



Part 5

Security, Power, Agency and Resistance







Chapter 12

Surveillance, urbanization, and the 'Revolution in Military Affairs'

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Introduction: The neglect of military power within surveillance studies

The recent upsurge of critical social scientific analyses of surveillance has been overwhelmingly dominated by attempts to theorize and analyse the complex relations between surveillance, citizenship, social control, governmentality and social relations. Whilst the emerging discipline of surveillance studies has built on this foundation to theorize the connections between globalization, new technologies and social and political power within contemporary civil societies, it has strikingly neglected another extremely important domain of political and social power. This neglect is especially problematic because this domain of power has been a prime, perhaps even dominant, force in imagining, bringing in to existence, and normalizing new surveillance techniques, technologies and practices since the origins of modern societies. This domain, of course, is that of military power.

Such a lacuna within surveillance studies might be partially explained by the effects of the academic division of labour within Western academy (Bishop and Clancey 2004). This division has traditionally worked to undermine links between spheres of work conventionally deemed 'sociological' – those centring on civil domains, domestic scales, social disorder and non-political violence within nation states – from

the larger-scale 'political' domains centring on international relations, international politics, geopolitics, military power and violent conflict involving formal state militaries. Whilst critical and interdisciplinary work linking military power, technology, geopolitics and surveillance is starting to emerge (see Gray 1997; Blackmore 2005), it is not surprisingly struggling to cut across the diverse theoretical, scalar and epistemological traditions of the many silo-like disciplines that it is forced to cut across.

This situation helps explain why, for example, the promising theoretical work of writers such as Paul Virilio (1998), Mackenzie Wark (2002), Manuel de Landa (1991) and James Der Derian (1990, 2001), who have done so much to theorize and problematize the links between the projection and imagination of military power and techniques and technologies of surveillance, has not been more influential in sociologically oriented surveillance research. Eric Toepfer and colleagues (2005) thus correctly diagnose a failure within the emerging sub-discipline of surveillance studies to back up such theoretical openings with critical empirical work. Whilst 'studies of military surveillance exist within International Relations and studies of warfare and espionage' (Toepfer *et al.* 2005), they argue that

these remain disconnected from studies of surveillance across other disciplines. However, methods and technologies developed for military purposes are deeply embedded in contemporary 'civil surveillance societies', as, for instance, cornerstones of the digital universe of geographic information, CCD chips in modern CCTV cameras, or C3I centres as next generation of police control rooms (Toepfer *et al.* 2005).

In such a context, this chapter develops one detailed case study of a particular intersection of surveillance and contemporary military power: that linking US military forces and processes of global urbanization. In what follows, I seek to problematize the ways in which the discursive and technological aspects of US military surveillance are currently being reworked to address the purported impacts of rapid urbanization across the geographical areas of the Middle East and global south that US military theorists see as their *de facto* future battlespaces. Analysis is centred particularly on how urbanization processes are being imagined and represented by US military theorists as processes which significantly undermine the American military and their technoscientific hegemony that derives from their unrivalled powers of digital surveillance.

The chapter falls in to three parts. The first describes the ways in which global south cities are perceived to interrupt and frustrate wider military strategies of transglobal surveillance and power projection surrounding the so-called 'Revolution in Military Affairs' (or 'RMA'). The second analyses the way in which key actors within the US military-industrial complex are suggesting deeply technophilic 'solutions' to this purported erosion of US geostrategic power through global south urbanization. The final part of the chapter attempts to draw theoretical and research conclusions for understandings of surveillance from the preceding discussions.

Fantasies frustrated: Urbanization and the US 'Revolution in Military Affairs' (RMA)

For Western military forces, asymmetric warfare in urban areas will be the greatest challenge of this century ... The city will be the strategic high ground – whoever controls it will dictate the course of future events in the world (Dickson 2002: 10).

Western military theorists and researchers are increasingly preoccupied with how the geographies of cities and processes of global south urbanization influence both the geopolitics and the technoscience of post-Cold War political violence. Indeed, almost unnoticed within 'civil' urban geography and social science, a vast 'shadow' system of military urban research is quickly being established. Funded by Western military research budgets, this research is quickly elaborating how such effects are allegedly already becoming manifest, and how the global intensification of processes of urbanization will deepen them in the future.

Fuelled by the growing realization that the scale and significance of contemporary processes of urbanization throughout the world might significantly reshape the geopolitics, doctrine and realities of post-Cold War Western military strategy, this research is generating a crucial set of technomilitary discourses. Within and through such discourses, attempts are currently being made to reconstitute dramatically the structure, orientation and technoscience of Western military power to directly reflect the alleged implications of such urbanization.

The widening adoption of such 'urban warfare' doctrine follows centuries of Western military planners preaching Sun Tzu's mantra from 1500 BC that the 'worst policy is to attack cities'. This shift follows a post-Second World War Cold War period marked by an obsession

with massive, superpower-led 'Air-Land' engagements within and above the spaces between bypassed city-regions. When cities were addressed through such Cold War doctrine, the United States' forces, in the euphemistic language so typical of military forces, 'approached the urban area by rubbing or isolating the city' (Grubs 2003: iii). That is, they either ignored or sought to systematically annihilate urban places.

As the global military hegemon, the military forces of the United States provide the most interesting and important example of how, after three decades concentrating on global surveillance and power projection, discursive constructions of 'urban terrain' in global south cities are now being used to justify the 'transformation' of the technologies, tactics and strategies of national military intervention more broadly.

The military strategies to project, sustain and deepen the US military hegemony in the post-Cold War period rest on the exploitation of a 'transformation' of US military power through what has been termed a 'revolution in military affairs' (see Pieterse 2004; Duffield 2002). Centring on the technologies of 'stealth', 'precision' targeting and satellite geopositioning, the RMA has widely been hailed amongst US military planners as the means to sustain US dominance in the post-Cold War world (Stone 2004).

