2022

Lessons:

- **The manoeuvrist approach.** The Armed Forces of Ukraine (AFU) used surprise, tempo and manoeuvre to attack Russian weak points. They presented the Russians with multiple dilemmas and caused decision paralysis - shock - shattering cohesion, leading to collapse of the defence. Isolated and out manoeuvred, the Russians had no choice but to attempt a withdrawal to preserve what was left of their force.
- **Shaping in the deep.** Russian ground forces were unable to use their mass firepower advantage against the encircling AFU forces. This is a result of, and demonstrates the importance of, AFU shaping the deep battle to degrade Russian command and logistics.

The second battle of Lyman occurred during the Russo/Ukraine war and was part of the Ukrainian eastern counter-offensive. Strategically, the capture of Lyman by the AFU dealt a blow to the legitimacy of the Russian annexation of the Donbas. The gains came a day after Russian president Vladimir Putin proclaimed, at a ceremony in Moscow, that the occupied regions of Ukraine, including the Donbas, were now Russian.

Operationally, Lyman was vital ground to both sides. It sits on an important rail hub which was indispensable to the Russian logistics network, and they expected to mount a determined and protracted defence.

On 29 September, open-source reporting indicated that Ukrainian forces had broken through Russian defences around Stavky, 10km north of Lyman, and cut the Torske-Drobyshev road the next day. This was the last supply and egress route for Russian elements holding the line west of Lyman the next day.

As the AFU continued their advance, they cut Russian access to the Svatove-Lyman road, a critical ground line of communication into Lyman. On 30 September, Ukrainian forces recaptured Stavky and severed the Drobyshev-Torske road, causing Russia to abandon Drobyshev. On the same day, the Ukrainians approached Lyman from the south and worked their way round to the north, systematically clearing a ring of Russian defences and threatening the city on three sides.

AFU reconnaissance and partisan activity on bridges over the Siverskyi Donets River, 15km to the east, prevented Russian reinforcement and relief of the estimated 5,000-strong defence, based on 752 Motorised Rifle Regiment in the city.

In isolating Lyman and denying the rail hub their enemy, the Ukrainians had effective control of the city, and could choose to avoid being drawn into costly urban combat. Their focus was on maintaining momentum of the counter-offensive by rapidly seizing crossings over the Siverskyi Donetsk river and pushing into the Russian depth.

Consequently, the defence of Lyman became untenable for the Russians, despite its importance to their operational and strategic plans. On 1 October, the Russian Defence Minister announced that RGF had withdrawn 'due to the risk of being encircled'.

The break-in

- 4-11.** The break-in secures an initial foothold from which the operation can be developed. The break-in can be achieved by infiltration, using light forces and making the maximum use of surprise and concealment, or by penetration characterised by the use of overwhelming force. It should be supported by fires in depth. Consideration should be given to attempting more than one break-in. It will be a critical stage of the offensive operation, and the attacker will be at their most vulnerable.



Figure 4-3. The break-in

- 4-12.** Grouping. The break-in force should comprise infantry and armour with engineer or assault pioneer support and indirect fire controllers.
- Armour.⁴³ Armour should be used to support the break-in but will be vulnerable to handheld anti-tank weapons.
 - The use of high explosive and smoke to support the break-in may destroy key points (particularly with precision munitions such as GMLRS-U), neutralise adversary positions and cover the movement of assault forces. In addition, artillery could be used to fix the adversary elsewhere. Commanders also must consider the effects created by obscuration and rubble and the risk of collateral damage and civilian casualties.
 - Aviation may be used to provide direct fire support and/or a real-time intelligence, surveillance and reconnaissance (ISR) feed to provide information on adversary dispositions or counter moves.
 - Air support should be coordinated with indirect fire support.

43 Including armoured engineer assets, for example - Trojan and Terrier.

4-13. Tasks. The tasks of the break-in force will be to:

- Establish a foothold in the urban area.
- Identify the principal adversary defended localities.
- Determine the strength, location and future intentions of the adversary.
- Force the adversary to commit their reserve.
- Establish routes for forward passage of lines.
- Provide a fire support base for subsequent stages of the operation.

Securing objectives

4-14. Securing objectives gives the attacking force control of the vital ground. This may be key adversary defensive locations, high-value targets, key capabilities (weapons of mass destruction, communication nodes, logistic sites etc), or vital civilian infrastructure. Manoeuvre should be driven by intelligence and avoid obvious routes. Troops should maximise covered routes and approaches, moving via rooftops, through buildings or subterranean passages where possible.



Figure 4-4. Securing objectives

4-15. Destruction of strongpoints, headquarters and supplies will erode the adversary's will to fight.

4-16. Once objectives are secured, the attacking force must switch to hasty defence to defend against enemy counter-attacks. They should adopt mutually supported positions with a screen to give early warning. Observers should occupy positions to cover likely enemy approaches. Consideration must be given to the carriage of sufficient combat supplies and casualty evacuation plans.

- 4-17.** Echelon forces must be able to conduct a forward passage of lines. Snipers will be particularly effective behind, above, on the flanks of, and integral to attacking forces.

Clearance

- 4-18.** Once the force has established itself on its chosen objectives then it must consider if a clearance is required. If so, the clearance must be methodical and ideally conducted during daylight. The use of sectors, or similar control measures should be used to ensure the clearance is systematic. The clearance is likely to be expensive in both friendly force and civilian casualties. Intelligence driven raids and precision strike might offer an alternative.



Figure 4-5. Clearance

- 4-19.** In a large urban area, there may only be sufficient combat power to clear mission essential infrastructure/locations and vital communications.

The Battle for Sadr City 2008



Lessons:

- **Situational awareness and precision.** Persistent ISR, technical intelligence and responsive precision-strike capabilities were fundamental to success and must be integrated. However, this integration presents significant airspace command and control challenges. These assets are key in showing proportionality in attacking targets among the people yet causing minimum collateral damage.
- **Freedom of manoeuvre.** Ground manoeuvre was essential to success but building the wall severely restricted the adversary's ability to employ indirect fire and separated him from the population, forcing him into costly attacks against its construction.
- **The utility of heavy forces.** Tanks and IFVs are key elements of manoeuvre in complex terrain; they are survivable, lethal and precise, but must be protected by infantry.
- **Snipers and special forces** are important enablers in operations in the urban environment and in exploiting intelligence about the location of insurgent leaders.
- **The ability to rapidly exploit.** The adversary is fleeting, so decentralised decision-making is required. Units at the brigade level and below must therefore have access to information and other capabilities required to support the rapid decisions required to deal with a highly mobile enemy and to enable effective, independent action.
- **Generating mass.** Capable host-nation security forces are indispensable for securing gains. They must be trained and mentored to ensure their effectiveness.
- **The 'three block war'.** The force must be capable of transitioning quickly between military activities, from counter-insurgency to intense close combat.

The battle for Sadr City⁴⁴ fell out of the Baghdad security plan which was an attempt to clear and secure the Baghdad area in preparation for the handover of responsibility for security to Iraqi forces. The plan was based on a 'clear, control and retain' framework. The adversary was the Jaish al-Mahdi (JAM), the Sadrists' armed militia, who had been contained within Sadr City and who now needed clearing out to allow US forces to establish control. Key components of the plan were:

- Moving US forces into Baghdad, where they could directly confront insurgent elements, thereby leading to better local security, cooperation and human intelligence.
- Using concrete barriers and checkpoints to limit the ability of insurgents to cause mass casualties using rockets, mortars, IEDs and particularly large, vehicle-borne IEDs and disrupt the insurgent's freedom of movement and resupply.
- Integrating special forces, conventional forces and all means of intelligence to locate and kill or capture insurgent leaders.
- Improve the capability and capacity of Iraqi security forces, including the Iraqi Army and police.

The task was complicated by the fact that the population was firmly controlled by the JAM which strictly limited the amount of intelligence within the area, leaving the US forces largely blind.

With the end of a self-imposed ceasefire by JAM, they launched several mortar and rocket attacks on government and coalition targets and over-ran about half of the Iraqi security force checkpoints in and around Sadr City. The decision was made to stop the attacks and defeat the militias.

Sadr City covered approximately 35 square kilometres and had an estimated 2.4 million residents. Crucially, it was in rocket and mortar range of the International Zone (IZ). Clearing the launch sites and pushing the militia back out of range of the IZ (beyond Route Gold) was a key part of the US plan to defeat the insurgents. The force allocated the mission consisted of a mechanised infantry battalion, a combined arms battalion, a cavalry squadron of Stryker, a support battalion and a special troops battalion with other supporting troops. During the operation another infantry battalion was added to this force. Armed UAS, AH, CAS and GMLRS-U were also allocated with 24-hour cover.

The operation was in two phases:

- Clearance of the rocket and mortar firing points while isolating the area by dominating the terrain to the north and south (three weeks).
- Erection of a concrete wall controlling access back into the area and denying the insurgents the ability to launch indirect fire attacks into the IZ.

The initial clearance proved tougher than expected and six Stryker were lost to IEDs and RPGs. The clearance force was reinforced by MBT and IFVs. Heavy armour proved important; providing firepower and an ability to withstand hits from IEDs and RPGs. The attack was also supported by Iraqi Army units who performed well. Although the area was cleared, the warren of alleyways and complex terrain allowed the insurgents to reinfiltre the area almost at will. The construction of the concrete wall was vital to prevent this infiltration.

Over a period of 30 days, 3,000 12ft, 9-ton, T-Wall sections were emplaced with MBT and IFV providing security. The insurgents launched determined attacks to prevent the construction of the wall but suffered constant attrition until the strength and determination of their attacks began to fall. Snipers played a key role in identifying and striking developing attacks. During the operation 818 main gun rounds were fired by MBT and 12,091 25mm rounds by IFVs. Six US soldiers were killed in the operation; JAM lost an estimated 700 fighters and much of its leadership fled to Iran and Syria. A few weeks later JAM requested a ceasefire.

The key to success was giving the brigade commander direct access to ISR assets that he could task almost immediately to identify firing points without having to go through a superior headquarters. This arrangement gave him a short decision-action cycle that enabled him to react promptly to JAM operations. He could pass intelligence rapidly and by secure communications down to subunit level and attack firing points around the clock with a wide range of assets, including AH, air and armed UAS.

Reorganisation

- 4-20. Reorganisation aims to secure the area taken, resupply and prepare for future operations, while denying the adversary the ability to do the same. It should also include establishing control of the population to prevent their interference and to enhance understanding through interaction and key leader engagement. The time available for reorganisation will be dictated by plans for subsequent operations. Nevertheless, the following points should be considered:
- Even after a systematic clearance of the defended location, the threat from snipers and counter-attack will remain. Care must be taken to cover every approach, including tunnels, alleyways and rooftops, by observation and fire. Immediately after the assault, temporary defensive measures should be adopted at every level, including the preparation of direct and indirect-fire defensive fire plans.
 - Regrouping must be considered if casualties have been high.
 - Immediate or early resupply of ammunition, water and fuel will be critical.
 - The casualty evacuation, control of captured persons and the evacuation of civilians may require considerable troop numbers and time.



