Additional Challenges for Light Forces

In the previous chapters we focused on how to improve rapid-reaction capability through the reshaping of light forces to fight larger armored adversaries, such as those faced in the last war and in many recent crises since then. In all the cases examined—whether the light forces were enhanced, made lighter and more dispersed, or made more maneuverable—the primary focus was on preparing them for warfare against an enemy in a conventional combat scenario. However, future rapid-reaction missions can involve a wide variety of situations and circumstances that might be considered less "conventional." In this chapter, we begin to explore other challenging rapid-reaction situations with which future forces may need to contend. Although we focus on the challenge of complex terrain, in particular military operations on urbanized terrain (MOUT), other dimensions of this analysis would ideally include jungle warfare, military operations other than war (MOOTW), and operations in a nuclear, biological, or chemical (NBC) environment.

Operations in these environments create conditions that can make combat extraordinarily difficult. For MOUT, some challenges include: very short LOS, three-dimensional fields of fire, collateral damage from rubbling, obstacles, and booby traps, restrictive rules of engagement (ROEs), restrictive movement, and the always confounding problem of "mission creep." For the other aforementioned dimensions, many of the same challenges are likely to be faced, including extremely short LOS and very restrictive movement. In these situations, because of the complexity of the terrain, the relative RSTA advantage may not be realized. As a likely result, the impact and relevance of standoff capabilities would be reduced, and at the same time the importance of physical presence, organic capability, and possibly the need for maneuver would be increased.

Military Operations in Urban Terrain—An Example of Expanding the Box

The likelihood of U.S. forces engaging in MOUT is increasing. Greater urbanization is a clearly established trend in most parts of the world, and it will present U.S. forces with significant challenges. Historically, operations in urban terrain have tended to "level the playing field" between two opposing forces, with less well trained and equipped organizations frequently able to exploit the urban environment to negate or reduce advantages held by the other side.

How should U.S. policymakers respond to the growing need to deal with MOUT? At the highest level, they have three very different choices: (1) mandate at the highest policy level the already-existing military tenet to avoid fighting in urban areas (on a large scale) altogether, (2) train, organize, and equip soldiers so that they are prepared to conduct large-scale urban warfare successfully,[1] and (3) use existing and planned resources to prevent, contain, and/or minimize the occurrence of large-scale urban warfare. Each option is discussed below.

Avoiding Urban Operations

The first option reflects the chief lesson learned from numerous past urban operations—a lesson now reflected in both the Marine Corps and Army urban field manuals: avoid fighting in cities when possible.[2] Urban combat tends to be marked by high levels of collateral damage and friendly casualties; as a result, it should be the last resort. Unfortunately, valid as this lesson may be, the option of avoidance is often dismissed as unrealistic. This is not to suggest that urban warfare cannot be avoided; in many cases, it has been avoided in the past and will continue to be in the future through a variety of means. However, having a comprehensive national-level policy that proclaims avoidance of MOUT for all situations would likely put too much of a restriction on applying military force, perhaps to the point where an enemy would invariably exploit such a policy.

Beyond this concern, some amount of warfare in urban areas is inevitable. For example, warfare in urban areas may be an unexpected consequence of carrying out other operations associated with national policy, such as the MOOTW discussed below. Specifically, sufficient stability and support elements, such as peace enforcement operations, may undergo "mission creep," resulting in unexpected escalation and higher-than-anticipated intensity of conflict. An apparently stable situation can undergo radical change, becoming an unstable and even untenable combat environment in a matter of hours. Since materiel and conduct of forces for such MOOTW can be considerably different from that needed for combat in other situations, forces can easily find themselves unprepared from both a training and equipment perspective.

In other cases, combat in urban areas may be necessary because immediate action is required and the geography happens to be a built-up area. Examples of these cases might be the retrieval of critical materiel, the neutralization of a weapon or facility, or personnel rescue. In these special cases, MOUT tends to be a very localized operation, with a very narrow mission focus; these types of operations are sometimes referred to as "precision MOUT" or "surgical MOUT" and are typically handled by highly specialized and trained forces.[3]

Another problem is that the threat will likely become more sophisticated. In looking at the world arms market, it becomes immediately apparent that a wide range of sophisticated sensor, communications, position location, obstacle, and weapon systems are obtainable, many at low cost. These include night-vision devices, miniature surveillance cameras, GPS receivers, cellular phones, secure radios, a variety of mines and booby traps, and even microwave beam weapons that can defeat missile electronics and smart or precision-guided weapons. For example, according to NGIC, 28 countries are developing or producing such smart/precision-guided weapons.[4] Use of weapons may also be less restricted than it is in the United States, where there are treaties or sanctions in effect against using gas grenades, anti-personnel mines, booby traps, and other devices. Moreover, in discussions with the Department of Energy (DoE), we found that the threat may have access to satellite imagery and multispectral sensing, as well as textured, multispectral camouflage.[5]

Preparing for "Offensive" Urban Warfare

The second option of better preparing the current force for urban combat would seem to be the logical solution and is often treated as the default way to approach the future MOUT challenge. A cursory examination, however, reveals that there is little in the way of high-level doctrine for responding to large-scale MOUT crises. This is notably the case for the conduct of joint MOUT.[6] In the absence of such guidance, it is no surprise that the solution space associated with this second option is largely determined from the bottom-up, incremental-change perspective.