Central to the RMA is the notion that 'military operations are now aimed at defined effects rather than attrition of enemy forces or occupation of ground' (Cohen 2004: 395). Through the interlinkage of the 'system of systems' of US military technologies, RMA theorists argue that a truly 'network-centric warfare' is now possible. Through this US forces can continually dominate societies deemed to be their adversaries by utilizing their increasingly omnipotent surveillance and 'situational awareness', devastating and precisely targeted aerial firepower, and the suppression and degradation of the communications and fighting ability of any opposing forces (Arquilla and Ronfeldt 2001). Thus, RMA theorists imagine US military operations to be a giant, integrated, 'network enterprise' – a 'just-in-time' system of post-human, cyborgized warriors that utilize many principles of logistics chain management and new-technology based tracking that are so dominant within contemporary management models (Duffield 2002; Gray 2003).

Importantly, however, such technophilic discourses depicting an RMA ushering new, relatively reduced-risk, 'clean' and painless strategy of US military dominance assumed that the vast networks of sensors and weapons that needed to be integrated and connected to project US power would work uninterrupted. Global scales of flow and connection have thus dominated RMA discourses. Technological

mastery, omnipotent surveillance, real-time 'situational awareness', and speed-of-light digital interactions have been widely portrayed as processes which, intrinsically, would usher in what US military planners term 'full spectrum dominance', on a planetary scale, irrespective of the geographical terrain that was to be dominated.

RMA discourses have, in this sense, been notably ageographical. Crucially, from the point of view of the current chapter, little account has been taken of the geographical specificities of the spaces, or geographical terrains inhabited by the purported adversaries of the US in the post-Cold War period (or how they are changing through processes of urbanization and globalization). A key axiom of RMA rhetoric has been the idea that the US was now able to prosecute its global strategies for geopolitical dominance through a 'radical non-territoriality' (Duffield 2002: 158).

RMA discourses have also been obsessively inward-looking; they have centred almost exclusively on how the Cold War strategies and military systems of the US military can be 'transformed' using new technology. 'The enemy never really figured very much in the RMA debate', writes Eliot Cohen (2004: 397). While 'American theorists and foreign imitators spoke in abstract terms of 200-mile by 200-mile boxes, sensor-to-shooter links and dominant battlefield awareness' Cohen (2004: 397), they completely ignored the complex processes of urbanization that were substantially undermining the possibility of realizing their dreams of dominance.

In an attempt to address these weaknesses, and driven by the ongoing horrors of the urban insurgency which has followed the US invasion of Iraq, RMA theorists and military research and development establishments have recently tried to 'urbanize' the RMA. That is, they have sought to change the focus of theory, along with research and weapons development, so that the RMA transforms the US military into a fighting force whose primary mission is to control and destroy urban insurgencies in global south cities. Two key emphases have emerged here.

First, emphasis is placed on the ways in which the sheer three-dimensional complexity and scale of global south cities allegedly undermine the United States' expensively assembled and hegemonic advantages in surveillance by targeting and killing through 'precise' air and space-based weapons systems (Graham 2003; Davis 2004). Many US military theorists now argue that the urban terrain in poor, global south countries is a great leveller between high-tech US forces and their low-tech and usually informally organized and poorly equipped adversaries (Gregory 2004; Graham 2004a). Such perceptions have been

strengthened dramatically by the horrors of the Iraqi occupation and urban insurgency. The complex and congested terrain below, within and above cities is thus widely viewed by US military commanders and theorists as a set of physical spaces which limit the effectiveness of high-tech space-targeted bombs, surveillance systems, and automated, 'network-centric' and 'precision' weapons. The US defence research agency, DIRC, for example, argue that 'the urban environment negates the abilities of present US military communications equipment resulting in dead spots, noise, signal absorption, propagation problems which severely undermine the principles and technologies of "network-centric warfare"' (DIRC 1997).

Second, it has been widely assumed that the purported effects of urban landscapes on US military systems will directly and causally lead to an increasing tendency amongst the United States' political adversaries to take refuge within urban areas. 'The long term trend in open-area combat', writes the leading US 'urban warfare' commentator, Ralph Peters, 'is toward overhead dominance by US forces.' As a result, he predicts that 'battlefield awareness [for US forces] may prove so complete, and "precision" weapons so widely available and effective, that enemy ground-based combat systems will not be able to survive in the deserts, plains, and fields that have seen so many of history's main battles' (Peters 1996: 6).

Fantasies reclaimed? From pre-emptive war to 'Persistent Area Dominance'

The time has come to change the perception that the high-tech US war machine fights at a disadvantage in urban areas (Houlgate 2004: 17).

The RMA is being fundamentally reworked because of the widespread perception that the intensifying urbanization of the parts of the global south that the US military envisages being their dominant areas of operation is radically undermining the US' broader efforts at technoscientific transformation. With the urban insurgency in Iraq as an ongoing fulcrum war, a 'transformation' based on the technophilic celebrations of the death of geography through new technologies is, ironically, being transformed into a major technoscientific effort to develop and experiment with surveillance, communications and targeting systems that are specifically tailored to the fine-grain physical and human geographies of global south cities.

It is now widely argued within US military strategic organizations and think-tanks that the RMA needs to be reconfigured to address the challenges of tightly built global south cities. Along with that, new bodies of 'urban' research need to be built up to understand how to use military violence to deliver precise 'effects' in such cities. And finally, it is widely argued that the doctrine, weaponry, training and equipment of US forces need to be comprehensively redesigned so that urban military operations are their *de facto* function. Major Lee Grubbs (2003: iii-5) of the US Army argues that US forces need to be redefined so that their main purpose is to:

create operational shock in the urban environment. Operational shock as an urban operational concept depends on selective influence ... The utility to selectively influence depends on a deep understanding of the battlespace to identify causality between critical point, action, and effect achieved. The level of situational understanding within the infinite relationships of any enemy system and the urban area requires a variation on the doctrinal development of an understanding of the city and operational design ... Operational design and a process for understanding the city becomes critical for the selection of critical points to destroy, control and influence ... The challenge is the development of an executable operational concept for achieving systematic, across the entire system, effects within the urban environment through the selective use of force (Grubbs 2003: 4).

