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**ROBO-WAR™ DREAMS:
GLOBAL SOUTH URBANISATION AND
THE US MILITARY'S 'REVOLUTION IN
MILITARY AFFAIRS'**

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WORKING PAPERS

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Abstract

This article seeks to open up to critical scrutiny the attempts currently being made to re-engineer post-Cold War US military power to directly confront global south urbanisation. Through analysing the discourses produced by US military commentators about 'urban warfare,' and the purported military and technological solutions that might allow US forces to dominate and control global south cities in the future, the paper demonstrates that such environments are being widely essentialised as spaces that necessarily work to undermine the United States' military's high-technology systems for surveillance, reconnaissance and targeting. The paper shows how, amid the on-going urban insurgency in Iraq, widescale efforts are being made to 'urbanise' these military systems so that US military forces can attempt to assert high-tech dominance over the fine-grained geographies of global south cities in the future. This includes an examination of how US and Israeli forces, by 2007, had already begun to implement ideas of robotised or automated urban warfare to counter the complex insurgencies in Iraq and Palestine/Israel, respectively.

Introduction

“War has entered the city again – the sphere of the everyday” (Misselwitz and Weizman, 2003, 272).

Cities, warfare and organised political violence have always been mutual constructions. "The city, the polis, is constitutive of the form of conflict called *war*, just as war is itself constitutive of the political form called the *city*" (Virilio 2002: 5, original emphasis). War and the city have intimately shaped each other throughout urban and military history. “There is [...] a direct reciprocity between war and cities”, writes the geographer Ken Hewitt. “The latter are the more thoroughgoing constructs of collective life, containing the definitive human places. War is the most thorough-going or consciously prosecuted occasion of collective violence that destroys places” (Hewitt 1983: 258).

The “Implosion of Global and National Politics into the Urban World”

In the ‘new’ wars of the post Cold War - which increasingly straddle the ‘technology gaps’ separating advanced industrial nations from informal fighters – cities, once again, are emerging as the key sites. Indeed, urban areas are now the ‘lightning conductors’ for the world’s political violence. Warfare, like everything else, is being urbanised. The great geopolitical contests of cultural or religious change, ethnic conflict and diasporic social mixing; of economic re-regulation and liberalisation; of militarisation, informatisation, resource exploitation, and ecological change are, to a growing extent, boiling down to often violent conflicts in the key strategic sites of our age: contemporary cities (Sassen 2002).

The world’s geopolitical struggles increasingly articulate around violent conflicts over very local, urban, strategic sites (Scheper-Hughes and Bourgois 2003; Sassen 2002). The last two decades have seen a geopolitical and strategic reshaping of our world based heavily on a proliferation of organised, extremely violent acts against cities, those who live in them, and the support systems that make them work.

The events of September 11th, 2001 are, of course, the most well-known and extensively reported case (see Calhoun et al 2002; Booth and Dunne 2002). But there are many, many others. Catastrophic urban terrorist attacks – fuelled by religious or political radicalism, anti-modernism, or resistance to brutal occupation, repression, or perceived biases of globalisation - have also targeted urban sites in Kitay (Bali), Moscow, Bombay and Karachi; London and Madrid; Jakarta, Casablanca, Delhi and Islamabad; and Riyadh, Mombassa, Kabul, Istanbul and Nairobi.

Since 9/11, George Bush’s ‘war on terror’ – a purported response to those attacks – has inflicted massive onslaughts by US and British forces on Basra, Baghdad, Kandahar, Kabul and surrounding areas. In the case of Iraq, this happened despite not a shred of evidence emerging to link Saddam Hussein’s regime to Al-Qaeda. Far from being routes to simple ‘regime change’ and peaceful reconstruction, however, these attacks have been followed by complex, uneven, guerrilla-style resistance campaigns against occupying ground forces. In these, the fact that occupiers have to move down from GPS targeting from 40,000 ft, or out from behind armoured plate, to occupy urban sites, means that they have become immensely more vulnerable to political opponents and bitter local civilians alike.

