Operational Environment Implications of the Megacity to the US Army

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Megacity Defined

The United Nations (UN) and the United States National Intelligence Council (NIC) define the megacity as a metropolitan area whose population exceeds 10 million people. While other definitions exist, this is the definition used as the basis for understanding future impacts of megacities to US Army operations. Depending on the statistical reference, there are between 23 and 30 megacities in the world. Statistical numbers vary primarily due to different interpretations of metropolitan limits and surrounding areas. However, regardless of how megacities are quantified, trends within the global operational environment (herein referred as the "OE") indicate that the number of urban areas will continue to rise. **[i]**

Global Drivers and Trends

In order to predict future impacts of megacities to the US Army, the global drivers and trends leading to megacity development must be identified. Drivers (as defined for this paper) are forces that always exist, such as demographics (people), natural resources (water, oil, land), and globalization (interconnectivity). Drivers constantly impact the OE.

Drivers are impacted by trends, which have life cycles with associated impacts on drivers. Trends are constantly analyzed in terms of their impacts to drivers. This article is not all inclusive but highlights some trend-driven impacts on drivers and resulting potential for involvement of the US Army across the range of military operations.

Demographics

Progressive ideologies; war; youth population bulges; unemployment; climate change; and scarcity of food, water, and medicine are among the reasons that human migration to urban areas is a trend expected to continue for several decades. The UN estimates that approximately 180,000 people move into urban areas every day and the Defense Intelligence Agency (DIA) estimates that 60 percent of the world's population will live in cities by 2030.**[ii]** This constant influx of population is certain to stress megacity infrastructures, resulting in the potential for certain population groups to perceive disenfranchisement and leading to US Army military urban engagement in cooperation with host nation forces.

Demographic trends can greatly affect political decisions in countries striving to continue economic growth, maintain a military, generate tax revenue, and maintain alliances. Among demographic trends, the

NIC estimates that by 2030 the world will have contracted from 80 to 50 countries whose populations will have a medium age of 25 years or less. Most countries maintaining a youth bulge are located in Sub-Saharan Africa, the Middle East, and in South and Central Asia.[iii] Those countries without a youth bulge in 2039 are located in Eastern Asia, North America, and Europe. In fact, the DIA estimates that by 2050 the most prevalent age group in Europe will be in the 55-69 year old category.[iv]

Natural Resources

Megacities are susceptible to natural and manmade disasters due to their physical proximity to large bodies of water. All of the top ten megacities fall into this category and eight of the ten are on a coast. Furthermore, the UN estimates that over 50 percent of the world's population lives within 120 miles of a coast.[v] Indeed, water near population centers has always been necessary for commerce, food, sanitation, etc. However, extreme water events caused by floods, hurricanes, typhoons, and tsunamis exacerbate life threatening situations in areas of increased urbanization. The US Army is likely to experience an increase in crisis response operations requiring foreign humanitarian assistance in large-scale urban environments.

Another complication megacities present is vertical growth.   This is especially true in cities along coastlines, where expansion is naturally inhibited. Design and development of high-rise cities could lead to greatly compromised military operations in urban settings where the effectiveness of precision guided munitions; elevation of weapon systems; and intelligence, surveillance, and reconnaissance (ISR) collection platforms are limited.

Globalization

Globalization as a driver creates OE interconnectivity. As societies become more connected, events unfolding in one area of the world are communicated and affect other areas. Some examples of potential manifestations of globalization and demographic interaction include:

- An increasing influx of Middle Eastern and African youth into Europe. Many of these migrants arrive without a formal education and are unemployed.
- Countries such as China wanting to attract migrants from low income countries to supplement its declining youthful workforce in order to sustain its economy.

The NIC forecasts that the need to support economic growth combined with the lack of opportunities in areas of the world that maintain a youth bulge will create even faster demographic shifts than those that occurred in the last quarter of the 20th century. [vi] A huge migrant influx into megacities and urban areas in general has the potential for increased xenophobic feelings and conversely, perceived inequities may lead to violence and acts of terrorism as the world has already witnessed in megacities such as London and Paris. A question to consider is, at what point do states begin to enculturate the character/culture of rapidly increasing ethnic minorities?

A PMESII-PT Megacity Analysis

The following is an analysis of some of the trends affecting drivers from the perspective of the US Army doctrinal taxonomy of PMESII-PT. It is intended to articulate how these trends might affect or involve the US Army, but is not a detailed PMESII-PT megacity analysis.

Political: Futurist Thomas Frey notes that democracy could be viewed as an inferior form of government by 2030.[vii] In fact, a number of megacities or large urban areas are located in democracies with a high risk of failure due to religious extremism or other trends. Even in states where democracy is not threatened, it is important to consider that disenfranchised populations often harbor feelings of deprived rights and may tend to incite violence as a means to force political change. For instance, megacity gangs

taking this approach could stress already taxed law enforcement to the point where the US military would be requested to provide foreign security assistance.