A large output of conceptual, technoscientific and research and development material has been created by the 'urban turn' of the RMA, especially since the Iraq invasion (see Grubbs 2003; Houlgate 2004). The overwhelming rhetoric in such efforts emphasizes that new military technoscience, specifically developed to address cities, will turn global south urban environments into areas that US forces can completely dominate, using their technological advantages, with minimum casualties to themselves. The widespread effort to tailor to RMA to support US forces' goal of dominating global south cities falls into two complementary areas of work.

Technophilic unveilings of global south cities: Dreams of 'real-time situational awareness'

The first involves programmes designed to saturate such cities with myriads of networked surveillance systems. The dream of US military theorists is that this can be done to such an extent that any target can be

automatically identified at any time and in so doing be exposed to high-technology tracking and killing powers of 'network-centric' weapons. Such visions imagine pervasive and interlined arrays of 'loitering' and 'embedded' sensors as overcoming all the limits and interruptions that megacity environments place in the way of successfully implementing network-centric warfare. Ackerman (2002), for example, suggests that such sensor suites will be designed to automatically trace dynamic change rather than constantly soaking up data from unchanging environments: observing 'change' rather than observing 'scenery', as he puts it. In other words, algorithms will be designed to function only when definable changes occur. They will thus identify purported notions of 'normality' against the 'abnormal' behaviours and patterns that can then be assessed as targets.

One major example of such a development is the tellingly titled 'Combat Zones That See' (CTS), a project led by the US Defense Advanced Research Projects Agency (DARPA). Launched at the start of the Iraq insurgency in 2003, CTS 'explores concepts, develops algorithms, and delivers systems for utilizing large numbers (1000s) of algorithmic video cameras to provide the close-in sensing demanded for military operations in urban terrain' (DARPA 2003: 4). Through installing computerized CCTV across entire occupied cities, the project organizers envisage that, when deployed, CTS will sustain 'motion-pattern analysis across whole city scales' (DARPA 2003: 4) that are linked to the tracking of massive populations of individualized cars and people through intelligent computer algorithms linked to the recognition of number plates and scanned in human facial photos.

It is envisaged that once CTS has been developed by 2007, it 'will generate, for the first time, the reconnaissance, surveillance and targeting information needed to provide close-in, continuous, always-on support for military operations in urban terrain' (DARPA 2003: 6). It will be designed to specifically address the 'inherently three-dimensional nature of urban centres, with large buildings, extensive underground passageways, and concealment from above' (DARPA 2003: 7).

The central challenge of CTS, according to DARPA, will be to build up fully representative data profiles on the 'normal' time-space movement patterns of entire subject cities so that algorithms could then use statistical modelling to 'determine what is normal and what is not' (quoted in Sniffen 2003). This will be a purported aid to identifying insurgents' activities and real or potential attacks, as well as warning of the presence or movement of target or suspect vehicles or individuals. The report states that the CTS project will:

include ... analysis of changes in normalcy modes; detection of variances in activity; anomaly detection based on statistical analyses; discovery of links between places, subjects and times of activities; and direct comparison and correlation of track data to other information available to operators. Predictive modelling, plan recognition, and behaviour modelling should alert operators to potential force protection risks and hostile situations. Forensic information (where did a vehicle come from, how did it get here?) should be combined and contrasted to more powerful 'forward-tracking' capabilities (where could the vehicle go?, where is the vehicle going?) to allow operators to provide real-time capabilities to assess potential force threats (DARPA 2003: 13).

After a stream of protests from US civil liberties groups, DARPA stressed that, whilst the initial test of mass, urban tracking will take place at a US army base within the United States (Fort Belvoir, Virginia), the deployment of CTS will only take place in 'foreign urban battlefields' (Defense Watch 2004).

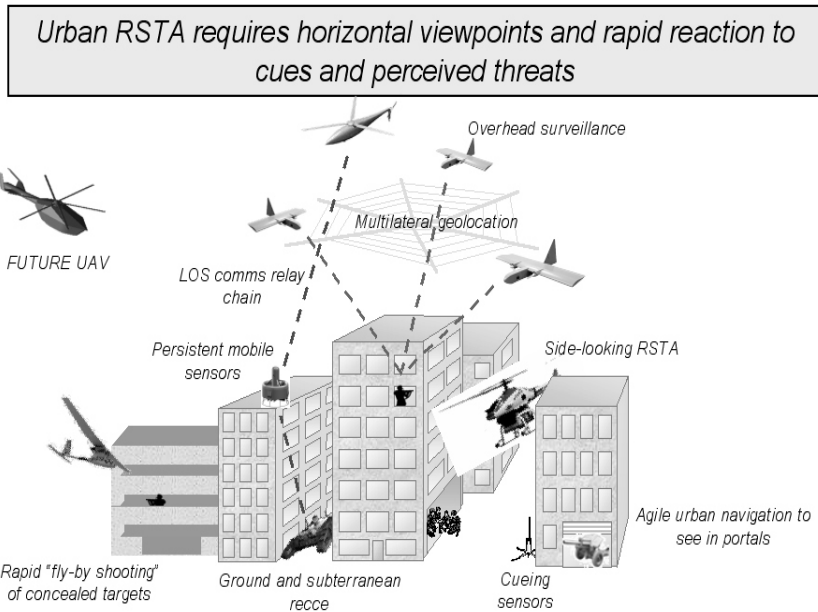


Figure 1 DARPA urban 'Reconnaissance, Surveillance and Target Acquisition' (RSTA) platforms as envisaged by its HURT Programme (DARPA 2004). (LOS = Line of Sight, RSTA = Reconnaissance, Surveillance and Target Assessment), UAV = Unmanned Aerial Vehicle)

Saturating occupied or target cities with microscale and even nanoscale sensors and cameras is also being investigated by the CTS programme and an associated programme labelled HURT (Heterogeneous Urban Reconnaissance, Surveillance and Target Acquisition Team). This programme centres on the development of a wide range of 'persistent' and unmanned surveillance and weapons platforms tailored to the demands of global south urban environments (Figure 1). DARPA's HURT and CTS programmes are, in turn, being backed up by major virtual simulations of wide-scale future urban wars in cities like Jakarta (an exercise known as 'Urban Resolve'). In these, future suites of surveillance systems, like those under development in HURT, are inputted into the simulations to assess their likely effectiveness.

