BACKGROUND

For several millennia in Asia, Europe, the Middle East, and the Americas, the city has played a unique role as a center of economic, political, and cultural activity. As well, the city has long played a military role. Built as fortified settlements, many early cities have been used as anchors for defensive lines. Typically astride major trade routes, cities—particularly national capitals—have often been the key to the physical and psychological vitality of a nation. Nations and armies have had varied motives in attacking cities. Annexation, tribute, destruction of the enemy's political center of gravity, denial of industrial or other economic resources, seizure of transportation hubs, defeat of enemy military forces, and the creation of refugees—all have been goals of attackers at various times and places.

The fall of major cities in war has typically been associated with final defeat. Thus, it is no surprise that battles for cities have been central to both civil and international conflicts from the Peloponnesian War to Bosnia. They also have been very common: Urban battles number in the thousands. Progress in wars has often been measured with

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respect to these cities. For example, during World War II (WWII), U.S. newspapers and newsreels routinely ran headlines such as “Allies Capture Caen” or “Allies 30 miles from Paris.” Although rivers and national borders were also used as milestones, the capture of key cities was viewed by both national leaders and the public as the true measure of success. In short, unlike any other terrain feature on a map, cities have symbolic and practical significance.

Despite the importance of cities and extensive U.S. experience with urban combat in WWII and, to a lesser extent, in Korea and Vietnam, urban military operations received little attention during the Cold War. However, since the end of the Cold War, the U.S. defense community has grown increasingly interested in urban combat.3

Since the end of the Cold War, U.S. forces have been involved in a number of operations (peacekeeping, humanitarian relief, and non-combatant evacuations) that have taken place in urban settings. Peace operations in Somalia, especially the deaths of 18 U.S. servicemen and the wounding of almost 100 others on October 3, 1993, profoundly influenced the American public’s perceptions of modern urban combat in the developing world.4 For military professionals, Somalia also was a painful reminder that the technological and operational dominance the United States experienced on the conventional battlefield during Desert Storm did not necessarily carry over into urban peacekeeping. For infantrymen in particular, the fierce fighting of “Bloody Sunday”—the most intense light infantry engagements since the Vietnam War—brought home the relevance of urban combat, its nastiness, and the need to develop concepts and tactics better suited to this unique environment.5

(1996). There were probably hundreds of urban battles in small towns and other built-up areas in World War II alone.

3For example, the December 1997 National Defense Panel report (p. 21) highlighted urban operations as increasingly likely in future conflicts.

4For a riveting account of this grim episode, see the now-classic narrative by Mark Bowden, Black Hawk Down: A Story of Modern War, New York: Atlantic Monthly Press, 1999.

5For a thoughtful assessment of these challenges, see Russell W. Glenn, Combat in Hell: A Consideration of Constrained Urban Warfare, Santa Monica, Calif.: RAND, MR-780-A/DARPA, 1996.
HOW LIKELY ARE URBAN OPERATIONS?

Are recent urban operations in Panama City, Khafji, Mogadishu, Port au Prince, Grozny, and Sarajevo an anomaly or a harbinger of the future?

According to a variety of hypotheses that have been posited, urban military operations will become more frequent.

By all accounts a fundamental demographic transition does seem to be occurring in the developing world. The world’s urban population is growing four times as fast as its rural population, and 150,000 people are added to the urban population of developing countries every day. By 2025, two-thirds of the earth’s population is projected to live in urban areas, and 90 percent of the growth will be in the developing world. Together, population growth and migration are leading to an urban world and changing the fundamental character of many previously agrarian societies.

Some observers believe that, as populations shift from rural to urban areas, the focus of existing conflicts—whether tribal, ethnic, religious, or ideological—will shift to urban areas also. For example, insurgents in El Salvador, Peru, Angola, Liberia, Sierra Leone, Afghanistan, and Egypt all shifted their focus to cities over the past two decades. In some cities, the slums have become urban sanctuaries for insurgents, much as isolated rural settings were during the insurgencies of the 1960s.

Although some conflicts with rural roots have shifted to urban areas, it should not be assumed that migrants will necessarily carry their rural animosities into the city. Several hundred years of rural-to-urban migrations have shown that cities change people’s attitudes and be-

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haviors. Birthrates drop, political allegiances shift, economic interests are often radically altered. It is difficult to assess the net effect of these changes in the abstract. In some cases, migration may remove sources of conflict; in others, it may produce the seeds of new urban-derived violence.