For example, the emphasis of two key MOUT initiatives under way—the U.S. Army/USMC MOUT ACTD and the USMC Hunter Warrior experiment—tends to be on the lower tactical and, marginally, operational levels. Both examine how to deal with "high-intensity" MOUT.[7] This often takes the form of a deliberate operation planned from the onset and, by design, one that is planned and executed with many similarities to infantry operations in nonurbanized terrain. For example, clearing an enemy that is occupying a built-up urban area might require forces to identify key approaches for attack and then engage by forcibly attriting or ejecting the enemy through direct contact.

Both of these initiatives include exercises that allow warfighters to explore new tactics, organization, and equipment. Nonetheless, these efforts are near term in scope and likely to produce recommendations for change at relatively lower levels because they are designed that way from the outset.

These approaches may be effective at the tactical and operational levels in smaller urban areas, but they are likely to be infeasible at the higher strategic level because of the associated cost of preparing soldiers en masse for this relatively specialized form of combat.[8] More important, even if the expenditure was made, it is quite possible that manpower requirements for modern megalopolises would exceed U.S. force strength capabilities. This suggests that if preparing the current force is to be viable, a brand new doctrine and strategy will have to be created; this appears feasible by the 2015–2020 time frame, but unlikely before that.

The Strategy of Preemption

From a historical perspective, one might argue that some urban contingencies could have been prevented if extensive preparations had been made, backed up by the threat of quickly closing rapid-reaction capability. This perspective—the basis for the third option—is similar to the first option of avoiding urban combat, but the notion of actively *preventing* or deterring urban combat—or at least *containing* its scope—clearly

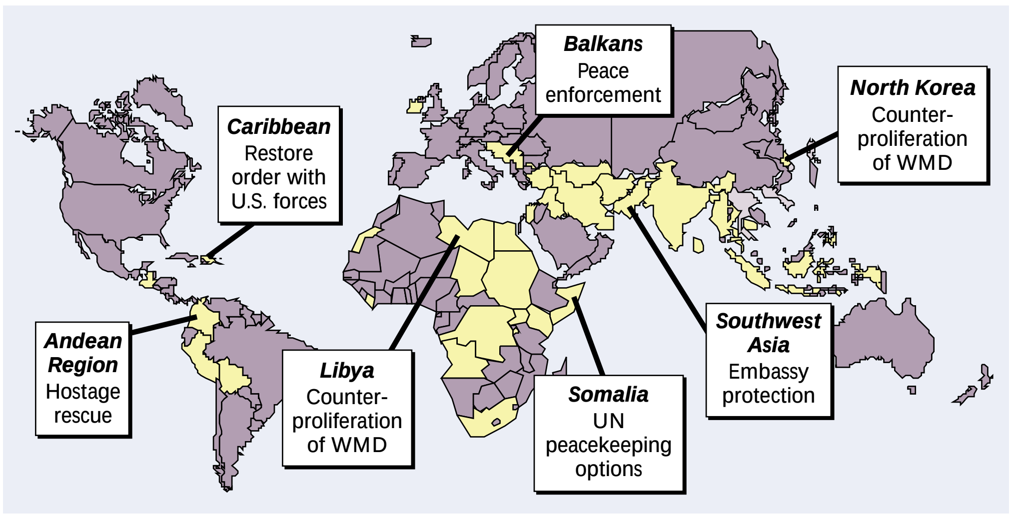

Figure 6.1—Location of Potential Hot Spots

changes the focus of the initiative. In this option, the light rapid-reaction capability might take on the specialized form of the light elements described in Chapter Four or, more likely, a variant of the light mechanized forces of Chapter Five.

Taken together, this MOUT option might involve three critical components: (1) indigenously preparing the urban environment, (2) using highly responsive forces, and (3) adopting new "offset" capability. Each is discussed below. We then discuss how the three components would need to interact as part of a concerted strategy.

Indigenously preparing the urban environment. Since preemptive defense is not possible in all urban areas, the first step in preemptive preparation of urban areas is to identify the areas at risk. Potential hotspots around the globe are highlighted in yellow on Figure 6.1, and some well-known examples are identified.