Increasingly, the wide-scale automated CCTV systems being developed through CTS and HURT are being merged with the geospatial simulation systems discussed above. They provide simulations of global south cities which also include real-time surveillance of the tracks and locations of purported 'targets'. One system, for example, labelled 'video flashlight', uses software to 'paint' in simulations of the details of occupied cities based on data fed in by CTS-like CCTV systems and other radars and sensors. 3D virtual models of subject cities can thus be created, allowing viewers to 'fly' through them, exploring the real-time tracks of known or suspected 'targets'. 'Our goal is to get to where I can model a small town in six hours' reports Steve Hsu, an employee of RCA Labs who work on the project. 'Such speed is critical for jobs like rapidly installing video surveillance on an urban battlefield' (Perkins 2004:72).

'Persistent area dominance' towards robotic killing systems in urban warfare

This leads neatly to the second main area of defence research and development to help assert the dominance of US forces over global south cities: a shift towards robotic air and ground weapons. When linked to the persistent surveillance and target identification systems just discussed, these weapons will be deployed to continually and automatically destroy purported targets in potentially endless streams of state killing. Here, crucially, fantasies of military omniscience and omnipotence, which blur seamlessly into wider sci-fi and cyberpunk imaginations of future military technoscience, become indistinguishable from major US military research and development programmes. The fantasies of linking sentient, automated and omnipotent surveillance – which bring God-like levels of 'situational awareness' to US forces

attempting to control intrinsically devious global south megacities – to automated machines of killing, pervades the discourses of the urban turn in the RMA.

'We really *do* want an Orwellian future not in Manhattan, but in Kabul,' argue Huber and Mills (2001), two defence consultants who are leading advocates of the automation of counter-insurgency and urban operations as part of the 'war on terror'. To them, the United States' 'longer-term objective must be to infiltrate their homelands electronically, to the point where we can listen to and track anything that moves' (Huber and Mills 2001: 30). They predict that:

Terrorist wars will continue, in one form or another, for as long as we live ... We are destined to fight a never-ending succession of microscale battles, which will require us to spread military resources across vast expanses of empty land and penetrate deep into the shadows of lives lived at the margins of human existence. *Their* conscripts dwell in those expanses and shadows. Our soldiers don't, and can't for any extended period of time. What we have instead is microscale technology that is both smarter and more expendable than their fanatics, that is more easily concealed and more mobile, that requires no food and sleep, and that can endure even harsher conditions (Huber and Mills 2001: 29).

Huber and Mills go on to envisage a near-future scenario where target cities are so saturated by targeting sensors that US forces are then able to

project destructive power precisely, judiciously, and from a safe distance week after week, year after year, for as long as may be necessary ... it will end up as their sons against our silicon. Our silicon will win (Huber and Mills 2001: 31–4).

A second telling example comes from the discussion of a model near-future US 'urban operation', described by *Defense Watch* magazine during its discussions of DARPA's CTS programme (2004). In their scenario, swarms of microscale and nanoscale networked sensors pervade the target city, providing continuous streams of target information to arrays of automated weaponry. Together, these systems produce continuous killing and 'target' destruction: a kind of robotized counter-insurgency operation with US commanders and soldiers doing little but overseeing the cyborgalized, interlinked and increasingly automated killing systems from a safe distance.

Defense Watch (2004) thus fantasize about 'a battlefield in the near future' that is wired up with the systems that result from the CTS programme and its followers. Here, unbound technophilic fantasies of omnipotent urban control blur into longstanding dreams of cyborgized and robotized warfare. These often involve large dehumanizing racism and the demonization of whole cities through 'terrorist' labelling. 'Several large fans are stationed outside the city limits of an urban target that our [sic] guys need to take' (*Defense Watch* 2004), they begin:

upon appropriate signal, what appears like a dust cloud emanates from each fan. The cloud is blown into town where it quickly dissipates. After a few minutes of processing by laptop-size processors, a squadron of small, disposable aircraft ascends over the city. The little drones dive into selected areas determined by the initial analysis of data transmitted by the fan-propelled swarm. Where they disperse their nano-payloads (*Defense Watch* 2004).

'After this, the processors get even more busy', continues the scenario:

Within minutes the mobile tactical center have a detailed visual and audio picture of every street and building in the entire city. Every hostile [person] has been identified and located. From this point on, nobody in the city moves without the full and complete knowledge of the mobile tactical center. As blind spots are discovered, they can quickly be covered by additional dispersal of more nano-devices. Unmanned air and ground vehicles can now be vectored directly to selected targets to take them out, one by one. Those enemy combatants clever enough to evade actually being taken out by the unmanned units can then be captured or killed by human elements who are guided directly to their locations, with full and complete knowledge of their individual fortifications and defenses ... When the dust settles on competitive bidding for BAA 03-15 [the code number for the 'Combat Zones That See' programme], and after the first prototypes are delivered several years from now, our guys are in for a mind-boggling treat at the expense of the bad guys (*Defense Watch* 2004).

Such omnipotence fantasies extend even further to the automated surveillance, through brain scanning, of people's inner mental attitudes to any US invasion so that 'targets' deemed to be resistant can be automatically identified and destroyed:

Robotic systems push deeper into the urban area ... Behind the fighters, military police and intelligence personnel process the inhabitants, electronically reading their attitudes toward the intervention and cataloguing them into a database immediately recoverable by every fire team in the city (even individual weapons might be able to read personal signatures, firing immediately upon cueing ... Smart munitions track enemy systems and profiled individuals ... Satellites monitor the city for any air defense fires, curing immediate responses from near-space orbiting 'guns'. Drones track inhabitants who have been 'read' as potentially hostile and 'tagged' (Defense Watch 2004).

Disturbingly, such fantasies of continuous, automated and robotized urban targeting and killing are far from the realms of sci-fi fantasy. Rather, as with the CTS and HURT programmes, they are fuelling very real multimillion dollar research and weapons development programmes aimed at developing ground and aerial vehicles, which not only navigate and move robotically, but also select and destroy targets without 'humans in the loop' based on algorithmically driven 'decisions'.