For example, some believe that the marginal living conditions of some urban areas in the developing world, particularly in the unsanctioned shantytowns that surround them, will lead to unrest. Although these conditions are often appalling from a Western point of view, they have to be assumed to be an improvement over rural life since most urban migration is voluntary. On the one hand, if migrants see their lives gradually improving and believe that the shantytown life is a temporary step on the way to a better existence in more-permanent urban dwellings, they are unlikely to be interested in political violence. On the other hand, rising expectations, if not met by improved conditions, could lead to resentment and provide a pool of possible recruits for criminal, terrorist, or insurgent groups. That said, we must recognize that the causes of violence—both criminal and political—are complex. No single variable (e.g., level of poverty) is a reliable indicator of a future propensity to violence.

Yet another argument for an increase in urban conflict sees urbanization as denying the open space to conduct traditional maneuver warfare. For example, Rosenau argues that "the amount of open space is decreasing, thus increasing the odds that land forces will have to fight in urban areas." This certainly is true in two places in which the United States has historic interests: Central Europe and the Korean Peninsula. It would be very difficult to fight a major war in either location without a substantial urban component.

That said, land-use patterns by themselves are not sufficient to argue for an increase in urban conflict globally, because the amount of urbanized terrain is still small compared with open space—forest,

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farm, mountain, or desert. For example, in 1994, 37 percent of the earth’s land surface was farmland or pastureland. Data for the percentage of the earth’s land surface that is undeveloped are hard to come by; however, population-density and land-use graphics in the 1998 *World Resources Guide* suggest that well over 50 percent, and probably closer to 75 percent, of the earth’s land surface is non-urban: farmland, pastureland, grassland, forest, desert, or tundra.

Another argument is that future U.S. adversaries will not want to fight wars in open spaces (at least not against the United States) and will actively avoid confronting the United States in places and under conditions in which its advanced sensors and weapons are most effective. Rather, among other clever strategies, they will take advantage of the land-use patterns that Rosenau identified and seek out built-up areas to counter U.S. technological dominance of the conventional battlefield. Their ability to do so will vary with their objectives and a host of military and political factors. However, the United States should expect future adversaries to increasingly embrace such strategies.

Perhaps the most compelling argument for future urban operations is also the most simple: Many U.S. objectives cannot be achieved without controlling key cities (or parts of them) for some period of time. For a special operation, this control might last for a matter of minutes or hours; for a noncombatant evacuation operation (NEO), it might last for days; for peace operations, it might last for years. We saw this in recent operations in Somalia, Panama, Haiti, Kuwait, and Bosnia, where U.S. forces were assigned cities as major operational objectives. Noncombatant evacuations—such as those that occurred in Somalia (1991), Liberia (1996), the Central African Republic (1996), Republic of Congo (1997), and Sierra Leone (1997)—are invariably centered on the capital or other major cities.

Cities were also core objectives in other operations in the 1990s. In Kuwait, the capture of the country’s capital city was an essential part of the larger objective of liberating Kuwait. In Panama, removing the national leadership and disarming Panamanian Defense Forces

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(PDF) were the core objectives, requiring the capture of PDF facilities in and around Panama City. In Haiti, control of Port-au-Prince, Cap-Haïtien, and other cities was necessary to ensure that General Raoul Cedras and the Haitian military would step down as they had agreed, to prevent violence and to allow President Jean-Bertrand Aristide to be restored to power. In Somalia, Mogadishu was the only place with the infrastructure (a port and an airfield) necessary to support the humanitarian intervention. It also was the scene of factional fighting and the headquarters for the Somali National Alliance and other factions. Similarly in Bosnia, it would have been impossible to enforce a peace without controlling the cities.

THE NATURE OF URBAN MILITARY OPERATIONS

Urban combat, Fighting in Built-Up Areas (FIBUA), Military Operations in Built Up Areas (MOBA), Military Operations on Urbanized Terrain (MOUT), operations in complex terrain, and urban military operations are all terms used to describe the subject of interest in this report. We use urban military operations in this report to describe any military activity from humanitarian relief to conventional combat that occurs in built-up areas. For our purposes, any area in which man-made structures are the dominant terrain feature—whether a large city, small town, or village—is considered urban. From a tactical perspective, any area sufficiently built up that it channels the movement of forces, restricts fields of fire, extends infantry combat vertically above and below the surface of the earth, and provides defenders a multiplicity of “natural” defensive strong points, concealment, and the potential for unobserved movement through buildings, is urban.