Unfortunately, although a rapid-reaction force may be equipped with sophisticated equipment, it may not be able to deploy to the urban area for several days.[9] In that time the enemy could take the city, forcing the rapid-reaction force to attack an entrenched foe.

A more effective approach might be to prepare our allies' vulnerable cities with a series of systems and technologies. These systems and technologies could then delay and attrit the advancing enemy, buying time for the rapid-reaction force. Such an action might even deter an enemy from considering an attack on the urban area in the first place.

The first steps in this preparation/preemption process are to instrument the city with secure, surreptitious sensors and to pass on this information both to decisionmakers locally and back to CONUS. The sensors should be able to collect information about enemy activities, locations, force sizes, battle damage, weapon types, noncombatant status, environmental conditions, and road trafficability. There should even be intrusion sensors in some key buildings to indicate occupancy.

Redundant secure lines should be used to distribute the resulting information. These lines will probably need to be high bandwidth to support voice, data, and images and to overcome the overhead from encryption. Software radios will need to be given to trained, trusted members of the local populace, facilitating passage of HUMINT. These radios will also have to be controllable in case they fall into enemy hands.

Structures critical to the safety and well-being of the urban area will have to be protected. There will also need to be backup generators, communication systems, emergency water supplies, and medical treatment facilities.

A key aspect of protecting the urban area is the installation of remotely controlled obstacle networks. Pop-up commercial vehicle barriers are currently available and can be placed on avenues of approach to the urban areas (such barriers are currently in place in South Korea) or on city streets themselves. More futuristic obstacles, such as superlubricants, sticky foams, and smoke generators, can be located at key canalizing points. Jammers, RF bombs, and other canister or munition-type systems can be placed or lofted as needed.

Noncombatant control can take the form of ensuring marked routes to shelters, dispensing identity tags for noncombatants and neutral forces, and even using calmatives or incapacitators to control mobs.

All these actions need to be controlled using command centers. Some of these should be mobile to avoid detection, localization, and neutralization by the enemy, while others may be located in protected structures. The C2 centers should have access to building blueprints, city infrastructure plans, and other information needed to coordinate a response.

Once an urban area is so prepared, one can implement a preemptive defense, such as the tiered defense concept developed by the U.S. military officers at the Engineer School at Fort Leonard Wood. When given a plan map of the Camp Lejeune MOUT training site, these officers prepared a tiered defensive concept plan for the complex, in which an engineer platoon, along with an infantry company for overwatching fires, could effectively defend the town against a battalion or possibly a brigade of attacking Red forces. Approximately four truckloads of equipment were estimated to be needed: smart mines, command-detonated explosives, booby traps, and building demolitions were all part of the notional plan. The idea is that the force would engage the attacking force at range along the likely avenues of approach, continue to activate belts of defenses as they approached, and then bring down the buildings themselves as the Red force penetrated. The Engineer School had previously used this type of defense very successfully in exercises at Fort Hood.

Figure 6.2 shows a diagram of that layered defense of the Camp Lejeune MOUT site. The Engineer School experts designed a defense for the town using Blue systems and tactics.[10] The outer layer of defenses is shown by circles (H stands for Hornet), representing WAMs and Volcano—helicopter-deployed anti-tank mines. Inside this layer