Lawlor (2004), for example, discusses the development of 'autonomous mechanized combatant' air and ground vehicles or 'tactical autonomous combatants' for the US Air Force. These are being designed, he notes, to use 'pattern recognition' software for what he calls 'time-critical targeting', which links sensors very quickly to automated weapons so that fleeting 'targets' both within and outside cities can be continually destroyed. Such doctrine is widely termed 'compressing the kill chain' or 'sensor to shooter warfare' in US military parlance (Hebert 2003). The 'swarming of unmanned systems' project team at US forces JOINT Command Experimentation Directorate, based in Suffolk, Virginia, Lawlor (2004) states, are so advanced in such experimentation that 'autonomous, networked and integrated robots may be the norm rather than the exception by 2025' (Lawlor 2004: 2).

By that date, Lawlor predicts that 'technologies could be developed ... that would allow machines to sense a report of gunfire in an urban environment to within one meter, triangulating the position of the shooter and return fire within a fraction of a second' (Lawlor 2004: 2) This would provide a completely automated weapon system devoid of human involvement. He quotes Gordon Johnson, the 'Unmanned Effects' team leader for the US army's 'Project Alpha', as saying that such a system:

if it can get within one meter, it's killed the person who's firing. So, essentially, what we're saying is that anyone who would shoot at our forces would die. Before he can drop that weapon and run, he's probably already dead. Well now, these cowards in Baghdad would have to play with blood and guts every time they shoot at one of our folks. The costs of poker went up significantly ... The enemy, are they going to give up blood and guts to kill machines? I'm guessing not (Hebert 2003: 3).

Tellingly, Lawlor predicts that such robo-war systems will 'help save lives by taking humans out of harm's way' (Lawlor 2004: 2); here, tellingly, only US forces are considered to fall within the category of 'human'.

In addition, unmanned aerial vehicles armed with 'intelligent munitions' are already being designed (ACCEPT) that will eventually be programmed to fire on and kill 'targets' detected by US Forces' real-time surveillance grids, in a completely autonomous way. Such munitions will loiter over targets for days at a time, linked into the data links, until 'targets' are detected for destruction. A programme called TUDLS (Total Urban Dominance Layered System) for example, is currently underway to provide what Plenge describes as:

long hover and loiter propulsion systems, multidiscriminant sensors and seekers, mini- and micro-air vehicles, mini-lethal and non-lethal warheads, autonomous and man-in-the loop control algorithms, and a strong interface with the [urban] battlespace in formation network (Plenge 2004).

Plenge stresses further that the loitering munitions developed through the TUDLS programme will 'be capable of completing the entire kill chain ... with minimal human involvement'. They will be able to cooperate to maximize their autonomous destructive power or, where there are 'more stringent rules of engagement', through referring back each time they strike to human-in-the-loop ways on working when they are 'in close proximity to friendly forces' (Plenge 2004). In other words, Plenge envisages 'swarms' of autonomous, robotic weapons systems working completely autonomously through cooperative artificial intelligence and surveillance systems, unless it is deemed necessary to have human beings approve their targeting decisions.

Crucially, such munitions will be equipped with algorithms designed to separate 'targets' from 'non-targets' automatically. The ultimate goals, according to Pinney, an engineer at Raytheon, is a 'kill chain solution'

based on '1st look, 1st feed, 1st kill' where each armed unmanned vehicle continuously 'seeks out targets on its own' (Pinney 2003: 16). Tirpak, a US air force specialist, envisages that humans will be required to make the decisions to launch weapons at targets only 'until UCAVs (Unmanned Aerial Combat Vehicles) establish a track record of reliability in finding the right targets and employing weapons properly'. Then the 'machines will be trusted to do even that' (Tirpak 2001: 32).

The munitions that will be tasked with such algorithmic killing weapons are already under development. One, termed LOCAAS ('Low Cost Autonomous Attack Systems'), the United States Air Force has already committed to buy. This system loiters and searches over an area of 80 square miles, scanning the area and comparing signals received with 'stored target templates' using the 'advanced algorithms' of what is known as 'automated target recognition' (ATR) software (Marzolf 2004: 29). When the signature of a known target is detected, the missile homes in to destroy it. The software currently has 'difficulty in discriminating real targets from look-alike targets, especially in cluttered terrain' like cities (Marzolf 2004: 30). Whilst having a human being to approve each weapon's final attack would 'keep the question of accountability solidly answered at all times', Marzolf admits that the USAF has rejected this 'mainly to limit the munition's cost' (2004: 23).

Conclusions

The ultimate expression of sovereignty resides ... in the power and capacity to dictate who may live and who must die (Mbembe 2003: 11).

This chapter has sought to 'open up' the connections between military technoscience, the military problematization of global south cities, and the doctrines, discourses and fantasies that drive the elaboration of a globe-spanning and hegemonic US military presence in the post-Cold War period. With the bloody morass of the Iraqi insurgency continuing at the time of writing (July 2005), such intersections could hardly be more politically charged, or more pregnant with significance. This chapter has demonstrated very clearly that a large-scale military research and development programme is currently underway in the United States to, quite literally, 'urbanize' the 'revolution in military affairs'. Here the cutting-edge technoscientific efforts and priorities of the world's military hegemon are being shifted from an emphasis on globe-spanning control, networking and vertical targeting, treating

planet earth as some unitary, ageographical 'battlespace', to one aimed at bringing maximum control, surveillance and killing power to the detailed micro-geographies of global south cities.

Such dreams of omnipotence, of course, must be treated with caution. The US military, and its associated complex of research and development outfits, has, after all, long held fantasies of superweapons that would deterministically realize their dreams of mastery and omnipotence (Franklin 1988). As now, such technophilic dreams of mastery have usually evolved closely with the wider discourses of speculative fiction and popular geopolitical domains and entertainment industries (Gannon 2003). The 'technological fanaticism' of both has deep roots within US political, popular and military culture (Sherry 1987). Certainly, future research into the central role of surveillance within the RMA needs to do much more to theorize and address the ways in which popular cultural discourses and fantasies of future war cross-fertilize with military fantasies and real research and development programmes in agencies like DARPA (see Gannon 2003).