Figure 4-6. Reorganisation

The raid

- 4-21.** An urban raid aims to secure information, confuse the enemy, strike or seize a high-value individual or target. It will also seek to destroy physical positions, equipment, or a discrete part of an enemy force. A raid is a swift penetration into hostile territory and ends with a planned withdrawal once the assigned mission has been completed.
- 4-22.** It can be conducted up to brigade level but is normally executed at battlegroup level and below, exploiting stealth and surprise. It will require detailed intelligence, planning, and preparation. The available time, the level of operations security and deception requirements, will determine the opportunity for detailed planning and mission rehearsals.
- 4-23.** In a large urban area, where there is insufficient combat power to clear and hold, a raid is likely to be the primary means of close combat.
- 4-24.** An operation may consist of several simultaneous or sequential raids. Raids may include a cordon to prevent an adversary escaping. They may be followed by extraction or defence and a raiding force must always have a reserve.
- 4-25.** Details for a battlegroup raid are provided in AFM *Conventional Warfare*, Chapter 2. Additional considerations for an urban raid are:
- Simplicity. The plan for the raid must be kept simple as possible.
 - Fire support. An adjustment and use policy must be agreed to ensure security and surprise are not compromised. However, it is unlikely that suppressive fire will be allowed in a populated area and a raid may only have precision fires to support it.
 - Flank protection and security. Raids generally rely on quick manoeuvre to achieve surprise. However, the withdrawal of the raiding force may afford the enemy an opportunity to block or ambush it. Alternative and secured withdrawal routes are recommended.
 - Surprise. Surprise is an essential element of a raid and the plan to achieve it must be realistic and convincing.
 - For balance of security and tempo, a raid should be planned to achieve simultaneity. The deception force must be carefully coordinated with the strike force and cordon (if all three are used) to reinforce the chances of achieving surprise and reduce the time on task, limiting the opportunities for an adversary to attempt an effective countermove.
 - Deploy from the column of march. A cluttered urban environment is unlikely to offer a conventional forming up point; the force must be prepared to deploy off the column of march into the assault and have carefully rehearsed this prior to the operation.
 - Communications. A robust communications plan must be developed if the raiding force is moving deep into the urban area to ensure it can call for support. Communications cannot be guaranteed, so mission command, a simple plan, and well-rehearsed contingency plans are essential.



Figure 4-7. Raid

Groupings and tasks

4-26. The raid force normally includes the following:

- ISR elements** confirm the target (using either ground and aerial reconnaissance), provide overwatch to warn of enemy countermoves and assist the assault element on its insertion and extraction routes.
- The fire support element** provides indirect and direct fires to support the raiding element during the approach, the execution of the activity on the objective, and the subsequent withdrawal.
- The assault force** is the dynamic element of raiding force, responsible to conduct the insertion/infiltration and reach the objective unobserved and without becoming engaged.
- The security element** secures the objective, gives early warning of enemy activity blocks avenues of approach to the objective, prevents the enemy moving into/out of the objective area and provides overwatch for force elements units on the objective.
- The support element** delivers suppressive fires during the infiltration on the objective/exfiltration, mobility and counter mobility and if capable provides short-range air defence to the assault element.

Conduct

4-27. The raid is likely to follow this sequence:

- Infiltration. The raiding element will use speed and covered approaches to the objective. Multiple routes may be used to deceive the enemy. Against an irregular enemy, the infiltration could be by ground or aviation lift to move light forces (or a combination

of both); boats could be employed for littoral or riverine operations. It is vital that the raiding element arrives at the objective in a manner which surprises the enemy.



Figure 4-8. Infiltration of security force

- b. Securing the objective. The security force will usually be the first element to arrive and will secure the objective, denying the enemy the chance to escape or reinforce. This may involve a cordon or a series of blocking positions on access routes. It should also secure the ingress and egress routes where required.



Figure 4-9. Establish cordon and route protection

- c. Assault. Momentum is important and the assault force should arrive as soon as the security force is in position. The raiding force will usually have a limited time to affect its aims before the enemy is able to react.



Figure 4-10. Assailing the objective

- d. Withdrawal. When the raid is complete, the force should withdraw. The assault force will withdraw through the cordon and extract followed by the security element. If route security is being provided, it collapses in sequence from the objective until the whole force is clear of the enemy.



Figure 4-11. Assail force withdraws



Figure 4-12. Security force withdraws

Armoured raids

- 4-28. Armoured raids are conducted by combined arms groupings of tanks and infantry fighting vehicles, taking advantage of their mobility and firepower to enter an urban area and establish dominance before withdrawing. The aim is to demoralise the enemy defenders and/or exploit gaps in the defence. Armoured raids should be acutely aware of the risk of anti-tank ambush and envelopment by enemy forces using complex terrain as cover.
- 4-29. The key to a raid's success is mutual support between armour, infantry, engineers and artillery, coupled with speed. Without a combined arms grouping, any the raid will become static and vulnerable to close range anti-tank fire. Thorough intelligence preparation of the environment is essential to identify main and secondary routes both for the entry and exfiltration. Close cooperation with uncrewed aircraft systems and joint fires will be required to pin enemy mobile forces and effect a break clean. Mobility assets should be task-organised with each group to overcome obstacles.
- 4-30. While the raiding force is expected to carry enough combat supplies for the duration of the raid, consideration should be given to casualty evacuation/treatment and the recovery and/or denial of damaged or broken-down vehicles. The two vignettes below describe the conduct of an armoured raid.

Armoured assault - Grozny 1995

Lessons:

- **Cohesion.** Armoured raids must be planned and rehearsed in detail. Units should have previously conducted collective training together.
- **Combined arms groupings** must systematically clear each area as the force advances. Routes must be reconnoitred ahead of the advance and flanks protected.
- **Concentration of force.** Urban operations are resource intense and force ratios must be sufficient for the task. It may be impossible to attack on multiple axes.
- **Do not underestimate the defending force.** Although poorly trained and equipped, their local knowledge and fighting spirit can overmatch conventional forces.



- **Contingency plans.** The operation is unlikely to progress as planned. Develop and wargame contingency plans.
- **Route security.** The attacking force may be unable to protect its rearward lines of communication. The plan must have contingencies to reinforce and resupply the force and evacuate casualties.
- **Command and control** will be challenging in an urban environment. Multiple systems, reversionary modes, control measures and mission command are essential.

Following the break-up of the Soviet Union in 1991, Chechnya declared independence and took control of their government. It was not until 1994 that Russia tried to reassert its control and invaded and seizing the capital, Grozny, was central to their success. By then, the Russian Army had suffered years of neglect and was still organised for a potential European war where it had planned to avoid fighting in large urban areas. In addition, its recent operational experience was limited to rural and mountain operations in Afghanistan. Its conscripts were of poor quality with low morale and were neither trained nor equipped for close combat in complex terrain.

Chechnya's military forces of barely 1,000 strong but with a cadre of experienced Russian trained officers. It was soon joined by 5,000 volunteers. Despite limited training and equipment, the highly motivated volunteers knew each other well and had a thorough knowledge of the city. They were formed into 25-men units, organised into groups of three, armed with machine guns, sniper rifles and RPGs and used commercial hand-held radios.

By 30 December 1994, the Russians had encircled the Grozny. The Russian high command did not expect a determined resistance and, surprisingly, made little attempt to control the movement of Chechen fighters or supplies. The assault would be from the north-west, north-east, south-west and south-east by a hastily assembled mechanised formations. Although a formidable force, units had not trained together nor had commanders been given insufficient time to conduct detailed reconnaissance, rehearsals or planning.

Although a relatively well-conceived plan, the execution was extremely poor and three of the four axes stalled in the face of relatively light resistance. Only the north-eastern axes became fully committed, but thinking this was a show of force, had not expected serious resistance. Long columns of APCs moved slowly along two parallel streets with neither reconnaissance nor security. In the early afternoon, one of the columns was ambushed by 1,000 fighters who fired from buildings, alleyways and rooftops. The leading and last vehicles were targeted trapping the rest of the columns, before other vehicles were destroyed by RPGs fired into their thin upper armour. Russian discipline broke the attackers were quickly chased from the city, leaving behind dozens of abandoned and destroyed armoured vehicles.

Another brigade column achieved its initial objectives unopposed and, unaware of the fate of the other column, was ordered to continue into the city centre. Arriving without opposition, it occupied its objectives but did not secure its own security. Without warning, the brigade was attacked by Chechen fighters who destroyed stationary, unmanned vehicles and targeting officers. Substantial casualties were caused before the Russians were able to coordinate its defence. The brigade was surrounded, and a battalion sent to reinforce was ambushed and fixed. Poor communications hampered rescue attempts and effective joint fires. Significant amounts of artillery fire fell upon the city causing extensive collateral damage and civilian casualties but had little effect on the Chechen fighters. After four days, the survivors fought their way out of the city. It had been a humiliating defeat with heavy losses of personnel and most of the brigade's armoured vehicles.

Four days later, a properly planned and coordinated attack was launched. The city was finally isolated, to prevent Chechen reinforcements and resupply, before heavy preliminary artillery fires. This advance made slow progress against heavy resistance as combined arms groupings systematically cleared each building. By 23 February 1995, the final Chechen fighters were surrounded and major operations ended.

Defensive activities

- 4-31.** The principles of defence⁴⁵ apply as much to actions within the urban environment as to rural defence. Defensive actions should be aggressive, have strong mobile elements and exploit depth. The defender should concentrate on retaining the initiative, particularly

45 Mutual support, all-round defence, depth, concealment, reserves, offensive action.

in their ability to move forces and locate those of the adversary, to counter penetration. However, in some cases, a defender may allow penetration to expose the adversary to fires, counter-attack and/or ambush, throughout their depth. The defender should seek to disrupt and frustrate adversary intentions in every phase of battle. The counter-attack must be at the heart of the defensive plan as this will keep the enemy off balance, destroy discrete portions of the enemy and provide the defender with the time to re-establish the shape of the defence. Without a strong counter-attacking element, the defensive battle will not succeed.