A city, however, is more than just a physical environment. It is a political, economic, social, and psychological environment as well. The physical landscape of the city, both natural and man-made, is the shell on which and within which a vast and multilayered living organism—the urban population—lives. The interplay of private and public activities—in homes, businesses, schools, marketplaces, and government—that constitutes urban life adds hundreds of degrees of complexity beyond those presented by the urban physical environment. In short, unconstrained urban combat in the abandoned shell of an empty city, although enormously difficult from a tactical per-
spective, is straightforward compared with military operations in a city whose civil lifeblood still pulses.

**From Rubble to Routine**

During the Cold War, most defense professionals understood urban operations to mean house-to-house fighting between conventional ground forces seeking to hold or take a city in the context of a major war such as World War II. Fighting of this intensity usually turned city landscapes to rubble and disrupted the routine economic and social activities of cities, typically causing mass evacuations and refugee flows. Thus, as urban battles wore on, the civilian population and its associated activities became less and less a factor. The all-out nature of WWII also meant that commanders were focused on defeating enemy forces whatever the cost. To constrain operations because of concerns about civilians would have risked defeat. The urban-operations challenge was primarily to find solutions to the tactical, logistics, engineering, and command exigencies of operating in this unique physical environment.13 Lesser conflicts that started in or spread to urban settings generally have been considered to be a subset of low-intensity conflict (what we now call MOOTW) typically not discussed in analytical or doctrinal writings on urban combat.14

Recent writings on urban operations, in contrast, have emphasized the challenges of lesser conflicts in urban terrain.15 The typical scenario is one in which U.S. and allied forces are attempting to enforce a peace agreement or defeat an insurgency in an urban setting. This

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13Admittedly, there are likely to be some situations in major wars where the civilian population would be a significant factor. For example, if Seoul were captured early in a future Korean conflict, the fate of Seoul’s civilian population would likely weigh heavily on allied planners as they developed options to liberate the city. Depending on North Korean treatment of the civilian populace, Seoul might even be bypassed initially in a counteroffensive to spare the city and population.

14For example, the 1979 version of Army Field Manual 90-10, *Military Operations on Urbanized Terrain (MOUT)*, makes no mention of the civilian population. This manual is clearly focused on the tactical challenges of defeating conventional enemy forces in a city that has been largely abandoned by its civilian population, although it never states this explicitly. See also Russell W. Glenn, “. . .We Band of Brothers,” Santa Monica, Calif.: RAND, DB-270-A, 1999.

15See, for example, Ralph Peters, “Our Soldiers, Their Cities,” *Parameters*, Spring 1996, pp. 43-49.
scenario—reminiscent of U.S. operations in Mogadishu—envisions an environment in which routine civilian functions and small-unit combat are juxtaposed; in which adversary forces have at least the tacit support of some of the population; in which adversary forces can exploit the physical and human landscape of the city for concealment, support, intelligence, mobility, and tactical advantage; in which strict rules of engagement (ROE) limit the use of heavy weapons; and in which U.S. military actions are monitored closely by international television and press.

These lesser conflicts have received more attention in the military literature both because they are more difficult to plan for than all-out war and because many believe such conflicts will become increasingly frequent, which has led to some definitional confusion in the broader defense community.

The urban-operations writings are paralleled by a more bureaucratic debate in Washington, and some services have seized upon urban operations as a mission they wish to claim as theirs exclusively.

**Redefining Warfare, Not Service Roles**

Some authors and senior U.S. Marine officers use urban operations increasingly as a shorthand for what they believe will be the most prevalent form of conflict in the future—civil wars, insurgencies, and transnational terrorism in the world’s cities—rather than its traditional meaning of all combat in built-up areas. These observers believe that subnational groups will increasingly attack U.S. interests through urban-based operations that do not present targets for the decisive application of large-caliber firepower, including precision weapons delivered by aircraft. In essence, the subject these authors and service representatives are seeking to capture is the future of warfare, not how best to conduct traditional military operations in urban settings.

Airmen have responded to this new view of urban military operations in a variety of ways. Some have noted that aerospace power has

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16 The Marines have focused on these complex, highly constrained contingencies in their Urban Warrior exercises.
played an important role in most urban battles the United States has fought, either through interdiction of enemy forces or by providing surveillance, reconnaissance, aerial resupply, and/or close support to friendly ground forces. Other airmen have simply dismissed urban-based lesser conflicts as secondary in importance to major wars. Still others have introduced their own redefinition, arguing that precision strikes in Baghdad or Bosnia during Operations Desert Storm and Deliberate Force constituted urban combat.