We must also remember that the 'US military' is far from being some single, unitary actor. All of the discourses, projects and programmes analysed in this chapter remain extremely contested. Within the vast institutional complex that together constitutes the 'US military', major political battles are underway – fuelled by the ongoing nightmare in Iraq – over the degree to which technophilic fantasies of omnipotence, through some urbanized 'RMA' or 'network-centric warfare', are realistic, even in military terms.

Many in the US army, for example, are deeply sceptical that the horrors and 'fog of war' in bloody 'urban operations' like the Iraqi insurgency, can ever really be technologized, mediated, and saturated with sentient surveillance and targeting systems, to anything like the degree that is common in the discursive imaginings driving the programmes discussed above (see for example, Price 2001). The relatively high casualty rates of US forces – forced to come down from 40,000 ft, or withdraw from ceramic armour, to attempt to control and 'pacify' violent insurgencies within sprawling Iraqi cities – are a testament to the dangerous wishful thinking that pervades all military fantasies of 'clean', 'automated' or 'cyborgized' urban 'battlespace' (Graham 2004b). It should also be remembered that, in Iraq, even rudimentary high-tech devices have routinely failed due to technical malfunctions or extreme operating conditions (Hills 2004).

Such caveats about the inevitable gulf between fantasies and reality should not, then, distract from the stark messages that emerge from this chapter. Whilst the urbanized RMA is, of course, being driven by

often wild and fantastical discourses, its effects will be very material and profound. Massive technoscientific efforts to saturate global south cities with real-time surveillance, targeting and killing systems are undoubtedly underway as the latest military-industrial research drive focuses on using new algorithmic surveillance capabilities to try to overcome the ways in which the micro-geographies of global south cities interrupt wider fantasies of US military omnipotence.

Whether such systems will ever function as imagined even in military terms is, then, beside the point. For, as the death of 100,000 Iraqi civilians within the first 21 months of the US–UK invasion testifies (Roberts *et al.* 2004), the very existence of an imperial project of launching the world's military hegemon's high-tech killing systems into global south cities will inevitably lead to mass civilian deaths. This seems especially so as the new algorithmic systems emerging are the actual agents of continuous, autonomous killing as 'kill chains' are 'compressed', 'sensors' are linked automatically to 'shooters', and the fantasies of 'persistent area dominance' achieve full expression through the favourable context of President Bush's huge increases in defence spending and ideologies of pre-emptive war. To put it mildly, dreams of clinically identifying and surgically killing only 'fighters' within sprawling megacities, through the agency of autonomous computer algorithms, are dangerously deluded. The results of such systems, inevitably, would be large numbers of civilians killed and injured with the added and deeply troubling development of software agency as the ultimate 'intelligence', manufacturing such carnage and automatically stipulating who should die and who should live.

The gravity of the developments reported means that a major challenge for both theorists of surveillance, and the wider bodies of critical social and political researchers and activists, is to incorporate the intersections of urbanization, a US-dominated neoliberal Empire (Hardt and Negri 2004), and military technoscience as a critical domain within their work. It is no longer adequate, for example, to solely consider the proliferation of algorithmic techniques, and the shift to ubiquitous surveillance, within the 'civil' domains of cities – as the surveillance literature has overwhelmingly tended to do so far. Nor is it adequate to consider transnational, military surveillance, simulation, and the convergence of what Der Derian (2001) has called the 'military-industrial-entertainment network', in isolation from the military problematization of global south urbanization, the purported effects of 'urbanizing terrain' on digital military systems of surveillance, targeting and killing, and the urban turn in the RMA reported here (see for example, Der Derian 1990). If this chapter makes one thing

clear it is this: the intricate and intensifying connections between micro-geographies of control and power on urban streets, and wider geopolitical, military and political economic strategies backed up by technoscientific research must be centrally addressed by all future theorists of urban, social and military surveillance.

An example of such research challenges comes from the deepening intersections between 'algorithmic' and digitized CCTV on city streets and the products of the urbanized RMA. Such cross-overs are especially important given the growing privatization of Western militaries, law enforcement and security industries, and the efforts by a small number of military-security 'prison industrial complex' conglomerates to colonize both 'homeland' and 'war zone battlespaces' equally. As the barriers separating the technoscience of 'civil' law enforcement and military urban operations are progressively dismantled, so the algorithmic surveillance systems embedded into the urbanizing zones of pre-emptive, continuous war will increasingly resemble those in the increasingly securitized cities policed by national security states (and associated private military corporations). Here we confront the latest stage in a long history where disciplinary devices are developed to assert control and dominance for colonizing powers within colonized cities being later transmuted back into 'homeland' cities by military and political elites. With the sorts of wide-area, algorithmic urban surveillance system being developed by DARPA and their like, so similar to systems envisaged as part of the 'homeland security' drive to securitize cities in the capitalist heartlands of the global north, these cross-overs are already rapidly strengthening further.

As an initial exposé of the close links between the problematization and demonization of global south urban areas within US military rhetoric, and the efforts to customize surveillance, targeting and killing systems of the RMA to sustain 'persistent dominance' of such cities, this chapter inevitably raises as many questions as it answers. What implications, for example, does the urban 'turn' in the RMA have for theorizations and analyses of globalization, the geopolitics of neoliberal 'Empire', the nature of the colonial present (Gregory 2004), the intensifying nexus between military technologies and entertainment and simulation industries, and the scope for nurturing progressive alternatives to aggressive US hegemony? What are the links between longstanding popular fantasies and imaginations of cyborg war (Gannon 2003) and the emerging automated killing systems discussed in this chapter? What are the implications of such emerging military systems and doctrines for analyses of global south urbanization and the geopolitics of the Middle East? How might systems for continuous,

low-level and automated killing alter the nature of warfare, state terrorism and organized political violence and what are the implications of algorithmic state killing for the laws of war and notions of state criminality and illegality? How might they impact on imagined and real separations between securitized 'homelands' and the 'frontier zones' subjected to pre-emptive and increasingly continuous 'wars on terror' by US strategy? Finally, how can discussions of 'persistent area dominance' best be incorporated into wider debates and activism surrounding the broader challenges thrown down by ubiquitous ICTs, global mobilities, pervasive tracking, sentient environments, the changing links between corporeality, technology and urbanity, and the growing importance of systems of algorithmic surveillance which fuse seamlessly into electronic simulations (Bogard 2006; Graham 1998)?