Defence of an urban area against a conventional enemy

- 4-32. The defence of an urban area against a conventional enemy is a mobile battle, initially using a screen/guard on the perimeter to identify approaches, conduct shaping operations and then defeat the enemy using a combination of defended localities, fires and strong counter-attacks.
- The perimeter battle. The aim of the perimeter battle is to gauge the enemy's strengths, intentions and avenues of approach; to blind them and cause some attrition; to delay their approach and buy time for the preparation of the defence. It can also impede any attempt to encircle the city.
 - The disruption battle. The aim of the disruption battle is to shape the enemy, dislocate and cause attrition, to disrupt the enemy's principal and subsidiary approaches, to slow confusion about the strengths and dispositions of the defence and draw them into selected killing areas. The disruption battle should be a coordinated mobile battle that employs relatively small, combined arms forces supported by fires, in delaying operations.
 - The main defensive area battle. The main defensive battle is the decisive element. It is based around a series of defended localities, ideally mutually supporting, with each comprising strongpoints sited to defeat or channel the enemy into engagement areas. This battle must set the conditions for the counter-attack.
 - The counter-attack. This is the battle-winning action. When counter-attacks are employed, the chances of an attacker taking the urban area reduces from 80% to 35%. Counter-attacks must be employed aggressively throughout the depth of the defence and at every level of command.
 - Throughout the operation, commanders must consider the prosecution of depth fires outside the urban area, to dislocate an enemy, strike forces forming up for an attack and to harass investing forces.
- 4-33. Mobile forces are employed to counter-attack the enemy at every available opportunity. Unless the adversary is moving towards a designated killing area, every assault or advance should be counter-attacked by any available force of any size. A mobile reserve is essential and must be prepared to recapture any key terrain or vital ground.

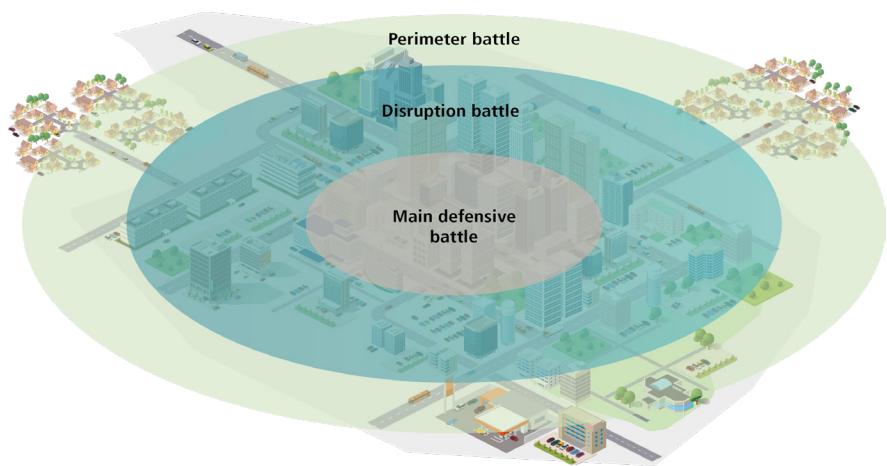


Figure 4-13. Layout of the urban defence

The perimeter battle

4-34. The perimeter force will usually be the first element of the defence to encounter the adversary.

- a. **Grouping.** The perimeter force should dominate the approaches to the built-up area. Each group can comprise reconnaissance, armour, anti-armour, and infantry support. Support from indirect fire, air and aviation should be integral to the grouping. Engineers may be required to provide mobility corridors for force withdrawal and can provide obstacle and mine-laying support. Typical tasks for the perimeter force include:
 - (1) Identify enemy strengths, intentions and main effort.
 - (2) Delay and destroy enemy reconnaissance and investment forces.
 - (3) Delay and destroy assault forces in assembly areas and forming-up points.
 - (4) Cover obstacles with fire.
- b. **Siting.** Information gathering devices should be sited to give as early and accurate warning of adversary intentions as possible. Perimeter force elements can be sited both on the outskirts of the urban area and beyond. Even when carefully sited and camouflaged, static positions on the edges of built-up areas are likely to be identified quickly and destroyed. Deception could include using a false front by occupying positions in advance of the urban area or in the second row of buildings.
- c. **Strength.** Composition of perimeter force must be balanced against the need to prepare the defence, collection of timely and accurate information and preservation of combat power before the start of the battle. Consideration to supporting the perimeter force withdrawal.

The disruption battle

- 4-35.** The disruption force should cause attrition, disrupt the attack and draw the enemy towards selected killing areas. The disruption force should aim to cause significant delay on the enemy from the start of their operation.
- Grouping.** The disruption force should be based on small infantry teams conducting fighting patrols, ambushes and tank-hunting patrols, supported by snipers, armour support and indirect fire. Tasks for the disruption may include:
 - Cause enemy attrition.
 - Delay and disrupt the enemy assault.
 - Draw the enemy into the main defensive area killing areas.
 - Confuse the enemy about the layout of the defence.
 - Counter-attack.
 - Location.** The disruption force should operate between the perimeter force and the main defensive area. It can operate outside and within the built-up area and, to be effective, should be prepared to conduct small group mobile, offensive and aggressive action.
 - Obstacles.** Explosive and non-explosive obstacles, covered by direct and/or indirect fire are used to shape and channel enemy movement.
 - Deception.** The disruption force should use deception before and during the battle, to mask the location, strength and intentions of the defence.

The main defence area battle

- 4-36.** The main defence area will comprise a series of well-prepared defended localities, ideally mutually supporting, and enhanced with obstacles to slow and channel the enemy into designated killing areas. These will be combined with strong, mobile elements supported with armour where possible, to counter-attack the enemy. The construction of strongpoints to withstand enemy shaping fires rehearsing counter-attack plans should be a high priority. Defence should be centred on vital ground/key terrain and force elements should not be dispersed.
- The role of the main defence area is to:
 - Stop the enemy advance.
 - Fix the enemy in place for the counter-attack.
 - Inflict attrition and erode enemy combat power.
 - Camouflage and concealment. Enemy ISR and night vision devices will quickly identify defensive positions if sufficient thought has not been put into their preparation and concealment. Precision weapons or concentrated indirect fire will then quickly destroy them.
 - Alternative positions. If time permits, alternative positions for every level of command should be prepared.
 - Killing areas. The enemy has a vote; it should not be assumed they will be channelled

neatly into killing areas. Contingency plans need to be in place and rehearsed to react to multiple enemy courses of action. Assets should be agile enough to cover all possible killing areas, and decision points to commit them put in place during the planning process. Mutual support will be important and covered movement between defended positions essential. Consideration should be given to movement through, rather than around, buildings or to using subterranean passages where practicable.

- e. Fire plan. The defensive fire plan should include an element of depth fires.
- f. Reserves. A central mobile reserve should be held to counter enemy penetration or a surprise attack from an unexpected direction. They may also be used to retake vital ground.

Fighting from an urban area

- 4-37.** A commander may choose to use the urban environment to fight from, rather than within. This involves a series of strongpoints centred on outlying urban areas to channel the enemy into the open ground between them. This is most effective in the very likely scenario that the enemy is seeking to bypass the urban area and fits into a wider defensive battle at both the tactical and operational level. If successful, it has the advantage of reducing the destruction and potential collateral damage associated with fighting within the urban area.
- 4-38.** Each strongpoint should be mutually supporting, with killing areas sited between them. Obstacles should be situated on the approaches to each strongpoint to prevent access and to deflect the enemy into the killing areas.
- 4-39.** Weapon systems should be sited to fire into flanks of the enemy from defilade positions on the edges of the strongpoint.
- 4-40.** Reserves should be sited to react rapidly to an enemy attempt to break out of the killing area.

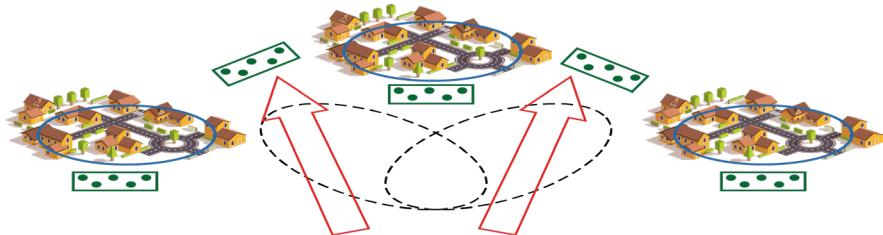


Figure 4-14. Fighting from an urban environment

Defence - The British Army of the Rhine in the 1980s



Lessons:

- **Fighting from the urban environment** is effective when the enemy chooses to avoid towns and villages to maintain momentum.
- **Disruption.** Once momentum is slowed by losses, the enemy is further slowed by having to systematically clear villages, which in turn provide opportunities for counter-attack.

While facing 3rd Shock Army across the Inner German Border (IGB), 1st (BR) Corps analysed the terrain and realised that it consisted of a lot of smaller villages approximately 2-3km apart. Drawing from the British Army experiences in 1944-45, it adopted a defensive system based on holding these villages, while utilising its anti-tank fires to create a series of interlocking and overlapping killing areas.

Each village was turned into a strongpoint, with infantry supported by obstacles defending the front portion of the village forcing the enemy to manoeuvre around them and into the killing areas, where they were engaged by Milan anti-tank guided weapons and Chieftain tanks firing from defilade positions further back in the village. Strong armoured reserves were maintained to prevent penetration and to counter-attack and retake any lost positions.

Engineers would help crater and mine approaches to the villages and provide disruptive minefields on the exits of the killing areas to bottle the enemy up within them.

Artillery would support the defence by providing heavy fires in front of the villages and on the forward edges of the killing areas, disrupting the attack and forcing tank crews to close down thus preventing them from spotting the anti-tank fire.

Defensive obstacle plan

4-41. Obstacles in the urban defence, as in any environment, are designed to turn, disrupt, delay and block. In short, they shape, slow and break up enemy manoeuvre elements. Separation of dismounted forces from armour disrupts the cohesion of the attacker, reduces their combat power and exposes individual elements to counter-attack. Obstacles are part of the combined arms defensive plan and are not just engineer business. They may employ lethal and non-lethal means, but all must be covered by observation, fire and support the effects which the commander needs to have on the enemy. The following factors influence the plan:

- a. The type and purpose of the defence.
- b. The degree of delay and denial desired.
- c. The impact on civilians.
- d. Acceptable friendly force casualties.
- e. The amount of physical destruction anticipated and permitted.

4-42. Urban obstacle planning must be three-dimensional, considering lateral, horizontal, vertical, interior and external avenues of approach. Identification of dead ground, which may be of use to the enemy is crucial.

- a. Subsurface. Access to these must be denied to the adversary, but consideration given to subsequent manoeuvre and exploitation options for friendly forces when they counter-attack.
- b. Surface areas. Surface areas follow the natural terrain and are themselves broken up by urban features. Integration of obstacles within the surface area will be the early focus of the obstacle plan.
- c. Supersurface areas. Supersurface areas are vulnerable to air assault operations and provision must be made to deny helicopter landing or fast-roping sites.

Nodal (key point) defence

4-43. Conventional defence against an irregular force may have to be adapted: concentrating forces around vital ground or key terrain (nodes or key points) rather than attempting to defend or secure the entire urban area. It may only be possible to occupy and secure the most important nodes to ensure the urban systems function effectively, and some of the key communication routes that connect them.