Military: An ever-narrowing gap between military capabilities, organization, and influence (due in part to globalization) is increasingly blurring distinctions between regular and conventional forces, irregular forces, and insurgents. When criminal elements are considered, a "hybrid threat" as defined in Army Doctrinal Reference Publication 1-02 emerges. While the term "hybrid threat" is relatively new, the concept behind it is not. There are many examples in military history of groups with military capabilities that unite either formally or informally to achieve a mutually desired outcome.

Hybrid threats (threats) seek ways to counter perceived strengths of their adversary. US Army military strengths such as situational awareness through mission command systems and ISR platforms, precision guided munitions (PGM), and protection/lethality provided by armored fighting vehicles (AFVs) afford the advantage to see, know, and act decisively. Threats study these advantages and deduct their own lessons learned. For instance, drawing US forces into urban areas compromises our technological advantages. Megacity congestion limits movement and predictable movement corridors will make the US Army susceptible to improvised explosive devices (IED), explosive formed projectiles, and an array of dual-warhead antitank (AT) missiles and rocket propelled grenades (RPGs). A recent RAND Corporation study "Comparing US Army Systems with Foreign Counterparts" noted the increasing weight in AFVs to protect against IEDs and other urban combat threats. Added weight, due to reactive armor, urban survival kits, and other protective enhancements affects vehicle dimensions and power train transfer. In an urban setting, conditions such as bridge classifications or road widths may prohibit where AFVs can travel as well as reduce AFV performance (vehicle power requirements vs. weight). The US Army must balance protection requirements while maintaining mobility.

Weight issues also apply to urban conflicts involving light infantry. The RAND report also noted the increasing loads that infantrymen are required to carry. One hundred pounds or more was cited as common practice.[viii]

Threats are subject to some of the same challenges. However, the OE will affect the threat much differently than it does the US Army. It is highly possible that initial US Army entry into a megacity and/or urban area will be expeditionary in nature and opposed by the threat. Operations will be primarily offensive and lines of communication (LOCs) will be under development. In addition, LOCs will be under the same scrutiny of predictability by the threat and hence subject to interdiction. Therefore, US Soldiers will be required to carry additional supplies (ammo, batteries, night vision, water, etc.) that at least initially threats will not face the same burden. When superior US military forces enter, threats will adapt to defensive operations while maintaining limited offensive actions such as raids and ambushes. Therefore, while threats still have logistical requirements, they have advantages in that they can cache supplies, do not need to carry loads similar to US infantrymen, and enjoy (at least initially) more mature LOCs.

Economics: The lure to megacities and urban areas because of employment opportunities is a trend that is likely to continue through 2030, especially for economies that are developing or want to sustain growth. The NIC cites not only current economic leaders (e.g., China, Europe, or Japan) but also developing economies such as Columbia, Indonesia, Nigeria, and others are becoming increasingly important to the global economy. As previously mentioned, a number of established economies are challenged because an aging workforce may look to migrants from low income countries to replace labor needs. This could lead to megaslums if local economies and infrastructures cannot react in concert with the rapid influx of migrants. Slums tend to exacerbate disenfranchisement and lead to conflict. Strategist and counterinsurgency expert David Kilcullen writes in *Out of The Mountains: The Coming Age of the Urban Guerrilla*

that it is time to take what we have learned from the war in Afghanistan and think how it applies to future conflicts consisting of "…urban, networked, guerrilla warfare occurring in megaslums and megacities." [ix]

Social: The UN estimates that 180,000 people migrate to urban areas daily. The cities and megacities of Brazil, China, Democratic Republic of Congo, India, Indonesia, Mexico, Nigeria, Pakistan, Philippines, and the US are forecasted to make up approximately 60 percent of the global urban growth through 2030. [x] Diaspora from youth bulging countries bring their cultures, ideologies, and most important, expectations. However, increasing migration to urban areas could at least, initially result in the expansion of slums and the materialization of acute poverty. A rapid increase in minorities could erode social fabric and lead to violent friction and the potential for overwhelming state security force capabilities. This could lead to generating domestic and international requests for the US Army to provide military engagement, security cooperation, and deterrence.