With a slightly longer time frame we should not forget, either, the levelling of Grozny by the Russians in 1996; the sieges of Sarajevo and Mostar in the Balkan wars of the early 1990s; the LA riots of 1992; the United States’ bloody incursion into Mogadishu in 1993; the

continuing suicide bombings in Israeli bars, buses and malls; Israel's bulldozing of Jenin and Nablus in Spring 2002, and their continuing policies of strangulation, immiseration and demolition against Palestinian cities; or the resource or drug-fuelled guerrilla wars in Freetown, Bogotá or Monrovia.

Finally, we must also not ignore the increasingly violent temporary urban sieges that now regularly occur around the planet (Warren 2004; Cockburn and St Clair 2000; Thomas 2003; Negri 2003). In these, anti-globalisation or anti-state movements 'swarm' together around the fortified urban summits of the IMF, the G8, and the WTO, to protest against the inequities of neoliberal globalisation. In post-modern, high-tech replays of medieval sieges, temporary walls, battlements, and massive armed force work - often with extreme violence - to try and separate the 'inside' from the 'outside' on the other side of the street. This happens even though both sets of protagonists are global organisations temporarily settled in local space for ritualised, bloody combat.

In such a context, anthropologist Arjun Appadurai has noted what he calls an "implosion of global and national politics into the urban world" (Appadurai 1996: 152). 'New' urban wars, he argues, "take their energy from macro events and processes [...] that link global politics to the micro politics of streets and neighbourhoods" (Appadurai 1996: 152-153). To Appadurai, these new urban wars thus represent little less than:

"a new phase in the life of cities, where the concentration of ethnic populations, the availability of heavy weaponry, and the crowded conditions of civic life create futurist forms of warfare [...] and where a general desolation of the national and global landscape has transposed many bizarre racial, religious, and linguistic enmities into scenarios of unrelieved urban terror" (ibid.)

Global South Urbanisation as a Challenge to Western Military Doctrine

Fuelled by these transformations, Western military theorists and researchers are increasingly preoccupied with how the geographies of global south cities, and processes of global south urbanisation, are beginning to influence both the geopolitics and the techno-science of post Cold-war political violence. Indeed, almost unnoticed within 'civil' urban geography and social science, a large 'shadow' system of military urban research is quickly being established. Funded by Western military research budgets, this is quickly elaborating how the effects of rapid urbanisation are allegedly already becoming manifest, and how the global intensification of these processes will deepen them in the future (Graham, 2004a). As Keith Dickson, a US military theorist of urban warfare puts it, the increasing perception within Western militaries is that:

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 2002a: 10)

Motivated by the growing realisation that the scale and significance of contemporary processes of urbanisation across the world might significantly reshape the geopolitics, doctrine and realities of post Cold War Western military strategy, such research fuels a crucial set of techno-military discourses. Within and through these, attempts are currently being made to reconstitute the structure, orientation and techno-science of western military power to directly reflect the alleged implications of such urbanisation.

The central consensus amongst the wide variety of western military theorists pushing for such shifts is that “modern urban combat operations will become one of the primary challenges of the 21st century” (DIRC 1997: 11). Major Kelly Houlgate (2004), a US Marine Corps commentator, notes already that “of 26 conflicts fought [by US forces]” between 1984 and 2004, “21 have involved urban areas, and 10 have been exclusively urban”.