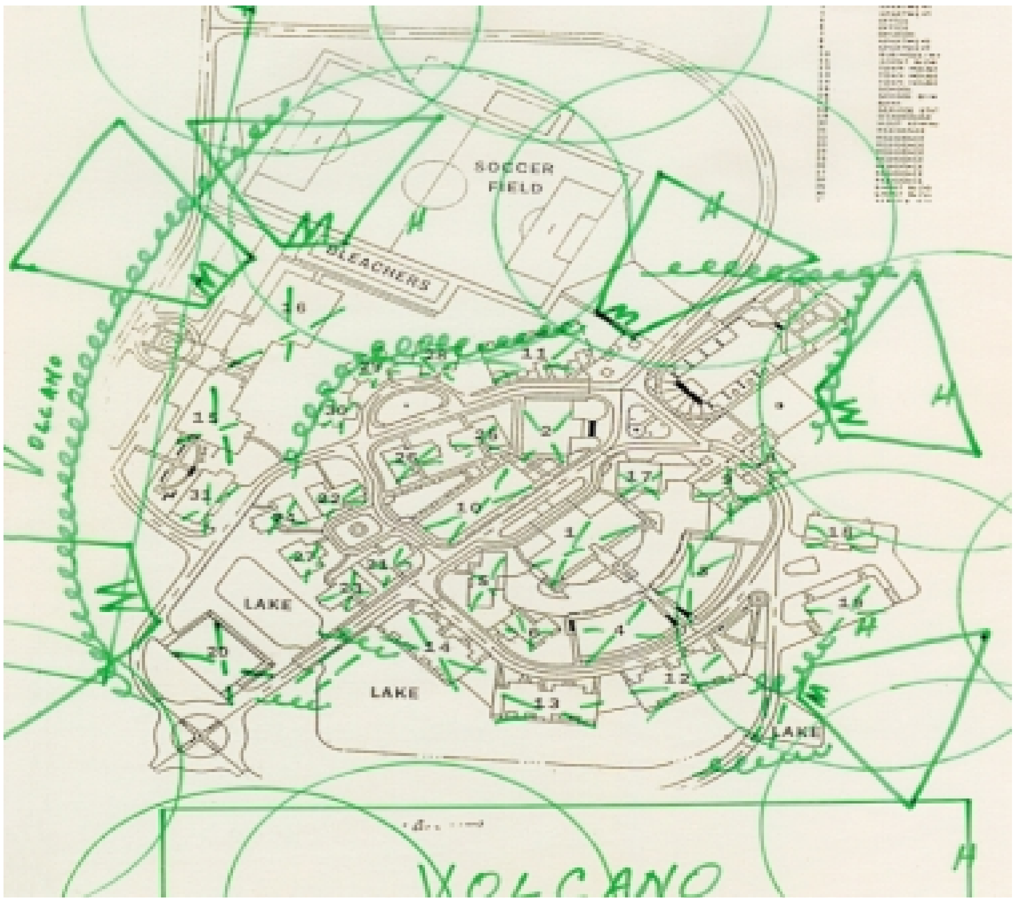

Figure 6.2—Diagram of Engineer School Layered Defense of Camp Lejeune

are the Modular Pack Mine System (MOPMS) elements—command-detonated mines and concertina wire. All the buildings, finally, can be rigged with explosive charges and can be dropped if taken by an adversary.

In many ways, these exercises show that current offensive concepts—such as those that are a part of option 2 described above—can be overcome and countered, even with limited resources. Interviews with participants in demonstrations at Camp Lejeune and the McKenna facility at Fort Benning revealed some of the problems anticipated for urban fighting: the vulnerability of air-mechanized deployment of forces, the ease of engaging ground vehicles supporting an infantry attack on the buildings, the unreliability of smoke in windy conditions, and the risks associated with soldiers moving through buildings. In all the demonstrations, soldiers were fighting at extremely close (less than 50-meter) ranges.

Interviews with the soldiers at the demonstrations highlighted the key difficulty of entering and moving through enemy-held buildings. They noted the time-consuming and manpower-intensive nature of interior fighting and brought up the problems of dealing with noncombatants. Commanders indicated that a 4:1 to 8:1 advantage of the defender over the attacker is typical, even with nonrestrictive ROEs. It was evident that the defender could often inflict enough damage and losses to make the mission unwinnable with current systems and tactics.

Using highly responsive forces. The second component involves inserting and coordinating with a rapid-reaction force, in this case one along the lines of the AAN "air-mech insertion" described in Chapter Five. We might also consider relying on an air-based "halt" campaign—in which bombers are planned to deploy quickly and deliver hundreds or even thousands of smart munitions and GPS-guided weapons. Unfortunately, this is not sufficient in many cases, because the bombers require too much time and space to operate. Figure 6.3 summarizes the results of high-resolution simulation runs and a weapons-effects computational model, showing that many real-world situations are not suited to such responses. The enemy has plenty of time to enter and secure key objectives, such as in Seoul or Tel Aviv, before the bombers can attrit him sufficiently to stop his advance.

In a similar fashion, ground forces are also limited in their ability to close quickly and block an enemy from reaching key urban areas. Even a very light force (e.g., the 82nd Airborne Division) requires many days to close and be ready for combat. Heavier mechanized forces may be able to close quickly with future fast sealift, but even these may arrive too late to prevent an enemy from occupying key urban areas. The minimum time for each of these options, even with future improvements in deployment, appears to be about 5–8 days to most of the "hot spot" areas of the world. We envision that an air mobile force such as that described in Chapter Five will not initially be able to block