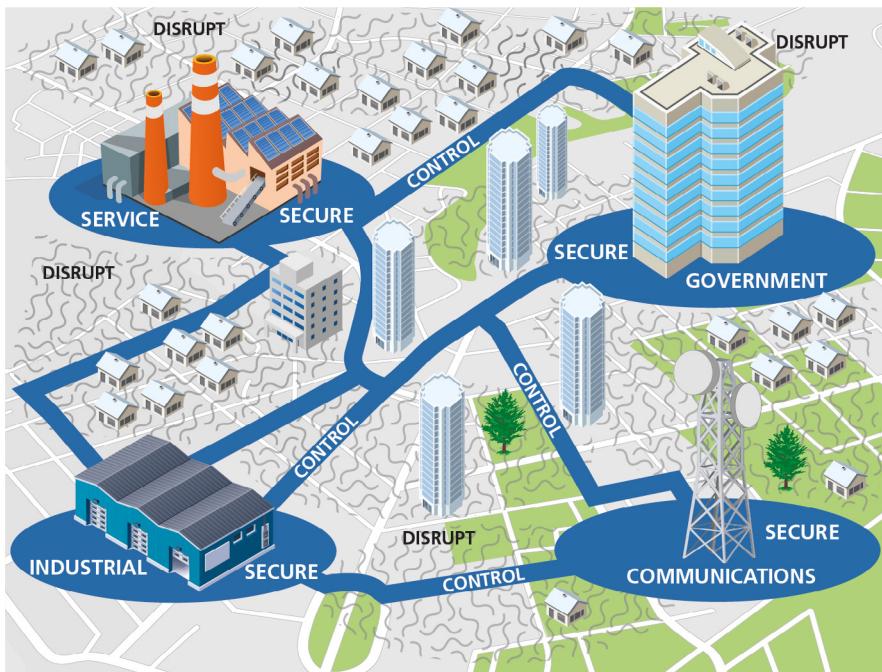


Figure 4-15. Nodal defence

- 4-44. Each of these areas may employ perimeter or disruption forces to patrol and to give early warning to prevent attacks. The main defensive force will prevent the enemy/adversary from gaining entry and provide a reserve.
- 4-45. Areas which are not secured initially may be subsequently cleared and occupied as host-nation forces are trained and expanded.
- 4-46. Nodal defence is most appropriate for a non-peer adversary using irregular tactics. The irregular adversary could employ 'swarm' tactics; large numbers of lightly armed fighters supported by 'technicals' carrying heavier weapons and potentially vehicle-borne improvised explosive devices. The node protection force and its defences must be capable of withstanding these attacks through sufficient mass, organic/base ISR, a reserve or quick reaction force on short notice to move and be able to call on offensive support. Mutual support may not be so vital, but irregular forces must quickly understand that an attack on a detachment will trigger a response.
- 4-47. In a nodal defence, military forces are likely to be based in requisitioned buildings, forward operating bases or patrol bases, depending on the type of military activity. Ready built complexes, such as light industrial premises will be chosen for suitability for defence and for personnel and technical accommodation. The extent of defensive work will be determined by the threat, but forward operating bases and patrol bases should be capable of repelling a determined assault by an irregular adversary using vehicle-borne improvised explosive devices and suicide attack.

- 4-48.** It is also likely that key infrastructure will need to be secured against irregular attack. If deployed in support of a friendly government, host-nation security forces might be best suited to this task.

Delay

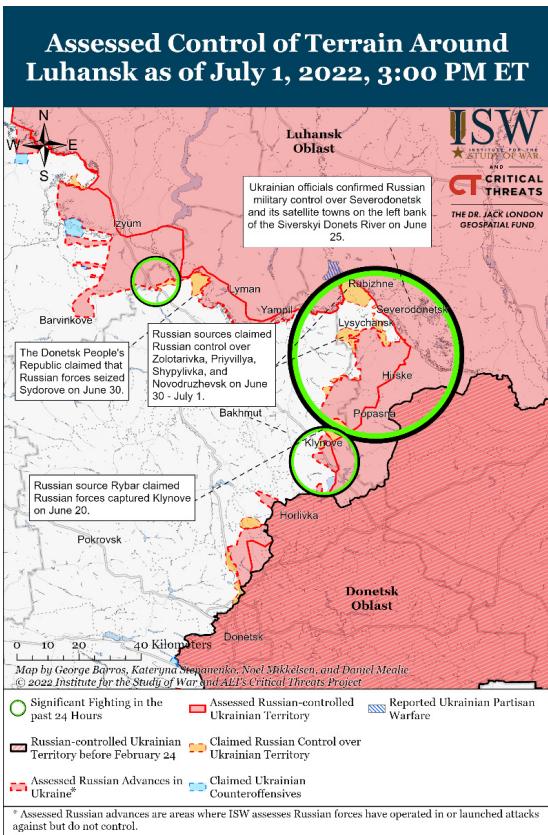
- 4-49.** The purpose of delay is to trade space for time without becoming decisively engaged. They seek to create favourable conditions for defence or counter-attack, reduce enemy combat power or gain information. They can utilise small settlements as delay positions or can be conducted within larger urban areas, using small mobile or light forces where mobility is difficult. The delaying force must be at least as mobile as the enemy.
- 4-50.** Delay in an urban environment can be achieved with moderate engineer effort by a small, combined arms combat force against a much larger enemy force.

The conduct of a delay

- 4-51.** A delay operation in an urban area is likely to be complicated and confused, and there are three stages for which should be carefully planned and rehearsed:
- Preparation.
 - Delaying action.
 - Breaking contact.
- 4-52.** Execution. The delaying force will normally consist of three elements:
- Screen.** This normally consists of reconnaissance, long-range anti-tank teams, armour, aviation, artillery and mortar fire controllers. Its task will be to report on the location, strengths and movement of the enemy, to engage and destroy their armour and to draw them into the engagement area.
 - Delaying forces.** These should consist of a combined arms grouping fronted by infantry inside urban areas. Armour, indirect fire and aviation should be used if available, particularly against the flanks and rear echelons of the enemy attack. Short-range anti-armour weapons, fired from above and from side streets, will be particularly effective in urban ambush.
 - Reserves.** Reserves should be available to support forward positions, assist the extraction of the screen and to deal with unexpected reverses that threaten the cohesion of the defence.
- 4-53.** Coordination.
- Every advantage offered by the terrain should be exploited. Every opportunity should be taken to surprise and ambush the enemy without becoming decisively engaged.
 - The fluid situation during delay operations will necessitate constant and close coordination between subunits and effective fire control.
- 4-54.** Breaking contact. Troops withdrawing from a defensive position should break clean if possible. Local counter-attacks, subterranean routes, smoke, fire support and deception can be used to support. The commander's aim should be to prevent the force from being 'fixed'. Control is critical; the enemy should be given as little indication as possible and liaison elements should be attached to superior and adjacent commands to identify withdrawing units as they retire.

Lysychansk 24 June to 2 July 2022

Lessons:



- **The urban battle extends far beyond the built environment.** The defence of Lysychansk became untenable with the loss of key terrain 10km away from the city's outskirts.
- **For the attacker, the importance of investment** and isolating the enemy from reinforcement or resupply.
- **For the defender, the value of a mobile defence,** the importance of timing the withdrawal and the need for a reserve which can conduct a combined arms counter-attack.

By 10 May, the twin cities of Severodonetsk and Lysychansk were the last Ukrainian strongholds in the Luhansk Oblast. They are divided by the Siverskyi Donets River, and Lysychansk occupies high ground on the west bank, overlooking three crossing points.

The Russian 74th Guards Motor Rifle Brigade (41st Combined Arms Army) attempted to

establish four crossings over the Siverskyi Donets River, near the villages of Dronivka, Bilohorivka and Serebryanka, north of Lysychansk, between 5-12 May.

Subjected to devastating artillery and airstrikes, they suffered heavy losses at the hands of the Ukrainian 30th Mechanized and 17th Tank Brigades, including the destruction of an entire Russian battalion tactical group on 10 May and the death of an engineer brigade commander the following day.

By 23 June, Russian and separatist forces from the so-called Luhansk Peoples' Republic (LPR) achieved a breakthrough in the south and captured Severodonetsk the following day. Three bridges connecting the cities were destroyed by Russian artillery and the defenders were forced to withdraw to positions in Lysychansk.

Strategically, the capture of Lysychansk was important to the Russians; it would cement the 'liberation' of the Luhansk Oblast. Operationally, RGF could destroy the Ukrainian centre of gravity through encirclement and destruction of the core of Ukraine's professional army in the Lysychansk pocket.

Geographically, Lysychansk presented a significant challenge to attacking forces. It is protected from the east by the Siversky Donets River, a string of hills and ridges which dominate ground to the south, and the Lysychansk Oil Refinery which occupies high ground to the south-west.

By 24 June, the Russian advance towards Lysychansk from the north had failed, with the destruction of the Siverskyi Donets River crossings. Their forces had culminated in Severodonetsk and were fixed by the Ukrainian National Guard Rapid Response Force and Ukrainian Foreign Legion, who held high ground on the western bank.

RGF identified the Lysychansk Oil Refinery as an important objective and key terrain because it dominated routes into the city.

On 25 June, RGF and LPR units entered Lysychansk from the south, supported by heavy artillery and airstrikes. Civilians were urged to evacuate, and the Russians captured the oil refinery from the Ukrainian 46th Battalion of the 24th Brigade on 27 June, setting up observation posts and directing fire onto the Ukrainian lines of communication.

With encirclement looming from the south and north (where the Russians had finally established river crossings) the Ukrainian Army was surrounded on three sides. Without control of the high ground and key terrain in Russian hands, their situation became untenable. In the end, the choice was relatively simple; lacking the requisite combined arms manoeuvre capability to relieve a siege, or to strike into Russian depth, Ukrainian forces withdrew to defensive positions around Siversk, Kramatorsk, and Sloviansk on 2 July, less than nine days after the loss of Severodonetsk.

Enabling activities

4-55. Most enabling activities not unique to an urban environment, and a table of these is at Figure 4-16. However, three key enabling activities require particular attention: reconnaissance, relief of encircled forces and breaching/crossing of obstacles.

Reconnaissance

4-56. The urban environment is challenging for both technical and crewed reconnaissance. A layered approach must be used which exploits a range of capabilities to mitigate this. Technical means are hindered by the built fabric and density of the population, while crewed reconnaissance risks compromise by the population and becoming isolated.

Relief of encircled forces

4-57. Relief of encircled forces may be conducted in support of the whole force when an enemy has invested the city, or a smaller force within the city cut off by enemy action. The breakout of encircled forces is covered in AFM *Conventional Warfare*, Chapter 2.