Addressing such questions entails profound interdisciplinary challenges. It demands that urban social scientists work closely with critical theorists of international relations and state power and violence. It lays down an imperative for multi-scale engagement to track the telescoping dynamics of the military technoscience being unleashed and imagined. It raises questions about the nature of sovereignty, or urban space, of globalization, and of the technoscientific underpinnings to contemporary colonial power (and responses to it). And it necessitates specialists of the social construction of technoscientific and military systems engaging closely with political and urban theorists so as to address the role of imagined geographies, and military surveillant simulations, in constituting and reshaping US Empire in particular, and the political economies and geographies of post-Cold War globalization more generally.

Theorists of surveillance will also need to be mindful that these processes are being further fuelled by proliferating cultures of fear, and the widespread demonization of Arab and global south urbanites and urban places, generated and perpetuated by both 'war on terror' discourses and the Orientalized products of Western entertainment industries (novels, video games, films) (Graham 2004a,b). In these, Islamic and global south cities are often discursively constructed as little more than receiving points for US military technoscience and ordnance, as intrinsically 'terroristic' or 'nest'-like spaces which must be unveiled, controlled and 'pacified' through the colonial technoscience and digitized surveillance and targeting technologies that produced by the urbanized RMA (Graham 2004b).

The final challenge – drawing on theorists as diverse as Foucault (1977), Agamben (1998), Deleuze and Guattari (1987), Gregory (2004)

and Said (1978) – is to expose in detail the ways in which urbanized RMA weapons programmes – and the discourses which fuel them – embed stark biopolitical judgements about the varying worth of human subjects, according to their location, beneath the intensifying, transnational gaze of militarized surveillance. Such a theme must be at the very core of any future re-theorizations of the links between corporeal, urban and transnational power in what Derek Gregory has called our ‘colonial present’ (2004).

Here, attention should fall in particular on the ways in which biopolitical stipulations of the worth – or lack of worth – of human subjects are, quite literally, cast into the software code that operates increasingly automated and multi-scale surveillance, targeting and killing systems. Thus, the new technoscience of the urbanized RMA concentrates on distinguishing ‘normal’ urban space-times and ecologies in the global north, so that the apparatus of an increasingly militarized police state can be used to discipline those deemed ‘abnormal’.

By contrast, those deemed to be ‘abnormal’ within surveilled and simulated urban space-times and ecologies in global south cities will, as examples of what Agamben (1998) has called ‘bare life’, be exposed to increasingly autonomous surveillance systems designed to sustain continuous, automated and cyborganized state killing. Here, the very technological architectures of such systems inscribe the cast-out bare life of global south urbanites, whose bodies can pile up unnoticed and without political fallout under the rubric of ‘collateral damage’, and who can be exposed to automated and cyborganized killing systems without hope of legal or ethical protection.

Crucially, of course, these stark biopolitical realities are endlessly veiled beneath the layers of technological fetishism and dominant political, military, technoscientific and popular-geopolitical discourses. Together, the infinite lexicon of military ‘geekspeak’ acronyms and euphemisms work to veil even the very humanity of ‘target’ people and places, whilst glorifying the cyborganized ‘warriors’ who are piecing together these ‘persistent area dominance’ systems (Davis 2002). The task, then, is to launch a powerful effort to assert the essential humanity of global south cities, and to so undermine the dehumanizing rhetoric of the urbanized RMA, in which cities become mere physical objects and people mere ‘targets’ to be annihilated through automated weapons systems brought in to animation by the deepest omnipotence fantasies of the United States military.

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References

- Ackerman, R.K. (2002) 'Persistent Surveillance Comes into View', *Signal Magazine*, May. Available at: <http://www.afcea.org/signal/articles/annviewer.asp?a=97> (accessed February 2005).
- Agamben, G. (1998) *Homo Sacer: Sovereign Power and Bare Life* (Stanford, CA: Stanford University Press).
- Arquilla, J. and Ronfeldt, D. (eds) (2001) *Networks and Netwars* (Santa Monica, CA: RAND).
- Bishop, R and Clancey, G. (2004) 'The City-as-Target, or Perpetuation and Death', in S. Graham (ed.) *Cities, War and Terrorism: Towards an Urban Geopolitics* (Oxford: Blackwell), 74–94.
- Blackmore, T. (2005) *War X: Human Extensions in Battlespace* (Toronto: University of Toronto Press).
- Bogard, W. (2006) 'Surveillance Assemblages and Lines of Flight', in D. Lyon (ed.) *Theorizing Surveillance: The Panopticon and Beyond* (Cullompton, UK: Willan), Chapter page #s needed
- Cohen, E. (2004) 'Change and Transformation in Military Affairs', *Journal of Strategic Studies*, 27 (3), 395–407.
- Davis, M. (2004) 'The Pentagon as Global Slum Lord', *TomDispatch* (19 April 2004). Available at: <http://www.tomdispatch.com/> (accessed 10 June 2005).
- Davis, M. (2003) 'Shock and Awe', *Socialist Review*. Available at: <http://www.socialistreview.org.uk/article.php?articlenumber=8352> (accessed February 2005).
- Defense Advanced Research Projects Agency DARPA (2003) *Combat Zones That See Program: Proper Information*. Available at: <http://www.darpa.mil/baa/baa03-15.htm> (accessed February 2005)
- Defense Advanced Research Projects Agency DARPA (2004) *HURT – Heterogeneous Urban RSTA Team, Briefing to Industry* (Washington: Defense Advanced Research Projects Agency).
- Defense Intelligence Reference Document [DIRC] (1997) *The Urban Century: Developing World Urban Trends and Possible Factors Affecting Military Operations*, (Quantico, VA: Marine Corps Intelligence Agency).
- Defense Watch (2004) 'Combat Zones That "See" Everything'. Available at: <http://www.argee.net/DefenseWatch/Combat%20Zones%20that%20See%20Everything.html>. (accessed March 2005)
- De Landa, M. (1991) *War in the Age of Intelligent Machines* (New York: Zone).
- Deleuze, G. and Guattari, F. (1987) *A Thousand Plateaus* (Minneapolis: University of Minnesota Press).
- Der Derian, J. (1990) 'The (S) pace of International Relations: Simulation, Surveillance, and Speed', *International Studies Quarterly*, 34, 295–310.
- Der Derian, J. (2001) *Virtuous War: Mapping the Military-Industrial-Media-Entertainment Complex* (Boulder, CO: Westview).
- Dickson, K. (2002) *The War on Terror: Cities as the Strategic High Ground* (Mimeo).