The widening adoption of ‘urban warfare’ doctrine follows centuries when Western military planners preached Sun Tzu’s mantra from 1500 BC that the “worst policy is to attack cities”. It follows a post World War II Cold War period marked by an obsession with mass, superpower-led ‘Air-Land’ engagements centred on the North European plain within and above the spaces between *bypassed* European city-regions. Whilst numerous wars were fought by western forces in developing world cities during the Cold war, as part of wider struggles against independence and terrorist movements and the ‘hot’ proxy wars, such conflicts were very much seen by western military theorists as unusual side-shows to the imagined superpower ‘Air-Land’ and nuclear engagements (Davis 2004a). Consequently, the doctrine of ‘urban warfare,’ already marginal, received very little attention during the Cold War and became even more marginalised within Western military rhetoric (Hills 2004). On the rare occasions when urban warfare was specifically addressed in Cold War military doctrine, United States’ forces, in the euphemistic language so typical of military forces, tended to “approach the urban area by rubbleing or isolating the city” using tactics unchanged since World War II (Grubbs 2003: iii). That is, they either ignored, or sought to systematically annihilate, urban places (as at Hue during the Vietnam war).

In the place of this neglect by western military doctrine of the specific challenges of counter-insurgency warfare within cities, a highly contested, diverse and complex set of institutional and techno-scientific battles are now emerging through which attempts are being made to try and re-imagine and reshape Western military forces so that counterinsurgency operations within large urban areas become their *de facto* operations (Hills 2004). Prevailing conceptions of Western military engagement are thus being widely challenged to address the perceived perils of engaging in ‘military operations on urban terrain’ (or ‘MOUT’).

As the world’s pre-eminent military power, the military forces of the United States provide the most interesting and important example of how discursive constructions of ‘urban terrain’ are being used to justify attempts at the ‘transformation’ of the technologies, tactics and strategies of national military intervention more broadly (see Ek 2000). US military research on ‘urban operations’ dwarfs that of all other nations combined (Hills 2004). The bloody experience of the Iraq urban insurgency is already looming large in these debates. A major review of the imperative of urban warfare ‘doctrine’ for US forces, prepared by Major Lee Grubbs in 2003, for example, stated baldly that “as the Iraq plan evolves, it is clear that the enemies of the United States military have learned a method to mitigate the Joint [US] Force’s dominance in long range surveillance and engagement. The enemy will seek the city and the advantages of mixing with non-combatants” (2003: 56).

The Aim and Structure of the Current Paper

One particularly important feature of US military discourses on urbanisation looms large in such debates. This is the way 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, targeting and killing through ‘precise’ air and space-based weapons systems (Graham 2003; Davis 2004b).

In such a context, this article seeks to analyse critically the ways in which processes of urbanisation are currently being imagined by US military theorists to significantly undermine the military and techno-scientific dominance of the US military in a rapidly urbanising world. The article is motivated by the argument that the processes through which US military planners imagine, and discursively construct, global south cities as their predominant 'battlespace' for the early 21st century, demands critical social scientific scrutiny. The article falls in to three parts. In the first, discursive problematisation of global south cities produced by US military urban researchers and commentators are reviewed. Emphasis is placed on how developing world cities are depicted as intrinsically labyrinthine, chaotic, structureless and deceptive environments which substantially frustrate the wider US geopolitical strategy based on the US military's advantages in air and space-based surveillance, digital processing, and 'network-centric' warfare – transformations that, together, are sometimes labelled the 'Revolution in Military affairs' or 'RMA' (Gregory 2004).

The second part of the paper goes on to analyse the way in which key actors within the US military-industrial complex are suggesting deeply technophilic 'solutions' to this purported erosion of US geo-strategic power through global south urbanisation. Here what I call the 'urban turn' of the of the RMA – the shift in deeply technophilic discourses from discussions of planet-straddling weapons systems to technological innovations designed to allow the micro-spaces of developing world 'megacities' to be controlled - is analysed in detail. Centred on the concept of 'persistent area dominance' within the so-called 'Long War', such strategies entail the saturation of 'adversary' cities with large numbers of miniature surveillance and targeting systems. These are being designed to support continuous targeting, and destruction, of detected 'targets'. An examination follows of how US and Israeli forces, by 2007, had already begun to implement ideas of robotised or automated urban warfare to counter the complex insurgencies in Iraq and Palestine/Israel, respectively. The final part of the paper draws brief theoretical and research conclusions of the preceding discussions.