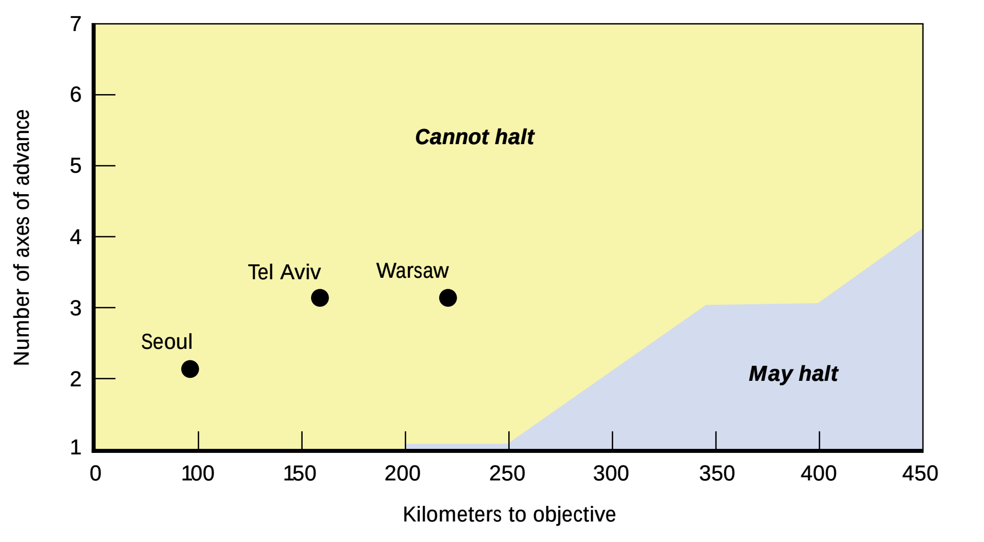

Figure 6.3—Limitations of Air-Based Halt Campaigns

an enemy from an urban area but, if suitably modified, will be able to close in a few days and aid in the defense (and, if necessary, the eviction) of the enemy.

Adopting new "offset" capability. As mentioned above, much of the training and preparation for MOUT has emphasized close combat. In fact, the focus of the MOUT ACTD appears to be on near-term demonstration of new technologies primarily designed to aid the warfighter in room-to-room, building-by-building clearing.[11] In this section, we discuss options that should minimize this high-attrition close combat, using remote means for intelligence gathering, isolation of enemy units in the city, and precision fires from range.

Three concepts make up our "offset" approach to MOUT. The underlying principle behind these concepts is that the main proportion of the urban fight may be carried out at standoff and that the enemy may be forced away from his favored position. Risky interior engagements should, as much as possible, be relegated to unmanned air and ground systems.

Two of these concepts—termed "sector and seal" and "nodal warfare"—represent departures from current tactics, especially sector and seal. This concept involves the use of standoff sensors to determine enemy locations and the deployment of isolation devices from afar to seal off the enemy from sensing or attacking our own forces. Nodal warfare also uses standoff sensors and weapons, but its main goal is to locate and disable key nodes, such as C2 sites, communications relay platforms, power sites, water supplies, airports, and air defenses. These methods also extend current concepts of ejecting entrenched defenders through the use of comprehensive situation awareness and standoff weapons. One notion is to predetermine enemy egress routes and then flush them out in a desired direction. Thus, rather than playing into the strengths of an urban defense, these concepts "entomb" the would-be defenders, deny them infrastructure access, and force them into disadvantageous positions.

The third concept, noncombatant control, uses technology to identify, tag, and move noncombatants out of the combat zones. In some cases, the inhabitants may even be enlisted to gather intelligence and coordinate movements.

Implementing these concepts will probably require expanding the time required to complete a given mission—resulting in a "casualties for hours" tradeoff.

A strategy for employing the three components. By themselves, none of the three strategies would be sufficient to provide an adequate preemptive defense. If unopposed, an enemy attacking a large urban area might take several days to occupy and defend it. Indigenous reaction without any concerted preparation of the city might take some time to initiate a response and then would likely have little effect on the outcome. Adding preemptive defensive preparations would have an immediate effect and would result in more enemy attrition and disruption, but without additional fires it would probably also simply delay the occupation.

The effects of long-range fires and rapid-reaction forces are also expected to be inadequate by themselves. These responses may arrive after much of the enemy force is already established in the urban area. The rapid-reaction units would then be forced to root out the enemy forces at high cost. Long-range fires, even precision ones, would have extensive collateral damage and noncombatant losses when targeted against enemy positions in the city.

However, the effects of all three components are expected to be highly synergistic. Defensive preparations used in concert with rapid-reaction forces should work together to prevent entry, disrupt the enemy attack, produce slow-moving targets for mid- and long-range fires, and result in substantial attrition. Enemy units that do achieve a lodgment in the cities can then be isolated and evicted using offset engagement techniques combined with limited numbers of close combat operations.

What might such a synergistic scenario look like? An example scenario for a prepared urban area might start with a surprise attack from a nearby border. The enemy force is quickly detected by the prepositioned air and ground sensor net. Obstacles set in belts outside the city soon slow the attack to a crawl. Coordination of the enemy force is degraded quickly by jammers, smoke, and coalition rocket, cannon, and mortar fire, along with air attacks.