Infrastructure: In addition to employment opportunities, another major contributor to urban growth is the need for food, fresh water, housing, and energy. Megacities and large urban areas in general have infrastructures to provide these life supporting necessities. However, the NIC estimates that the demand for food, water, and energy will increase by 35, 40 and 50 percent respectively over the next 40 years and that housing demand will equal the entire volume of construction worldwide to date.[xi] These figures are staggering and will surely stress infrastructure capacities. The effort to meet demands could result in poor construction quality, gridlocked transportation networks, and utility service failures. In addition, the fact that most megacities are located along coasts restricts horizontal development. Vertical development is more vulnerable to natural (earthquakes, tsunamis, typhoons, etc.) and man-made disasters. US Army assistance for civil support and civil-military operations may be in greater demand than ever before.

Information: Urban areas tend to have the most mature radio, television, and cellular networks. Information can be passed by the adversary using a variety of means with almost instantaneous results. High rise buildings afford nearly unobstructed signals for jamming of US PGM and unmanned ISR platforms therefore reducing US military technological advantages.

Physical terrain: Urban settings are dominated by buildings and roads that develop predictable man-made mobility corridors. Buildings can both impede and improve observation. High rise buildings provide both commanding observation and concealment for individually operated anti-tank launchers. They also create elevation issues for AFV weapon systems targeting such threats while serving as obstacles to acquiring aerial ISR platforms. Urban settings also have mature sub-surface structures such as sewer, drainage, and subway transit systems. Underground mobility is an important aspect of urban warfare. The use of existing subterranean features and tunneling can create elaborate defensive networks. Hence, megacity physical terrains present three-dimensional threat challenges to the US Army in that threats may occur simultaneously above, at, and below surface levels.

Time: It is assumed that potential US adversaries have developed operational plans that involve adaptive operations within urban settings. The use of urban terrain by militarily inferior opponents against superior opponents has been exercised throughout military history. Chechen tactics against the Russian military [xii] and Hezbollah's defense[xiii] against the Israeli Defense Force are recent examples of how urban terrain is used to engage and prolong conflict while using information operations to generate world opinion. Potential adversaries understand that the US has transitioned to primarily an expeditionary force, which could at least initially favor the adversary. Future adversaries do not need to win; they just need to avoid losing to force a stalemate.

Replicating Future Complexities at US Army Training Centers

What emerging technologies and capabilities should the US Army consider replicating in live, constructive, and virtual (LVC) training environments in order to realistically represent OE complexities?

Physical destruction in urban areas will further degrade the infrastructure and alter perception of non-combatants once supportive of US forces. Therefore, we must place more emphasis on employment of non-lethal weapons for more affective riot control and against military targets. Various types of stun guns, mood-altering gasses, and other temporarily incapacitating capabilities are needed to train for military engagement, security cooperation, and deterrence.

In addition, constructive and virtual gaming simulations must accurately reflect munitions effects ranging from small arms to artillery on different types of buildings and also reflect physical properties of how these buildings are constructed. The current multi-integrated laser equipment system (MILES) is ill-suited for registering effects in urban terrain. We need MILES to reflect partial and catastrophic destruction inflicted on buildings by both US and threat weapon systems. We also need improved personnel and equipment MILES that factor material used for cover in the probability of hit/probability of kill codes.

We must be able to see-through urban environments. We need ultrasound and x-ray technology that permits squad level US Soldiers to penetrate walls and below the surface in order to acquire adversarial information.

Dual warhead AT missiles and RPGs also pose a real threat to US Army AFVs. AFVs need the ability to automatically acquire, track, and launch countermeasures to neutralize and/or defeat these weapons.

Urban settings (physical structures, subterranean, population, etc.), reduce US stand-off weapon and ISR superiority, requiring close in combat to identify friendly vs. foe. Robotic platforms that serve a multitude of functions such as the ability to acquire, assimilate, and transmit biometric data and serve as weapon platforms are needed to offset the challenges presented by urban environments.

Conclusion

History shows it is difficult to predict with clarity what future conflict will look like. However, drivers and their trends analyzed through the lens of PMESII-PT lend some form of credence as to what future challenges megacities pose to the US Army. As such, the US Army must continue to prepare its training centers for replicating urban settings by establishing LVC training conditions that include the aforementioned emerging technologies and capabilities.

Credits

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End Notes

[i] NIC

[ii] DIA

[iii] NIC

[iv] DIA

[v] UN Atlas

[vi] NIC

[vii] Frey

[viii] RAND

[ix] Kilcullen

[x] NIC

[xi] NIC

[xii] Billingsley, Grau

[xiii] Fleser

About the Author

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Darryl Ward has 30 combined years of experience in Military Intelligence with the U.S. Army, civil service, and as a government contractor. He is retired from the U.S. Army and currently serving as an MCR contractor within the TRADOC G27 OPFOR Program Management Directorate supporting the U.S. Army Quality Assurance Program. He holds a BS in Education from the University of Arkansas and an MA in Health Business Administration from Webster University.

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