Dreams Frustrated? Urbanisation and the 'Revolution in Military Affairs' (RMA)

Urban operations represent a black hole in the current Revolution in Military Affairs pantheon of technological advantage [...]. The technologies traditionally ascribed to the current Revolution in Military Affairs phenomenon will have negligible impact on Military Operations in Urban Terrain. (Harris 2003: 38-41)

The military strategies to project, sustain and deepen US geopolitical power in the post Cold war period (see Roberts et al 2003; Kirsch 2003; Barnett 2004) rest on the exploitation of a 'transformation' of US military power through what has been termed a 'Revolution in Military Affairs' (see Ek 2000, Pieterse 2004). Centring on the technologies of 'stealth,' 'precision' targeting, and satellite geo-positioning, 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 U.S. military technologies, RMA theorists argue that a truly 'network-centric warfare' is now possible through which US forces can continually dominate societies deemed to be their adversaries through 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; Graham 2005). Thus, RMA theorists imagine US military operations to be a giant, integrated, ‘network enterprise’ – a ‘just-in-time’ system of posthuman, cyborgised warriors that utilises many of the principles of logistics chain management and new-technology based tracking that are so dominant within contemporary management models (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 *uninterruptedly*. 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 that, intrinsically, would usher in US military ‘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 paper, little account was 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 urbanisation and globalisation). 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).

In response to this neglect of global urbanisation within RMA discourses, and spurred on by the catastrophic and ongoing urban insurgency since the US-UK invasion of Iraq in 2003, an increasingly powerful range of counter-discourses have emerged within the US military. Through these a second group of US military theorists have asserted that the technophilic dreams of RMA will either fail, or be substantially undermined, by global processes of urbanisation, especially in the global south cities where they imagine US forces being most often engaged. The pronouncements of those advocating an ‘urban turn’ in the RMA have had two main features.

Signal Failures: Urban Environments as Physical Interrupters to ‘Network-Centric Warfare’

“In simple terms walls tend to get in the way of today’s battlefield communications and sensor technologies” (Hewish and Pengelley 2001)

The first major feature these pronouncements been the strong suggestion 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 organised and poorly equipped adversaries (Gregory 2004; Graham 2004b). The complex and congested terrain below, within, and above cities is seen here as a set of physical spaces that limit the effectiveness of high-tech space-targeted bombs, surveillance systems, and automated, ‘network-centric’ and ‘precision’ weapons. The U.S. 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, and propagation problems that severely undermine the principles and technologies of ‘network-centric warfare’.” (DIRC 1997)

The architects Misselwitz and Weizman are amongst the very small number of critical urban researchers who have addressed the ways in which urbanisation undermines the technologies produced by the RMA. They conclude that within contemporary cities:

high-tech military equipment is easily incapacitated. Buildings mask targets and create urban canyons, which diminish the capabilities of the air force. It is hard to see into the urban battlespace; it is very difficult to communicate in it, because radio waves are often disturbed. It is hard to use precision weapons because it is difficult to obtain accurate GPS satellite locations. And it becomes more and more difficult (but not impossible) for the military to shoot indiscriminately into the city. For all these reasons, cities continue to reduce the advantages of a technologically superior force. (Misselwitz and Weizman 2003: 8)

The ‘urbanisation of battlespace’ is therefore seen by US urban warfare commentators to reduce the ability of U.S. forces to fight and kill at a distance (always the preferred way because of their ‘casualty dread’ and technological supremacy). Cities are therefore seen to produce rapidly escalated risks for US forces fighting pre-emptive, expeditionary wars. “From refugee flows to dense urban geography, cities create environments that increase uncertainty exponentially” (DIRC 1997). Military operations in cities are therefore seen as treacherous Trojan horse-style events, which might allow weak and poorly equipped insurgents to gain victory over the world’s remaining military superpower (Glenn et al 2001).