4-58. The conduct of the relief of the whole force, in any environment, is laid down in AFM *Conventional Warfare*, Chapter 4. The need to operate in smaller groups in urban terrain (whether carrying out offensive, defensive or stability operations) and the risk of

isolation, makes encirclement of a patrol or subunit a very real threat. Groups operating in the urban environment must have the combat power, or support to hold out until relief arrives. The following should be considered:

- a. **Communications.** Communications between the encircled force and relieving force are fundamental to coordination. Battlespace management, control of supporting fires (where appropriate) an effective link-up and the avoidance of fratricide will depend on the two forces being able to speak to each other.
- b. **Deception.** A deception or diversionary operation or other distraction should be considered to attempt to draw some adversary forces away from the encircled forces.
- c. **Fratricide.** As a relief force approaches an encircled force, the threat of fratricide is high; coordination measures to avoid fratricide must be included in planning. The encircled force must fully understand the direction of approach of the relieving force.
- d. **Security.** The enemy will expect an attempt to relieve the encircled force. The threat of ambush and interdiction of routes is high. As routes for the relieving force are likely to be limited and predictable, reconnaissance, clearance, and overwatch of the move by ISR and fires must be considered, as well as deception. Infiltration of a relieving force may be an option if the risks of compromise are sufficiently low or if routes for vehicles are too predictable or dangerous.

Breaching and crossing obstacles

- 4-59. The range of potential obstacles in urban areas is vast, even when facing an adversary with no specific engineer capability, and many may not even be part of enemy planning. Interdiction of routes will canalise friendly forces and deny freedom of movement. Engineer capabilities for mobility support and route reconnaissance are covered in more detail in Chapter 3.
- 4-60. Major moves through an urban area should routinely have engineer assets task-organised to them; adversary obstacles can be emplaced quickly when a route is identified, and after friendly route reconnaissance has been carried out. Brigade and battlegroup obstacle crossing drills, and considerations for obstacles are contained in Standard Orders Card 4 (SOC 4), and AFM *Conventional Warfare*. The following points could be considered specific to the urban environment:
- a. Flanks are particularly vulnerable and must have appropriate forces tasked to secure them.
 - b. Specialist engineer assets are high-value targets and must be allocated close protection troops.
 - c. RVs/headquarters and waiting areas will be vulnerable to three-dimensional attack from multiple directions.
 - d. The effectiveness and availability of ISR overwatch will be difficult to guarantee; snipers and other troops on the top of buildings or at height must be considered.
 - e. The nature of the obstacle and surrounding urban terrain will determine the composition of the in-place force. It is unlikely to be a suitable task for armour and will probably fall to the infantry.

- f. Communications. Effective obstacle crossing operations rely on well-rehearsed drill and radio silence should be maintained until the last safe moment (when the crossings open) to preserve operational security.
- g. Manoeuvre space and battlespace management. Heavy engineer assets may be required for an obstacle crossing operation; many of them will face difficulties in manoeuvre and concealment in close terrain. Siting RVs, waiting and assembly areas will be particularly challenging.
- h. Clearance of the crossing site. Obstacle crossing sites in urban areas are more likely to be predictable and easily observed. The enemy is likely to mine them and cover them with fire, targeting signature engineer equipment.

| Enabling activity | Threats | Opportunities |
|---|--|---|
| Reconnaissance | <ul style="list-style-type: none"> ■ Poor fields of observation. ■ Buildings and tunnels provide adversary concealment. ■ Electronic screening. ■ Unfriendly population. | <ul style="list-style-type: none"> ■ Greater HUMINT opportunities. ■ Open-source material available. ■ Exploit high ground (rooftops etc). ■ Exploit infiltration/tunnels. |
| Advance to contact and meeting engagement | <ul style="list-style-type: none"> ■ Difficulties of reconnaissance. ■ Short engagement ranges. ■ Restricted routes. ■ Restricted manoeuvre space. ■ Difficulty of synchronised movement. ■ Difficulty of maintaining momentum and balance. ■ Control affected by poor communications. ■ Fires difficult to call, adjust and control. | <ul style="list-style-type: none"> ■ Exploit opportunities for infiltration. ■ Exploit armoured protection. ■ Exploit greater options for deception and surprise. ■ Exploit rooftops for overwatch especially use of snipers. ■ Well-practised drills will allow seizing of initiative ■ Decentralised command. |
| Link-up Relief of encircled troops | <ul style="list-style-type: none"> ■ Control difficult due to poor communications. ■ HQs/RVs vulnerable. ■ Identification of FF difficult. ■ Flanks vulnerable. ■ Route options restricted and easily interdicted. ■ Short fields of observation and fire for in-place force. | <ul style="list-style-type: none"> ■ Infiltration/exfiltration possible. ■ Deception opportunities enhanced. ■ Picket cleared routes. ■ Exploit rooftops for overwatch especially use of snipers. |
| Relief of troops Withdrawal Retirement | <ul style="list-style-type: none"> ■ ISR overwatch difficult. ■ Control difficult due to poor communications. ■ Security difficult to maintain ■ Flanks vulnerable. ■ Restricted routes available ■ Clearance of routes likely to be lengthy. ■ RVs vulnerable. ■ Identification of FF difficult. | <ul style="list-style-type: none"> ■ Break clean easier because of limited fields of view/fire. ■ Opportunities of surprise and deception enhanced. ■ Exploit rooftops for overwatch especially use of snipers. |
| March Breaching and crossing of obstacles | <ul style="list-style-type: none"> ■ ISR overwatch difficult. ■ Short fields of observation and fire for in-place force. ■ Control difficult due to poor communications. ■ Difficulty of finding suitable place for assembly area for heavy plant. ■ Large engineer vehicles vulnerable and difficulty of manoeuvre. ■ HQs/RVs vulnerable. ■ Difficult to coordinate forward passage of lines, fire support, routes. ■ Identification of FF difficult. | |

Figure 4-16. Urban considerations for enabling actions

Stability activities

- 4-61. During operations in the urban environment, the force will almost inevitably be involved in some variation of the 'three block war' in which both offensive and defensive actions will have stability actions running simultaneously, requiring the allocation of precious time, effort and resources.
- 4-62. As populations and the services which support them are concentrated in urban areas, the impact of all military activity in such a complex environment is substantially magnified. During planning, the full implications of collateral damage caused by force directed against an adversary must be considered. Extensive collateral damage caused during an intense period of violent confrontation, especially civilian casualties and destruction of essential infrastructure, will make subsequent stability actions considerably more difficult; consideration must be given to the second and third order effects.
- 4-63. All stability activities described in AFM *Stability and Peace Support Operations* are designed to work within the urban environment. This should be read alongside the *Stability Tactics Handbook*, which covers specific tactics, techniques and procedures.

The subterranean environment

Context and understanding

- 1A-01.** **Context.** The subterranean environment has played a major role in military operations since antiquity. More recently, organised crime has greatly increased the use of subterranean systems for the trafficking of drugs, people and weapons and some have been exploited by opponents during recent conflicts. Non-state actors, such as Daesh, have successfully employed relatively sophisticated tunnelling techniques during the battles for Mosul and Raqqah to neutralise the effectiveness of US-led coalition reconnaissance, surveillance, indirect fires and air-to-ground munitions.⁴⁶ These developments and the continuing sprawl of urban areas increase the probability that the subterranean terrain will feature prominently in future urban operations, providing opportunities and threats.
- 1A-02.** **Understand.** No two subterranean systems⁴⁷ are the same but they usually share common characteristics. It is therefore essential that commanders direct that subterranean systems are included in the intelligence preparation of the environment so that their staff can understand and assess the opportunities that they offer and threats that they pose and are integrated into the commander's scheme of manoeuvre. Accurate and extensive information is often available for the subterranean and this should be accessed as part of the intelligence preparation of the environment. This may be in the form of design drawings or surveys but equally photographs and written accounts may assist. Sources of information may include construction/mining/utility companies, local authorities, academic institutions (local, national and international), existing and former employees, emergency services, and hobbyists (cavers, urban explorers) etc.
- 1A-03.** **Exploitation.** Knowledge of the nature and location of subterranean systems is of great value to both the attacker and defender in the urban environment. Opponents have demonstrated that not only are they capable of operating within the subterranean terrain but are also highly proficient at manoeuvring throughout the subterranean, surface and supersurfaces. Furthermore, recent operational experience has shown that both state and non-state opponents possess the will and engineering expertise to extend/connect existing passageways and excavate entirely new ones⁴⁸ to exploit the concealment and protection provided by existing urban subterranean systems. Urban subterranean systems cannot therefore be abandoned for the enemy to exploit or treated as a discrete terrain.

⁴⁶ The most casualty-producing weapon systems. Only special air-to-ground munitions are capable of penetrating deep and hardened subterranean systems.

⁴⁷ The term 'subterranean system' to refer to any space or structure located below ground.

⁴⁸ Although the urban environment typically has a multitude of subterranean features, subterranean operations are not limited to the urban environment.

Attributes and categories of subterranean systems

1A-04. Structure categories. Subterranean structures are divided into the following three tiers:

- a. **Tier one** - caves, natural cavities and tunnels. Category one structures are further subdivided by the extent to which they have been developed:
 - (1) **Rudimentary.** Rudimentary structures lack basic infrastructure or even engineered support to reduce the risk of structural collapse. These structures can often be constructed quickly and with only hand tools/light power tools.
 - (2) **Sophisticated.** Sophisticated structures will have some form of structural reinforcement to enhance the natural support of the surrounding ground, to reduce the risk of collapse, or damage by earthquakes or flowing groundwater.
- b. **Tier two** - urban subterranean systems. Urban subterranean systems are built to support the civilian population and will be the most common category in the urban environment. Their location, foundation, design and depth will be determined by the subterranean geological conditions. Category two structures are further subdivided into substructures and civil works:
 - (1) **Substructures.** These include basements, shelters and car parks. These may appear similar to sophisticated category one structures but usually have explicitly designed structural reinforcement or shoring and are therefore more robust.
 - (2) **Civil works.** These works include aqueducts, sewers, passageways, underpasses, rail and road transportation and utility tunnels.
- c. **Tier three** - underground facilities. Underground facilities are sophisticated, complex structures specifically designed and built to provide maximum concealment and protection for the people and equipment within them. They are generally hardened and protected using a variety of means including bomb traps, blast doors, blow throughs and strongpoints. Underground facilities usually rely on 'umbilical structures' to function. Construction standards vary, but they are subdivided into shallow and deep, based on the depth and amount of overburden (soil and rock) above them.⁴⁹
 - (1) **Shallow.** An underground facility with 20m or less overburden. Examples include silos, cut-and-cover facilities and basement bunkers.
 - (2) **Deep.** An underground facility with more than 20m overburden. Examples include protection sites for government officials, military operations facilities and research and production facilities for weapons of mass destruction.

1A-05. Supporting infrastructure. Underground facilities may include the following external umbilical structures with some having robust internal redundancies:

- a. Power, such as above-ground power lines, buried power lines, substations, transformers, power generators and batteries.
- b. Communications, such as: landline wire and fibre-optic cables, buried antennas, surface antennas, satellite dishes, internal and external networks.

⁴⁹ The level of blast protection is related to the depth and type of overburden.

- c. Life support and environmental controls, such as heating, ventilation and air conditioning, water lines/pipes or storage tanks, vents, water chillers, sewage disposal, dehumidifiers, carbon dioxide scrubbers, chemical, biological, radiological and nuclear filters, blast valves and air handlers.
- d. Transportation, such as access ways, vehicles, trains, conveyors, escalators and elevators.