Rather than embrace any one of these perspectives, we suggest that defense planners cannot afford to focus on one type of urban conflict to the exclusion of others. Defense planners need to identify those capabilities that the United States will need for diverse urban operations that will vary on at least the eight dimensions listed in Figure 1.1.

As we think through the many potential permutations, it becomes clear that the kinds of capabilities the United States needs for urban military operations are going to vary greatly, depending on the par-

| Nature of opponent (e.g., nation, subnational group) |
| Type of adversary forces (e.g., regular, irregular, heavy, light) |
| Rules of engagement (e.g., restrictive to permissive) |
| Physical environment (e.g., high-rise or low-rise, compact or sprawl, permanent or shantytown, town or city) |
| Social environment (e.g., degree of popular support for adversary, city populated or evacuated) |
| U.S. objectives (e.g., enforce peace agreement, liberate friendly city) |
| Adversary's objectives (e.g., capture territory, overthrow government) |
| Adversary's strategy (e.g., city hugging, urban insurgency) |

**NOTE:** City hugging occurs when conventional forces use urban terrain to hinder the defender's attempts to detect and attack them with standoff sensors and weapons.

**Figure 1.1—Analytic Dimensions of Urban Military Operations**
ticular situation. For example, at least some of the tasks the U.S. military would be called upon to accomplish in an urban battle during a major theater war can be expected to be different from those associated with an urban counterinsurgency operation, urban peacekeeping, or opposed NEO in an urban setting. Even when the tasks are the same (e.g., detect, identify, and attack adversary forces), the means used to accomplish them will vary according to the rules of engagement, social environment, and so on. Consequently, the relative contribution of air, land, sea, and space forces will also vary with the specifics of a particular scenario.

It would be risky to posture U.S. forces for only one of the many potential scenarios or to rely exclusively on any one type of force element for the diverse challenges of urban military operations. The smoke from the interservice competition for resources should not obscure the fact that each service has roles to play in urban operations. Indeed, one huge advantage that the United States enjoys over many potential foes is the ability to integrate and orchestrate joint forces to accomplish key operational tasks. Urban-operations analysis should cover the spectrum of possible urban-conflict situations, identifying operational tasks associated with each one and deriving weapons, training, tactics, and organizational requirements from these tasks.

PURPOSE

The objective of this report is to help the USAF and others in the defense community better understand the role of aerospace forces in future urban military operations. Because urban stabilization operations—peace operations, counterinsurgency, or humanitarian

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17 One challenge for future researchers in this area is to develop task lists for various missions in an urban environment.

18 The role of the Navy in urban operations tends to get less attention than it deserves. With most of the earth’s population within 200 miles of a coastline, naval forces have participated in many urban operations, particularly noncombatant evacuations. Naval contributions to urban operations have included or could include transportation, surveillance, airlift, and fire support. Urban operations in port cities might also require use of naval SOF patrol craft, mine warfare assets, and smaller surface combatants. Navy SEAL teams are particularly well suited to operate in such environments.
aid—are likely to remain the most common, the emphasis of the report is on improving USAF capabilities to tackle these problems.

ORGANIZATION

Recognizing the difficulty of predicting future military challenges and seeing a role for aerospace forces in urban operations across the spectrum of conflict, this report addresses both conventional and unconventional challenges. Chapter Two explores how aerospace forces can be used to deter or prevent conventional attacks on urban areas. Chapter Three discusses the unique legal and political constraints on urban military operations, from classic strategic air campaigns to peace operations.

The remainder of the report focuses on enhancing the contribution of air and space components in lesser urban conflicts. Chapter Four presents data on urban geospatial forms and analyzes how the urban physical environment constrains air operations. Chapter Five presents new concepts of operation to accomplish key military tasks in light of the challenges and opportunities identified in the previous chapters. Chapter Six identifies key technology areas in which investments will be necessary to achieve the capabilities envisioned in Chapter Five. Chapter Seven presents the conclusions and recommendations. Appendix A shows how trigonometric calculations in Chapter Four were done. Appendix B discusses microwave recharging of UAVs. Appendix C provides additional details on countersniper technologies. Appendix D presents an analysis of lessons learned from previous urban air operations.