The ‘Urbanisation of Insurgency’: Global South Cities as Refuges From US Vertical Power

Opposition forces will camouflage themselves in the background noise of the urban environment. Within the urban environment, it is not the weapon itself rather the city which maximises or mutes an arm’s effectiveness. (DIRC 1997: 11)

A second main feature of US urban warfare discourses is that the breaking down of high technology sensors and weapons, because of the physical morphology of cities, will directly and causally lead to an increasing tendency amongst the United States’ political adversaries to take refuge within cities. “The long term trend in open-area combat”, writes the leading US ‘urban warfare’ commentator, Ralph Peters (1996: 6), “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.”

As a result, Peters argues that the United States’ “enemies will be forced into cities and other complex terrain, such as industrial developments and inter-city sprawl” (1997: 4). Grau and Kipp, (1999), concur, suggesting that:

“urban combat is increasingly likely, since high-precision weapons threaten operational and tactical manoeuvre in open terrain. Commanders who lack sufficient high-precision weapons will find cities appealing terrain [...], provided they know the city better than their opponent does and can mobilize the city’s resources and population to their purposes.” (Grau and Kipp 1999: 4)

Central to this perception of the incentives underlying what RAND theorists, Taw and Hoffman (2000), have termed the ‘urbanisation of insurgency,’ is the notion that insurgents

exploiting the physical geographies of global south cities can force US military personnel to come into very close physical proximity and so expose US politicians to much higher casualty rates than stipulated within RMA doctrine. DIRC argue that:

The weapons [such insurgents] use may be 30 to 40 years old or built from hardware supplies, but at close range many of their inefficiencies are negated. The most effective weapon only needs to exploit the vulnerabilities that the urban environment creates. Each new city will create a different pool of resources and thereby create different urban threats. (DIRC 1997: 8)

Here, the obvious limits of attempting to understand the complex geographies of cities through the verticalised surveillance systems emphasised by the RMA are a major bone of contention amongst those promulgating the counter discourses emphasising the urbanisation of insurgency. A common tendency here is to naturalise and essentialise the complex physical and social geographies of global south cities as 'jungle'-like environments, in which small insurgent groups gain political and financial support from the wider population, that necessitate new techniques to ensure the 'cleansing' of the city (Glenn 2001). As is very common in US military and political literature on the threats of future urban insurgencies (see Norton 2003), the DIRC report emphasises that informal and *favela* districts in global south cities add great power to the strategies of insurgent and criminal groups utilising the classic techniques of guerrilla and 'asymmetric' warfare against potential US or western incursion. It argues that:

the shanty sprawl of the developing city frequently allows insurgents to adapt their rural strategy more effectively to an urban environment. Asymmetric forces have the same benefits and advantages that have traditionally been enjoyed in the jungle of forest base: control over territory, allegiance (whether voluntary or coerced) of much of a country's population, inaccessibility to security forces. The urban environment adds reasonably secure bases for operations around the heart of government and its administrative and commercial infrastructure [...]. The urban geography of slums favors the tactics of an unconventional force. [...] Guerrilla campaigns need not be overall military urban success, but rather need only to make the opposition's campaigns appear unpalatable to its domestic support. Urban warfare favors the media age. (DIRC 1997: 6)

Dreams Reclaimed? From Preemptive 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)

Urban areas should become our preferred medium for fighting. We should optimize our force structure for it, rather than relegating it to Appendix Q in our fighting doctrine, treating it as the exception rather than the norm [...]. It is time to tell Sun Tzu to sit down [...]. Instead of fearing it, we must own the city. (Lt. Col. Leonhard, US Army 2003[sic])

With the widespread perception that the intensifying urbanisation of the parts of the global south that the US military envisage being their dominant areas of operation is radically undermining their broader efforts at techno-scientific transformation, a wide range of projects and initiatives are emerging aimed at specifically tailoring the 'RMA' to the specific

geographies of urban areas in the global south. With the urban insurgency in Iraq as an on-going fulcrum war, a 'transformation' based on the technophilic celebrations of the death of geography through new technologies is, ironically, being transformed into a major techno-scientific 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 organisations and think-tanks that the RMA needs to be reconfigured to address the challenges of tightly built global south cities; 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 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." This requires, he argues, a deep understanding of the battlespace "to identify causality between critical point, action, and effect achieved." In turn, Grubbs suggests that "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" (ibid.)