1A-06. Underground facilities usually rely on umbilicals to function. In many cases, consider underground facilities functionally mitigated if rendering the critical umbilicals inoperable, for example by cutting their ability to communicate or by targeting life support or environmental control umbilical systems external to the facility. Large umbilical conduits may also serve as alternative entry points into a subterranean facility. Often measures are undertaken to hide supporting infrastructure and umbilicals. These can include false buildings, vegetation/woodland, builds commissioned for other purposes (hotels, factories, etc) or other underground infrastructure (underground rail network).

1A-07. Military function. Militarily, both category one and two structures can be extended or connected, or entirely new structures excavated. All of which can be used as manoeuvre corridors to enable the attacker to bypass or envelop the defender's positions and achieve surprise by attacking from an unexpected direction. This requires understanding as to whether they are discrete or more likely, part of a larger system. Tunnels may also be used in defence as a means of providing concealed and protected movement of troops and sustainment activities to and from fighting positions. Category three underground facilities vary in size, degree of overhead protection and obstacles depending on the importance of their function(s). Such facilities can be used as command and control nodes, the production of weapons and their storage.

- a. Basements and underground car parks can be adapted to provide concealment and protection for command and control as well as sustainment nodes to store combat supplies, treat casualties or conduct forward repair. Civilians who have not been able to escape will also seek to protect themselves by occupying these structures. Detection of subterranean human activity cannot automatically be assumed as hostile.
- b. It is important to remember enemy deception. They will attempt to distract attention away from subterranean systems that they see as vital to their operations, while simultaneously attempting to attract attention to dummy or less important locations.

1A-08. Threats and hazards. The threats and hazards of the subterranean pose greater danger and challenges than surface operations. These challenges are grouped into the following four categories:

- a. Environmental and atmospheric hazards.
- b. Material and chemical, biological, radiological and nuclear hazards.
- c. Structural hazards.
- d. Psychological hazards.

1A-09. Environmental and atmospheric hazards. Environmental and atmospheric hazards are the most complex and dynamic of the four categories and, next to the enemy and structural failure, pose the greatest hazard. Every action that any actor takes underground may make the environment worse. Everything from weapons fire to breathing (consuming

oxygen and exhaling carbon dioxide) can make the environment more dangerous. Without understanding and planning for the environment, units may suffer casualties before making contact with the enemy.

a. **Air quality.** The air we breathe is a mixture of different gases. Many contributing factors may result in dangerously poor air quality within subterranean systems. Poor air quality can physically stress personnel and reduce their stamina and effectiveness. There can be significant differences in air quality between the floor and the ceiling of a subterranean space due to the layering of gases. These potential differences are important to understand when monitoring air quality. The gases listed in sub-paragraphs (3) to (6) occur naturally. Carbon monoxide, hydrogen sulphide and sulphur dioxide for example, are associated with volcanic activity, while carbon dioxide is released into the air when limestone is dissolved in rainwater. Urban areas built over such geologies will use a variety of techniques to monitor and prevent accumulations from reaching dangerous levels in their subterranean structures. Specialist engineer advice should be sought, and consideration given to the consequences of damaging these systems during military operations and how they might be minimised. Adequate ventilation prevents most hazardous gases from reaching dangerous concentrations.⁵⁰ Personnel need to be alert to the symptoms that may indicate poor air quality and be aware of the danger percentages of gases so that they understand air monitor readings. The most common factors that cause poor air quality are:

- (1) **Smoke.** Smoke inhalation caused by fires within underground systems can lead to a variety of hazards including reduced oxygen levels that can eventually result in asphyxiation; thermal injury to the upper airways; or chemical injury from inhaling toxic gases suspended in the smoke.
- (2) **Oxygen.** The normal proportion of oxygen in air is 21%. Inhalation of air deficient in oxygen (17% or less) will initially cause personnel to gasp and then become dizzy and experience headaches. If oxygen levels reach 9%, personnel will lose consciousness and will quickly die unless they use breathing apparatus or return to the surface.
- (3) **Carbon monoxide.** The symptoms of inhaling dangerous levels of carbon monoxide are headaches and dizziness. The gas reacts with haemoglobin in the blood and prevents the transfer of oxygen in the lungs into the bloodstream. High doses can be fatal. Carbon monoxide is an odourless, colourless and tasteless gas that because it is heavier than air, accumulates in low areas and displaces oxygen. The exhaust from vehicles and generators contains it. Firing weapons inside confined subterranean spaces can quickly raise carbon monoxide to dangerous levels because air circulation is usually poor.
- (4) **Carbon dioxide.** The initial symptoms of inhaling air with less than 1% of carbon dioxide causes a lack of focus, loss of energy, weakness and anxiety.

⁵⁰ Whether mechanical ventilation is available or not, the following actions need to be routine procedures: use pipes to route vehicle and generator exhaust out of an occupied subterranean system; point vehicle exhausts away from an opening to a subterranean system; personnel working in a confined space must monitor each other for symptoms of exposure to poor air; prevent and extinguish fires; use caution when opening and entering sealed areas; troops carry respirators and depending on the threat, wear chemical, biological, radiological and nuclear protective clothing and deploy detection equipment.

Exposure to concentrations of 10 to 15% for only a few minutes leads to unconsciousness and death. It is a colourless and odourless gas exhaled as part of human and animal respiration. Even a small increase in the number of personnel in a confined subterranean space can have a dramatic effect on carbon dioxide levels because it is also heavier than air and displaces oxygen unless there is good ventilation.

- (5) **Hydrogen sulphide.** Lower concentrations of this gas can cause burning of the respiratory tract and eyes. Higher concentrations can cause lung failure. Hydrogen sulphide reacts with enzymes in the blood to inhibit the transfer of oxygen in the lungs into the bloodstream. This gas is often produced from the breakdown of organic matter in sewers and although colourless, smells of rotten eggs.
- (6) **Methane.** Methane is colourless and odourless but is flammable and explosive. It is produced from the decomposition of organic waste in low-oxygen conditions such as sewers. It can cause asphyxiation.
- (7) **Riot control and chemical agents.** The use of riot control agents to 'flush out' enemy troops from subterranean systems contravenes the law of armed conflict. It is therefore likely to be a tactic that cannot be authorised for use by UK forces in armed conflict. The enemy may not, however, adhere to the law. Respirators must therefore always be carried as should counter-chemical, biological, radiological and nuclear suits and detector equipment deployed if the threat dictates.
- (8) **Explosives.** Explosives rapidly consume oxygen, as well as releasing toxic fumes, which is very dangerous a subterranean or enclosed space. This is a double-edged sword: exploitable for offensive operations, but with force protection constraints. Thermobaric explosions are particularly devastating in the subterranean environment.
- b. **Fire.** Subterranean fires rapidly consume oxygen, are a direct hazard to personnel and equipment and can cause combustibles such as explosives or fuel containers to explode. Different types of fire require different types of extinguishers and method of use. Units need to be prepared to extinguish fires using the appropriate equipment and method or evacuate. Carbon dioxide extinguishers should not, however, be used in the subterranean terrain - see paragraph 1-9a(4).
- c. **Overpressure.** The overpressure⁵¹ created inside subterranean spaces using explosives and weapons can be significantly higher than on the surface and propagation effects are very different. Shock waves reverberate, combine and cancel within subterranean passageways. The closest troops may or may not experience the overpressure in the same manner as those further away.
- d. **Radio communications.** Radio communications within and between subterranean and surface are usually even more limited than surface-to-surface communications within the urban environment.⁵² Strained communications, degraded position, navigation and timing systems and confined space in unknown terrain combine to make navigation, command and control and battlespace management extremely difficult.

51 Overpressure is the pressure resulting from the blast wave of an explosion.

52 Personal role radio, for example does not work within the Corsham Mines/Tunnels.

- e. **Obscurants.** Obscurants such as smoke and dust from explosive breaching of barriers, fire, weapons discharges and explosions tend to persist for much longer due to reduced air movement. Obscurants rapidly degrade the ability to see and make sense of the immediate surroundings.
- f. **Water.** Water can be especially dangerous in underground systems. In addition to natural or deliberate flooding, water traps may have been constructed to deny access to other parts of a subterranean facility or to reduce the effects of gases and explosives. Drowning is a real risk when attempting to traverse a water trap which may be deliberately or inadvertently become electrified due to collateral damage. Note that personal weapons may not fire correctly if they have been totally immersed.
- g. **Movement hazards.** Category one structures can contain numerous hazards to movement: vertical shafts, steep slopes, uneven flooring, holes, deadfalls and natural and artificial obstacles. Category two structures will have movement hazards related to their civil functions including fuel, steam or water pipes, valves, and cables. Category three structures will have obstacles designed to attrite and delay attacking forces. All movement hazards will be difficult to detect in low or no light or obscured conditions.
- h. **Vermin.** Subterranean systems may be inhabited by venomous insects, reptiles, bats or rodents. Some systems may also be inhabited by larger land, most notably feral dogs, or aquatic animals.
- i. **Human waste.** Construction standards for the removal of human waste vary enormously, but damage may stop even the best from working. Additionally, the civilian population that has been unable to escape and has sought refuge in subterranean spaces may not have any means of disposing of their waste. Operating in such conditions may expose friendly forces to dangerous hygiene issues and bacterial infections.

1A-10. Materiel, toxic industrial and chemical, biological, radiological and nuclear hazards. Items of materiel located in storage areas, laboratories or missile launch⁵³ sites are dangerous to handle and operate around. Extreme caution is needed as rocket fuels or toxic chemicals can combust and contribute to poor air quality and they also prevent or limit the use of certain munitions and explosives within these facilities. If chemical, biological, radiological and nuclear agents are used in tunnels, concentrations would be higher and persist longer than on the surface as they would not be dissipated by air movement.

1A-11. Structural hazards. Construction standards of subterranean facilities vary. Caution is required when breaching or using weapons inside a subterranean structure to avoid an inadvertent collapse. Engineer advice should always be sought on the type of munitions that may be used and those that should be avoided when clearing a subterranean complex. Tunnels and passageways can, however, be deliberately collapsed to deny access or to trap attacking forces inside, but this should be avoided without a clear understanding of the rock mass. A sudden collapse may lead to wider unintended consequences that thwart the commander's intent.⁵⁴ Before entering and while inside a subterranean system, personnel need to be alert for the signs that may indicate

⁵³ For example, those used by Hezbollah in Gaza.

⁵⁴ In addition to potentially creating additional hazards for friendly forces - such as the rupture of a gas main the severance water or electrical power supplies, or sewers for the disposal of human waste, or even the collapse of buildings on the surface would cause the loss of support from local and international audiences.

instability and may cause a collapse: loose rocks or dislodged construction materials overhead; damaged, cracked or dislodged shoring; indications of fire damage to the support structure; water running down the walls. When a structural hazard is identified, its location and description must be relayed to the whole team and to the surface support team. The hazard must be marked and avoided.