Nevertheless, some portion of the enemy attack may succeed in the first few hours or days and part of the city may be occupied. The invaders are tracked, slowed, and isolated using in-town obstacles. When the rapid-reaction force from neighboring areas or CONUS is able to close, its fires are immediately directed from mobile and stationary C2 centers. Long-range naval, air force, and ground fires are similarly targeted from the C2 centers. A portion of the ground force may be designated to clear any enemy strongholds in the city. This would be done using offset engagement.

Figure 6.4 illustrates some of the process. Prepositioned defensive belts extend far from the city periphery, allowing precision fires from the city and from rapid-reaction

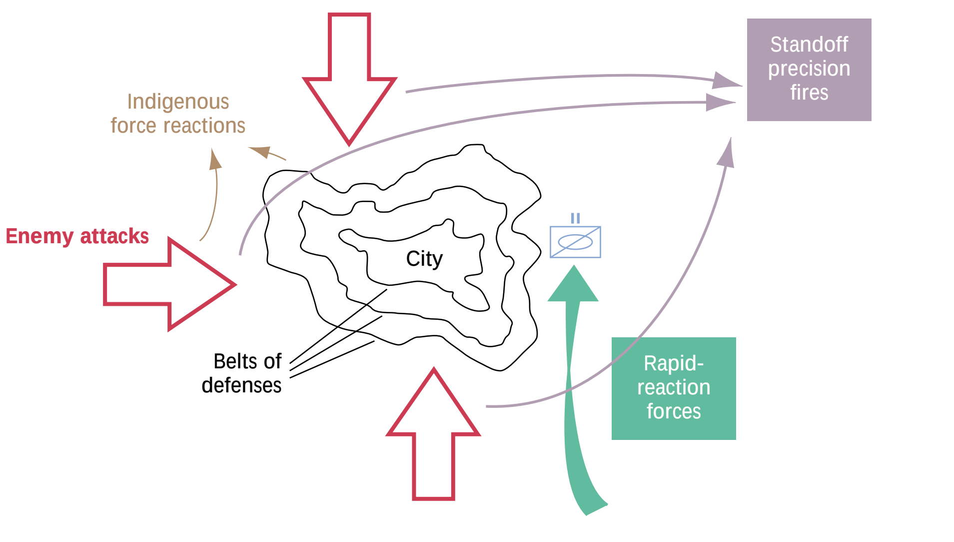

Figure 6.4—How the Three Components of Option 3 Work in Synergy

forces to concentrate on the slowed targets. These belts allow a coordinated fall-back, with increasing canalization of the attackers.

Part of the key to successful defense outside city boundaries is the recent development of wide-area (smart) mines and other new technologies. Smart mines can cover large areas, killing or slowing ground vehicles and low-flying helicopters. Higher-altitude air mobile operations may be stopped using increasingly capable man-portable and vehicle-mounted air defense systems. Software radios and the tactical internet can coordinate indigenous, rapid-reaction, and long-range fires. Fast-setting foams can set up obstacles or can establish bridges over broken terrain. Robotic air and ground vehicles can resupply the defenders with additional sensors, obstacles, and weapons as they are needed. Fast-reacting weapons with the ground forces can engage fleeting targets, and standoff precision fires can go after key nodes and moving targets in the open.

Preemptive preparation of urban areas against attack is not a new idea. Seoul, Tel Aviv, Grozny, and many other cities have extensive preparations from many avenues of approach. One difference between those traditional defenses and the concepts put forth here are the many new technologies that enable flexible, effective disabling of enemy attacks. Only in the last few years have new microsensors, mobile commercial communication systems, three-dimensional visualization tools, robotic security and resupply systems, special foams, and other technologies matured to the point where they can contribute to flexible, cost-effective defenses. Unlike historical defenses such as walls, ditches, minefields, and protective fires, many of these systems can be shifted quickly to the specific areas being attacked. Using offset tactics, they can also capitalize on the principles of massed fires, hitting an enemy's most vulnerable points, seizing the initiative with counterattacks, and using multimode, redundant systems which cannot easily be countermeasured.

Jungle and Forest Operations

In addition to the challenges posed by fighting in an urban environment, U.S. rapid-reaction forces could also be confronted with fighting in jungle or heavily forested areas. Indeed, there are locations around the world where urban areas are in close proximity to jungle or heavy forest, including Southeast Asia, South America, and parts of Europe. Even as urbanization increases in those areas of traditional U.S. interest, large tracts of jungle and forest remain.