- Duffield, M. (2002) 'War as a Network Enterprise: The New Security Terrain and its Implications', *Cultural Values*, 6, 153–65.
- Foucault (1977), *Discipline and Punish* (New York: Pantheon).
- Franklin, H. B. (1988) *War Stars: The Superweapon and the American Imagination* (Oxford: Oxford University Press).
- Gannon, C. (2003) *Rumours of War and Infernal Machines: Technomilitary Agenda Setting in American and British Speculative Fiction* (Liverpool: Liverpool University Press).
- Graham, S. (1998) 'Spaces of Surveillant-Simulation: New Technologies, Digital Representations, and Material Geographies', *Environment and Planning D: Society and Space*, 16, 483–504.
- Graham, S. (2003) 'Lessons in Urbicide', *New Left Review*, 19, January/February, 63–78.
- Graham, S. (ed.) (2004a) *Cities, War and Terrorism: Towards an Urban Geopolitics* (Oxford: Blackwell).
- Graham, S. (2004b) 'Vertical Geopolitics: Baghdad and After', *Antipode*, 36 (1), 12–19.
- Gray, C. (2003) 'Posthuman Soldiers and Postmodern War', *Body and Society*, 9 (4), 215–26.
- Gray, C. (1997) *Postmodern War: The New Politics of Conflict* (London: Routledge).
- Gregory, D. (2004) *The Colonial Present* (Oxford: Blackwell).
- Grubbs, L. (2003) *In Search of a Joint Urban Operational Concept* (Fort Leavenworth, KS: Army Command and General Staff College, School of Advanced Military Studies).
- Hardt, M. and Negri, A. (2004) *Multitude: War and Democracy in the Age of Empire* (London: Hamish Hamilton).
- Hebert, A. (2003) 'Compressing the Kill Chain', *Air Force Magazine*, March, 34–42.
- Hills, A. (2004) *Future Wars in Cities* (London: Frank Cass).
- Houlgate K. (2004) 'Urban Warfare Transforms the Corps', *Naval Institute Proceedings*, November. Available at: http://www.military.com/NewContent/0,13190,NI_1104_Urban-P1,00.html (accessed February 2005).
- Huber, P. and Mills, M. (2002) 'How Technology Will Defeat Terrorism', *City Journal*, 12, 24–34.
- Lawlor M. (2003) 'Robotic Concepts Take Shape', *Signal Magazine*. Available at: <http://www.afcea.org/signal/articles/anmviewer.asp?a=64> (accessed February 2005).
- Marzolf, G. (2004) *Time-Critical Targeting: Predictive Versus Reactionary Methods: An Analysis for the Future* (Maxwell Air Base, AL: Air University Press).
- Mbembe, A. (2003) 'Necropolitics', *Public Culture*, 15 (1), 11–40.
- Perkins, B. (2004) 'Seamless Surveillance', *Technology Review*, February, 71–4.
- Peters, R. (1996) 'Our Soldiers, Their Cities', *Parameters*, Spring, 1–7.
- Pieterse, J. (2004) 'Neoliberal Empire', *Theory, Culture and Society*, 21 (3), 118–40.

- Pinney, C. (2003) 'UAV Weaponization: The Next 100 Years', seminar at International Air and Space Symposium, 14–17 July 2003, Dayton, OH. Available at http://www.raytheon.com/feature/stellent/groups/public/documents/legacy_site/ms01_042879.pdf
- Plenge, B. (2004) 'Area Dominance: Area Dominance with Air-Delivered Loitering Munitions Aids the Warfighter', *AFLR Briefs*. Available at: www.afrlhorizons.com/Briefs/Apr04/MN0308.html.
- Price, D. (2001) *Technology in Transformation: Critical Strength or Critical Vulnerability?* (Newport, RI: Naval War College). Available at: <http://handle.dtic.mil/100.2/ADA393536>.
- Roberts, L., Lafta, R., Garfield, R., Khudhairi, J. and Burnham, G. (2004) 'Mortality Before and After the 2003 Invasion of Iraq: Cluster Sample Survey', *The Lancet*, 364 (9448), 1857–64.
- Said, E. (1978) *Orientalism* (London: Routledge and Keegan Paul).
- Sherry, M. (1987) *The Rise of American Air Power: The Creation of Armageddon* (New Haven, CT: Yale University Press).
- Sniffen, M. (2003) 'Pentagon Project Could Keep a Close Eye on Cities', *Philadelphia Inquirer*, Wednesday 2 July 2003, A02.
- Stone, J. (2004) 'Politics, Technology and the Revolution in Military Affairs', *Journal of Strategic Studies*, 27 (3), 408–27.
- Tirpak, J. (2001) 'Send in the UCAVs', *Air Force Magazine*, August, 31–3.
- Toepfer, E., Wood, D. and Graham, S. (2005) 'Surveillance and Violent Conflict', *Surveillance and Society*, 3:2/3. Available at: <http://www.surveillance-and-society.org/call.htm#vio>.
- Virilo, P. (1998) *Open Sky* (London: Verso).
- Wark, M. (2002) 'To the Vector the Spoils', in T.Y. Levin, U. Frohne and P. Weibel (eds) *CTRL [Space]: Rhetorics of Surveillance from Bentham to Big Brother* (Cambridge, MA and London: MIT Press), 396–401.