1A-12. Psychological hazards. Descending into dark and unknown subterranean spaces increase feelings of isolation, claustrophobia and fear. These can combine to affect soldiers' psychological well-being and self-confidence even before direct contact with the enemy. Commanders must account for these psychological hazards when planning, conducting and after the operation as they influence the unit's ability to accomplish their subterranean mission and may have medium to long-term effects. Measures to mitigate these psychological hazards include leadership training, mental resilience training,⁵⁵ sleep discipline and by minimising the time spent underground by rotating teams on a regular basis.

1A-13. Access control. Most subterranean structures have some level of access control in the form of one, if not multiple barricades. Category three underground facilities will additionally have protective and guarded obstacles outside them. An attacker would have to overcome these obstacles before engaging the portals and barricades. While access is ordinarily achieved by breaching these barricades, consideration must be given to achieving surprise by gaining entry from an unexpected direction. For example, via a ventilation shaft. Barricades are classified by the materials used to construct them.

- a. **Level one.** This level includes residential and commercial-grade barricades along with relatively unsophisticated concealment techniques (rug, furniture or foliage) and has the following characteristics:
 - (1) Portals include openings in walls made of brick, breeze block, or similar materials in residential or commercial buildings. The portal does not have any additional reinforcement or hardening. The tunnel is constructed in soil and rock.
 - (2) Barricades are made of wood or metal and have a hollow or solid core. They include standard locking mechanisms (deadbolts, chains and padlocks) hinges, handles and fasteners. They do not possess any special reinforcement against access.
 - (3) Basic entry techniques should normally suffice on the barricade or the surrounding wall. While effective, thermal breaching would probably be excessive.
 - (4) The portal and its immediate surroundings may be covered by closed-circuit television cameras.
- b. **Level two.** Level two access points are concealed (false floors and walls and special elevator access) and reinforced with residential or commercial grade barricades which include a security gate and an entry door. This level is typically used to restrict or control access to law enforcement, other secure government buildings, public utility facilities and private commercial premises. Level two barriers have the following characteristics:

⁵⁵ Future training must include provision for: emotional control, dealing with negative thoughts, anxiety regulation and mental warm-up.

- (1) Portals include reinforced framing and sturdier wall construction (reinforced concrete and/or brick).
 - (2) Barricades use heavier-gauge metal in their locking mechanisms, deadbolt and latch points (covered by metal to prevent prising open), modified hinges (welded or setscrews) to prevent removal and reinforced handles and fasteners. The barricade itself can also be reinforced with a security bar or internal relocking bars to protect against breach by ramming.
 - (3) Forced entry is possible on the barricade or surrounding wall using extensive mechanical or basic explosive and thermal breaching techniques.
- c. **Level three.** This level includes doors designed for high levels of security and protection against blast effects such as vaults and blast doors. Governments use this level to protect national-level facilities such as command bunkers, critical communications or weapons of mass destruction. Level three barriers have the following characteristics:
- (1) Portals vary in size from a standard door to those big enough for large vehicles, and barricades can vary in thickness and reinforcement. Portals are generally set into reinforced walls or even bedrock. Framing is typically an insert design of very thick, heavy-gauge composite metal which is anchored to bedrock or very thick reinforced concrete walls.
 - (2) Initial entrances may contain multiple barricades. Locking mechanisms are larger in diameter than internal locking bolts or plungers and may be fitted with hydraulic latches. Barricades may be integrated with electromechanical or personal recognition access/exit control systems.
 - (3) Entry will probably require specialised breaching techniques including multiple explosive charges (steel-cutting, shape and bulk) and extensive use of thermal cutting techniques. Before attempting to breach such barriers, appropriately trained and experienced engineers need to have thoroughly assessed them. An incorrectly executed breach may result in a permanent barricade.

1A-14. Restriction on subterranean mobility. Subterranean spaces and structures vary in size. Access points and internal corridors may be small and narrow, greatly restricting movement, or they may be large enough to drive container vehicles through. Subterranean systems therefore need to be categorised by the restrictions they impose, or opportunities they present to movement from both the attacker and defender's perspectives. This requires the normal mobility definitions to be adapted for subterranean systems:

- a. **Severely restricted.** Soldiers can only crawl or walk but with head, possibly trunk, hunched forward, in single file. Their ability to fire personal weapons or use protective equipment may be reduced. Examples include narrow, low rudimentary or sophisticated tunnels or narrow shafts.
- b. **Restricted.** Soldiers can walk upright one, possibly two abreast wearing all issued protective equipment and are able to fire personal weapons. Examples include tunnels or passageways in a basement or car park. These spaces are similar in size to those found in buildings in an urban environment.

- c. **Unrestricted.** Large enough to allow three or more soldiers abreast to manoeuvre along it with tactical spacing. Some facilities are large, wide and tall enough for tactical vehicles to move through them.

Tactical implications

- 1A-15.** **Subterranean systems** pose a significant and complex range of challenges and a high level of risk. The enemy may seek to conceal and protect their high-value assets such as command and control nodes, artillery hides and combat service support facilities by locating them underground. Conversely, we may choose to do the same. If located, such subterranean targets could be neutralised/destroyed by using precision-guided missiles or bespoke bunker-busting penetrating munitions (for example joint direct attack munition or massive ordnance air blast) but noting that ground penetration is still limited below approximately 2.5m. These may, however, only succeed in piling protective rubble on top of the installation/hides and make their surface defence easier for lightly equipped infantry. Urban subterranean systems cannot be abandoned to the enemy to exploit, and it may therefore be necessary for ground forces to attack or defend subterranean systems. Such activities should, however, only be executed when accurate intelligence on the attributes of the system and its defences is available, particularly to avoid being unnecessarily fixed.
- 1A-16.** **Defending forces** will seek to compound their advantage by, for example, incorporating sharp turns, water traps, choke points and killing areas into passageways and integrating such features with mines, improvised explosive devices. These can be sited on or within the floor, walls or ceiling to cause collapse and inflict crushing injuries.⁵⁶ Where the ground is weak enough to allow devices to be embedded, there will be signs of disturbance. Such obstacles combined with total darkness and possibly obscurants drastically slow the pace of operations as there usually is no alternative route to avoid them; they must be neutralised. In most cases, it will take considerable time to gather and collate an accurate intelligence picture of a subterranean system's defences. However, without it, attacking forces are likely to quickly become dislocated and defeated.
- 1A-17.** **Weapon effects.** Stand-off remotely delivered effects, munition-based or other, should be the primary means employed for subterranean systems, backed up by close combat forces a secondary (less desirable) option. Therefore, planning and warfare development should look at improving our ability to employ remotely delivered offensive effect, cued by unmanned intelligence, surveillance and reconnaissance systems as the US Marine Corps states 'why send a marine where a bullet can go'.
- 1A-18.** **Movement.** In complicated natural and constructed sewer systems, it will often be necessary to use rope and ladders to gain access as well as move underground. This practical limitation will also apply to any defending forces underground. Fixed or 'in situ' ropes and ladders found in any underground environment should be treated with caution as such locations often channel movement. Rope descent and ascent techniques, with and/or without equipment bundles or casualties, must be rehearsed.

⁵⁶ However, see paragraph 1-12 for potential unintended consequences of sudden collapses in an urban environment.

- 1A-19. Battlespace management.** While the urban surface terrain has plenty of natural and constructed features that provide distinctive boundaries for battlespace management, they will rarely if ever align with subterranean passageways. Therefore, there is a requirement for remote automated, fast and effective mapping, although it can be done through manned patrolling if necessary. Forces moving underground will inevitably cross surface boundaries into the battlespace of adjacent friendly forces and potentially cross the forward line of own troops into and return from enemy territory. This combined with the difficulty for a subterranean force to navigate underground⁵⁷ and the typically difficult to unworkable radio communications between the subterranean and surface, makes multi-surface battlespace management particularly challenging. The risk of fratricide is, therefore, increased as it is difficult for surface troops to distinguish between friendly and enemy subterranean forces. The progress of the subterranean force must be regularly relayed to the surface command post by radio where possible, or if not, by landline⁵⁸ or runner. The surface command post must then clear the subterranean force's entry into the adjacent unit's area of responsibility through its superior command post. Consequently, subterranean battlespace management must include a robust and coordinated system to avoid fratricide, support situational awareness and navigation.
- 1A-20. Psychological factors.** Combat operations in subterranean passages are more demanding and stressful than night operations. The psychological factors that affect soldiers during night operations are further magnified. These include claustrophobia, reduced confidence, fear and increased feelings of isolation, which are further magnified by the tight confines of tunnels or the greater dispersion of positions. Conversely the effect of subterranean operations on the enemy, by forces emerging and attacking from an unexpected direction can have a dislocating effect on the enemy.
- 1A-21. Mitigation of psychological effects.** Commanders should maintain communication with soldiers manning positions in the tunnels, either by personal visits or by field telephone. Soldiers manning positions below ground should be given as much information as possible on the layout of the tunnels, their task and purpose, any contingency plans and other positions should their primary position become untenable. Physical and mental fitness can be maintained by periodically rotating soldiers away from tunnels, so they can stand and walk in fresh air and sunlight.
- 1A-22. Casualty evacuation.** The evacuation of causalities from an underground environment provides some practical problems. Cave rescue organisations around the world use a simple rule of thumb: 'for every hour you walk in a tunnel it will take up to ten hours to carry a stretcher out'. In a tactical setting, evacuation may be even more complex. Careful consideration must be given to the method of casualty evacuation as even with what would be considered minor injuries, constricted sewer passages and complicated tunnels often make movement extremely difficult.

⁵⁷ Global positioning system will not work underground but inertial navigation systems may, however, provide a more accurate fix than making manual bearing and distance calculations in the dark - especially if the nature of the rock and/or steel reinforcement of the structure make compasses inaccurate.

⁵⁸ As part of battle preparation, landline can be measured and marked with tape to help estimate location in the subterranean system.

Understanding

- 1A-23.** Attacking forces will inevitably move over subterranean systems and pass portals as they advance through the urban environment. Ground, air and space reconnaissance will have collected information on the subterranean system so that it can be collated into the headings covered in Chapter 1 and analysed. It must, however, be assumed that the defender will succeed in concealing most portals. Ongoing subterranean construction can be detected remotely by detecting changes in surface morphology, moisture content, temperature and vegetation. Pre-existing systems may be detected by their emission of heat and light or monitoring human traffic in and out. No single technology provides a comprehensive subsurface detection capability. The application of two or more technologies will be required. When available, these include:

| Sensor | Domain | | | The Royal Engineers retain limited capabilities in the following areas: |
|--|---------------|------------|-------------|--|
| | Space | Air | Land | |
| Interferometric synthetic-aperture radar | Yes | Yes | | |
| Imagery | Yes | Yes | Yes | |
| Hyper, multispectral imagery | Yes | Yes | Yes | |
| Ground-penetrating radar (GPR) | | Yes | Yes | Yes, shallow GPR, ca. maximum 3m, via 530 STRE |
| Electromagnetic | | Yes | Yes | |
| Magnetic | | Yes | Yes | |
| Gravity | Yes | Yes | Yes | |
| Seismic (reflection) | | | Yes | |
| Seismic (refraction) | | | Yes | Yes, via 530 STRE |
| Induced potential/resistivity | | | Yes | Yes, via 530 STRE |
| Acoustic (passive) | | | Yes | |
| Motion detection (passive) | | | Yes | |
| Quantum gravimeter (under development) | | | TBC | |

- 1A-24. Key points to highlight are:**

- a. The Royal Engineers capability is very limited.
- b. Some of these assets would only be available through operational or strategic level tasking. The use and tasking of such assets/sensors would only come via specialist support, from the Royal Engineers or Defence Intelligence.
- c. The 'presence of the abnormal; absence of the normal' + 'change' + 'ground signs' have many analogies with counter-explosive ordnance.