When deploying into such areas, rapid-reaction forces could be confronted with terrain that can severely affect the capability of their organic or supporting sensor suites. As was recently shown in Kosovo, dense forests can provide substantial concealment, even for mechanized forces. The American experience in Vietnam is another example of how jungle can significantly degrade U.S. reconnaissance capabilities.

Not only does forest and jungle degrade reconnaissance systems, it also has significant impacts on precision munitions, slashing their effectiveness virtually to zero. During research for the 1998 DSB, RAND examined the effect of heavily forested terrain on air- and missile-delivered precision munitions. These munitions were being used to engage enemy mechanized units in road-march formation where there was substantial foliage in the immediate area around (and even overhanging) the road. Even with smart munitions such as BAT and SFW, this study found that foliage reduced the number of kills by roughly 60 percent. This reduction in the potential effectiveness of long-range, interdiction-type weapons could have a significant impact on the operations of rapid-reaction units that may be relying on interdiction to meter the flow of enemy forces moving in their direction.

Forest and jungle will also have a major impact on the direct-fire or close battle. Engagement ranges will be closer, thus giving short-range weapons—including small arms and light anti-armor weapons—more opportunity to enter the battle. U.S. experience in the Pacific theater in World War II and in Vietnam during the 1960s and early 1970s showed that combat in heavily forested areas significantly increases the likelihood of short-range, direct-fire engagements. The jungles of Vietnam also showed the innovation likely to come from a determined enemy, such as spoofing systems that can fool REMBASS, soldiers able to co-opt U.S. radios, and extensive use of decoys. Accordingly, technology areas that may require greater emphasis include sensor systems that can penetrate foliage, enhanced lightweight armor for individual soldiers, secure communication devices, and munitions that can identify and engage targets located under trees.

Simulation and Modeling for Complex Terrain

How can such unconventional military operations be simulated and modeled? To a limited extent, we can use the JANUS simulation environment used throughout the analyses described in this book to explore these challenging situations. JANUS and its integrated models can characterize many aspects of exterior fighting in urban areas, along with firing from openings in buildings. Jungle operations with overhead cover, difficult movement, and short lines of sight can also be represented to some extent. Even combined arms engagements in MOOTW situations can be examined. Unfortunately, the JANUS suite of models is much more appropriate for modeling conventional warfare between mechanized forces than MOUT or MOOTW operations. Interior fighting between dismounted soldiers is extremely difficult for JANUS to accurately portray, as are the degrading effects of buildings and foliage on communications, mobility, weapons, and command and control.

The JANUS-based suite of models provides a two-dimensional map view of the combat situation and, like many constructive models, does not represent many of the special aspects of MOUT. For example, Figure 6.5 is a rendering of the British Army's Copehill Down, one of the premier MOUT training sites in the world. The three-dimensional view shows the importance of building structure, look-down aspects from windows and firing ports, sloped roofs, and many other issues that JANUS does not address.

Even so, a three-dimensional rendering may not be sufficient to model all the critical aspects of urban areas. For example, Figure 6.6, a photograph of one of the Copehill Down roads, shows the complexity of fighting. Training exercises often use un-

Figure 6.5—Three-Dimensional Rendering of Copehill Down

derground areas covered by logs and rubble. These may be occupied shortly after troops have passed and then the troops will be engaged from the rear, with the snipers moving to the next position after taking a few shots. Other subterranean areas include sewers, subway areas, and basements. Such areas are very difficult to model with simulation.

Figure 6.6—Photograph of Road at Copehill Down

We examined three other promising constructive simulations for MOUT analysis. The first, CAEN, was originally based on JANUS. It is a MOUT-specific simulation developed by the Centre for Defense Analysis in the United Kingdom. The current simulation is written in Turbo-Pascal, but it has been ported to Symbolics machines and will soon be ported to Suns. Joint Combat and Tactical Simulation (JCATS) is a soon-to-be-available combination model incorporating the best features of JTS and JCM, which have been in extensive use with many agencies. IUSS is a special-purpose physiological modeling tool that can supplement the other models.

CAEN makes a nice start at modeling more aspects of urban operations than JANUS because it represents portions of building interiors, shows two-dimensional and three-dimensional views from different locations, and models more special aspects of MOUT. However, it is somewhat limited in scope, since it currently can display an area of only 5 by 5 kilometers and since it limits forces to company size and below.[12]

JCATS, now nearing release for general application, may provide the greatest amount of scale and resolution of any of the simulations examined.[13] Unlike CAEN and JANUS, it can model interior fighting, with representations of floors, walls, interior doors, and many other building characteristics. Enemies, friendly forces, and non-combatants can have many different affiliations. While JANUS equips each entity with two sensors maximum, JCATS allows as many as four. Areas as large as 600 kilometers on a side can be played, with as many as 20,000 entities present. Suppression is projected to include both the standard forms of JANUS and CAEN, but also a secondary suppression during which the entity moves to a hide posture. There is some discussion about how much three-dimensional visualization and replay will be present, but the user should be able (as in CAEN) to call up perspective images from different vantage points.