A large output of conceptual, techno-scientific 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 emphasises that new military techno-science, 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. New weapons and sensor programmes, specifically designed to enhance the ability of future US forces to control and dominate global south cities through network-centric means, are already emerging from the wider efforts at physical and electronic simulation, wargaming, and the evaluation of the experience of the Iraq insurgency. These centre first on unveiling global south cities through new sensor technologies, and second on developing automated and robotic weapon systems linked to such sensors.

Technophilic Unveilings of Global South Cities: Dreams of 'Real-Time Situational Awareness'

The first key effort to redirect the RMA to the purported challenges of US forces attempting to dominate and control global south cities involve 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 identified target can be automatically identified at any time and so exposed to high-technology tracking and killing powers of 'network-centric' weapons. Such visions imagine pervasive and interlinked arrays of 'loitering' and 'embedded' sensors as overcoming all the limits and interruptions that megacity environments place in the way of successfully implementing networks 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 only function 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 title ‘Combat Zones That See’ (CTS) 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 utilising large numbers (1000s) of algorithmic video cameras to provide the close-in sensing demanded for military operations in urban terrain.” Through installing computerised CCTV across whole occupied cities, the project organisers envisage that, when deployed, CTS will sustain “motion-pattern analysis across whole city scales”, linked to the tracking of massive populations of individualised cars and people through intelligent computer algorithms linked to the recognition of number plates and scanned in human facial photos. “Combat Zones that See”, the launch report, suggests:

will produce video understanding algorithms embedded in surveillance systems for automatically monitoring video feeds to 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 2003a: 6)

A direct response to the interruptive effects of city environments on older notions of air and space-based network centric warfare, CTS, 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 2003a: 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 behavior modeling 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 2003a: 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).

Saturating occupied or target cities with micro-scale and even nano-scale sensors and cameras is also being investigated by the CTS Programme and an associated programme labelled

HURT. Table 1 and Figure 1 show the range of ‘persistent’ and unmanned surveillance platforms currently being considered by DARPA through its CTS and HURT Programmes.

<i>Platform</i>	<i>Payload</i>	<i>Range</i>	<i>Endurance</i>	<i>Sensors</i>	<i>Control</i>
Raven MOUT UAV	0.4 lb	10 km	75 min	One IR or combo of down- and side-looking daylight camera.	GPS autopilot.
PUMA "urbanized" Pointer UAV	2 lb	8 km	120 min	Daylight camera housing; side-look capable.	GPS autopilot.
Matilda ground robot	125 lb	1.5 km	N/A	Modular payload	<u>Teleoperated only.</u>
Dragon Eye UAV	1 lb	4.0 km	60 min	Downward-looking EO/IR.	GPS autopilot.
Maverick UAV	300 lb	200 km	7 hours	Modular payload	SEC asset, variable autonomy
Silver Fox UAV	4 lb	2400 km	24 hours	Downward-looking EO/IR.	GPS autopilot.
OAV (29" version)	20 lb	50 km	90 min	EO/IR downward and slant-angle.	GPS + ?
Yamaha RMAX Autonomous	60 lb	200 km	90 min	Modular payload, inc. new stabilized sensor ball	GPS autopilot.
Predator	450 lb	5500 km	40 hr	EO/IR sensor ball plus SAR, ESM, comms, SIGINT/ELINT	Piloted or GPS waypoints
Fire Scout	200 lb	320 km	6 hrs	EO/IR sensor ball plus SAR, ESM, comms, SIGINT/ELINT	TCS

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Table 1: DARPA’s table of urban surveillance and weapons platforms under development by its HURT program (DARPA 2004). (GPS = Global Positioning System, IR = Infrared, OAV = Organic Air Vehicle, UAV = Unmanned Aerial Vehicle)