ANNEX B

Operations at night

General

- 1B-01.** Night-time and limited visibility degrades many of the senses, but particularly the primary sense, sight. Night vision devices do not replace continuous all-round visual understanding. By night as it is by day, not understanding the unknown, invariably in new and unfamiliar surroundings, gives an unqualified advantage to an enemy who knows the ground well.⁵⁹ These disadvantages can be overcome by discipline, mental strength, enlightened leadership and professional experience. Training and preparation for night operations in the urban environment might be protracted and must be rigorous.
- 1B-02.** The advantages brought by technology, discipline, training advantage and professionalism can give conventional armed forces the opportunity to close with and defeat urban adversaries at night in every type of operation. However, many opponents have access to night vision devices, and a commander must carefully assess their use, training and wider capabilities to determine the advantage gained by night operations.

Advantages of night operations

- 1B-03.** When fighting in urban areas at night, attacking or defending forces can leverage certain advantages:
- a. In all operations, advantage should be taken of the technology offered by thermal imagery and light intensification. The ability to identify, engage and destroy targets before detection by an adversary may favour night operations. However, it must be assumed that the enemy will also have access to these capabilities and so training and familiarity in their use is likely to be the deciding factor.
 - b. In periods of limited visibility, effective target acquisition may be reduced without access to night vision devices. This enables attacking forces to close to shorter ranges and reduce the technical advantage.
 - c. Night-time and limited visibility offer an attacker a better chance of surprise. This is particularly important when conducting infiltration or raids.
 - d. There may be a more opportunity at night to conduct covert operations or aggressive or kinetic response to adversary activity.
- 1B-04.** In stability operations, night-time provides military forces with the opportunity to undertake intelligence-led and often more aggressive activities than in daylight. The cloak of darkness, the availability and use of collective and individual night vision devices, reduced civilian activity, under curfew or by habit, the ability to mount directed operations using disciplined, professional and trained troops gives commanders the

⁵⁹ This was particularly well understood by the Russians in Stalingrad who defeated a more technically superior enemy by 'hugging' them close, separating the infantry from their indirect fire support and wearing them out. The same applies to the Taliban attacking defended outposts in Afghanistan.

opportunity to use force in a way that they cannot by day. Reduced civilian activity at night denies the opportunity to the adversary to remain anonymous among the civilian population: it denies them the immediate possibility, for example, of inspiring adverse civilian reaction or civil unrest. There may also be a greater opportunity for aggressive and kinetic response to adversary activity.

Disadvantages of night operations

- 1B-05.** When fighting in built-up areas, attacking and defending forces face the following disadvantages at night:
- a. The cover of night can give an advantage to an adversary, to move, to mount surprise attacks, to escape and to prepare ambushes without being seen.
 - b. Fighting through noisy, dark and unfamiliar rooms and houses in the dark, wearing night vision devices or by torchlight is chaotic. Command and control is difficult and the risk of casualties and fratricide is increased.
 - c. Soldiers have an instinctive tendency to bunch during night operations, increasing individual and collective vulnerability.
 - d. The characteristics of built-up areas at night and in reduced visibility can be disorientating. Target identification and indication is difficult at night and may result in indiscriminate engagement and loss of fire discipline.

Other considerations

- 1B-06.** Other considerations include:
- a. The risk of fratricide is higher, the risk of failure to anticipate or understand the enemy's movement or intentions is higher and the risk of plans being misunderstood or going wrong is greater. These factors increase the need for greater control and the restriction on individual action.
 - b. Risks to air operations may reduce at night depending on the enemy air defence sensor array. This risk may be offset by the advantages of night operations, especially when an opponent is reluctant or unable to conduct their own operations in darkness.
 - c. At night, the human body needs time to recover from daytime activities. During prolonged operations, it will be necessary to allow for the movement of combat supplies, equipment and vehicle maintenance and rest. Night-time may provide that opportunity and a lower activity regime.
 - d. There is a need for a different form of discipline at night. Daytime reactions, small team drills, hand signals and the use of oral commands are conducted differently. Training at night must include the night-time passage of information between individual soldiers.

- e. The difficulties of conducting urban operations are exacerbated at night. Commanders must anticipate the physical effects of night conditions on soldiers and the technical restraints on their operations while training and preparing soldiers for unbroken day/night operations. There is a need for greater control and rehearsal to overcome the problems of operating at night.
- f. The challenges of working with the armed and security forces of partner nations are exacerbated at night particularly when they use different doctrine and tactics, techniques and procedures and have limited access to night vision equipment.

Night vision devices

- 1B-07.** Combined arms urban warfare brings a variety of night vision device technology to the battlegroup. The soldier's head-mounted night vision systems improve individual night-time vision. Information available to the battlegroup is aided by infantry, tank, artillery and engineer armoured vehicles, thermal imaging sights. Sensor pods mounted on Wildcat, attack helicopters and fast-air platforms can feed thermal imaging imagery down to the battlegroup level.
- 1B-08.** The characteristics of built-up areas may degrade night vision devices and sights. Both operators and commanders must allow for the degradation of their own systems while trying to exploit impacts on the adversary to maximum advantage.
- a. Most built-up areas will have electric power, streetlights and building lights. These can cause a 'white out' on image intensification devices.
 - b. The chance that fires will be burning in operations is high. This will potentially cause problems for both light intensification and thermal devices.
 - c. Subterranean areas and the interiors of buildings will not have ambient light if the power is off. Passive II require an artificial light source⁶⁰ to provide enough ambient light for the devices to work.
 - d. The many reflective surfaces found in built-up areas may cause false images, especially for laser range-finders and laser target designators.
 - e. The effectiveness of thermal imaging devices is severely degraded by dust or smoke suspended in the air.
 - f. Night, dust and smoke obscuration and fog degrade long-range thermal surveillance and target acquisition.
 - g. Weapons flashes within enclosed areas appear much brighter than by day. Soldiers can lose their night vision and light intensification devices can be overloaded.
 - h. Trip flares, flares, mortar and artillery illumination and spotlights (visible light or infrared) can be used to blind enemy night vision devices or to artificially illuminate the battlefield.

60 Such as infrared.

Features of operations in the urban environment at night

- 1B-09.** Before conducting any urban operations at night, the commander should balance the risks and complexity against the requirements of the mission. Rehearsals will be important; sound command and control measures can reduce mistakes and casualties. Specific points to note are:
- a. Soldiers should clear buildings and rooms using the same techniques they use during daylight to reduce confusion. They should be rehearsed, practised and confident in the techniques and equipment.
 - b. Movement will be slower. The problems of night target acquisition, clearing buildings, and command, control and communicating may cause significant delay. Commanders should allocate sufficient time to achieve their mission to both the planning and conduct of operations.
 - c. Night vision devices should be made available to every soldier involved in urban operations at night. White light can be considered although this option may allow the enemy identification of the location of friendly forces.

Vehicle-mounted operations

- 1B-10.** All night urban operations, even simple ones, but particularly those mounted in vehicles, can lead to confusion and disorientation. Changes to plan, changes to timings, changes to vehicle crewing must be understood and rehearsed by all ranks. Briefing must be comprehensive, the control and counting of individual team members is vital. Count them out, check, count them in, check.
- 1B-11.** All ranks, all trades, all soldiers must be able to carry out the tasks of their immediate colleagues. Driver, commander, signaller, gunner, each soldier must know how to operate the vehicle, the radios, the weapons in their vehicle.
- 1B-12.** The potential confusion that limited visibility brings will amplify the difficulties to nearly every potential situation. Armoured vehicles might be ambushed, might get lost, might get separated and will break down. Tactical commanders must plan for the actions on vehicle breakdown and recovery, at night, in contact, with casualties and in a confined and hostile environment. Vehicle commanders and crews must rehearse and be confident in the plan and their part in it.

Fratricide

- 1B-13.** The key to avoiding fratricide is good training and a high level of situational awareness by both commanders and soldiers. Other considerations include:
- a. Fire support control measures should be clearly defined using easily identifiable features on the ground, for example motorways, overpasses, distinct buildings, and rivers.
 - b. Indirect fire and close air support needs careful coordination.
 - c. Fire control and movement should similarly be tightly controlled.
 - d. Cleared rooms and buildings should be clearly marked to identify cleared areas to friendly troops using clylumes.
 - e. Visible markers (for example glint tape or thermal strips) can be attached to individual soldiers and buildings.
 - f. Safe routes between and through buildings should be marked.

Combat service support

- 1B-14.** In principle, the provision of combat service support for night operations does not differ from daytime operations. Although not exclusive to the urban environment, the following points require particular attention:
- a. Although night may offer a good opportunity to maintain and repair equipment consideration should be given to the tactical implications of doing so including increased signature from noise, movement, light and heat.
 - b. Casualty collection may be significantly more difficult at night. Clear methods for marking any casualties must be established before the start of the operation. Commanders should allow for sufficient time for the movement of casualties and the marking of evacuation routes.
 - c. Collection and control of captured persons may require more resource at night. Additional personnel should be nominated before the start of the operation.
 - d. In urban areas, combat service support may rely heavily on vehicles. Apart from normal night discipline for vehicle movement, the allocation of additional night vision devices to vehicle crews and detailed route marking may be necessary.

Glossary

Acronyms and abbreviations used in this publication

| | |
|----------------|---------------------------------------|
| AH | attack helicopter |
| APC | armoured personnel carrier |
| BFI | bulk fuel installation |
| C2 | command and control |
| CAS | close air support |
| CASEVAC | casualty evacuation |
| CIS | communication and information systems |
| FF | friendly forces |
| GMLRS | guided multiple-launch rocket system |
| HIMARS | high mobility artillery rocket system |
| HUMINT | human intelligence |
| IED | improvised explosive device |
| IFV | infantry fighting vehicle |
| LNO | local national officer |
| MBT | main battle tank |
| MEDEVAC | medical evacuation |
| RPG | rocket-propelled grenade |
| RV | rendezvous |
| SOP | standing operating procedure |
| STRE | Specialist Team Royal Engineers |
| TV | television |
| UAS | uncrewed aircraft system |
| UHF | ultra-high frequency |
| UO | urban operations |
| VHF | very high frequency |

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