IUSS is a special PC-based model that primarily gauges the effects of exertion and protective equipment on soldier physiological performance. The movements and conditions from a larger simulation such as JANUS or CAEN can be input to IUSS and an assessment made of the movement speed and soldier capability. These outputs (particularly important in stressful MOUT and jungle vignettes) can be returned to the larger simulation or used independently in off-line analyses.

The constructive models examined provide a basis for answering many key questions about MOUT, jungle, and MOOTW operations, but there are still many aspects that are as yet too hard to emulate. Among these are many of the issues brought up at MOUT training sites: noise and confusion from weapons and obscurants, rapid changes in mission, and problems with communications and position-location systems. Some of these aspects may be captured in distributed interactive simulation (DIS) systems, but the processing power and interaction levels required may be prohibitive. The most cost-effective approach may be to determine the impacts of many of these effects off-line from DIS systems and field tests, and then feed the resulting factors (reduced reaction times, reduced accuracy, etc.) into constructive simulations.

Chapter Summary

Many of the observations to this point are simple ones. It is becoming increasingly clear that the United States and its allies cannot respond quickly enough to stop an aggressive force from taking over many key urban areas. Going in and driving out an entrenched aggressor from a newly occupied urban area can be a costly proposition, even with dramatic new tactics and technologies. Preemptive preparation and halt operations can buy time, but by themselves they are probably not enough to stop or deter an aggressor.

One approach for MOUT application appears to be a combination of preemption, rapid-reaction ground forces, and standoff fires. These disparate capabilities need to be orchestrated from a unified command and control center to achieve the greatest shock, delay, and disruption of the enemy attack. Because of the likely responsiveness needed for such missions, it seems prudent to incorporate MOUT and other special force capabilities (including jungle warfare, MOOTW, and NBC) anticipated for the future in any rapid-reaction modernization or redesign initiative. Required combat capabilities in these areas may ultimately define the boundary of requirements for future rapid-reaction force characteristics.

CHAPTER SIX ENDNOTES

1 Success is defined as the capability to succeed militarily with minimal numbers of U.S. casualties and tolerable noncombatant and collateral damage.

2 See USMC Operational Handbook 8-7 and U.S. Army Field Manual FM 90-10-1.

3 By doctrine, "precision MOUT" tends to be very restricted MOUT operations (e.g., tight rules of engagement, ROEs) where the enemy is thoroughly mixed with the noncombatants. "Surgical MOUT" operations are those that "include special-purpose raids, small precision strikes, or small-scale personnel seizure operations in a MOUT environment." Source: FM-90-10-1, G-1 to G-2 of Change 1.

4 Personal communication with Michael Holthus at the National Ground Intelligence Center, 1997.

5 In this case, DoE sources included Bechtel Nevada, SO Technologies, and Lockheed-Martin.

6 Reflecting comments about multiservice and coalition-based operations made by many individuals during a RAND-Dismounted Battlespace Battle Lab MOUT Conference, February 1998.

7 This type of MOUT is distinguished, by doctrine (FM-90-10-1, G-1 to G-2 of Change 1), from "precision MOUT" and from "surgical MOUT."

8 A major component of the emerging solutions focuses on improving close combat capabilities (e.g., fighting block-to-block, building-to-building, and room-to-room); however, the number of soldiers required to conduct this kind of operation in a large, modern city is likely to be enormous. At the same time, committing such large forces to close combat will often result in unacceptable casualty levels.

9 Even the very light DRB of the 82nd Airborne, tasked to be the "first to fight," can require as much as 4–6 days to deploy to distant locations such as Southwest Asia.

10 The plan was limited to Blue options and tactics; if carried out by enemy forces, it could be expanded to include anti-personnel mines, booby traps, and even weapons of mass destruction. The enemy would also not be constrained by our ROEs and could use noncombatants as hostages or shields.

11 For a detailed discussion of the MOUT ACTD and of current doctrine and training status, see the ACTD Web site, *http://www.geocities.com/Pentagon/6453/index.html*, and Glenn (1998). (Web site accessed and running on August 21, 2000.)

12 Neal Shepard of CDA indicates that they have recently expanded the terrain area to 10 by 10 kilometers.

13 See the JCATS Web site, *http://www.jwfc.jfcom.mil/genpublic/jw500/jcats/*, for a description and demonstration of the system. (Web site accessed and running on July 28, 2000.)