Urban RSTA requires horizontal viewpoints and rapid reaction to cues and perceived threats

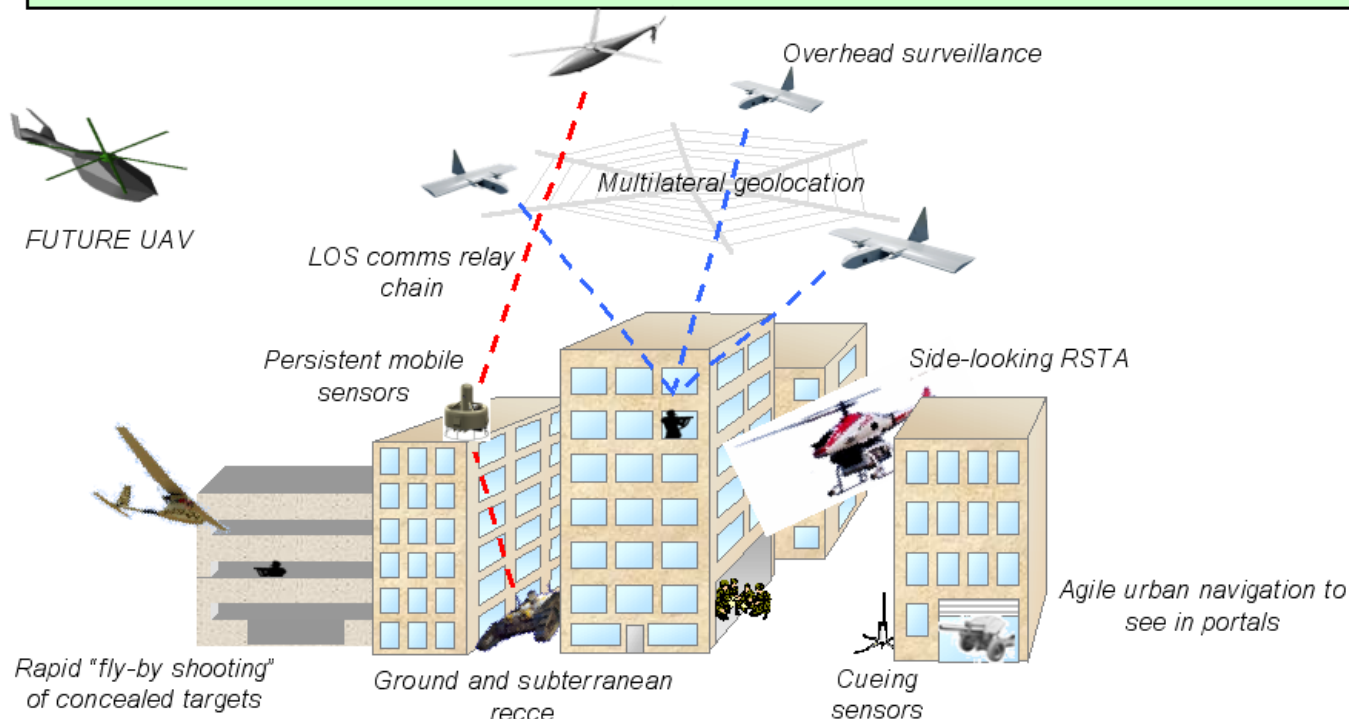


Figure 1: DARPA urban ‘Reconnaissance, Surveillance and Target Acquisition’ (RSTA) platforms as envisaged by its HURT Programme (Darpa, 2004). (LOS=Line of Sight)

‘Persistent Area Dominance’: Towards Robotic Killing Systems in Urban Warfare

Military leaders are developing a vision of the tactical operations future where adversaries will have to decide if they should send flesh and blood troops to fight nuts, bolts, circuits and sensors. (Lawlor 2003)

The second main area of defence research and development to help assert the dominance of US forces over global south cities focuses on a shift towards robotic air and ground weapons which, when linked to the persistent surveillance and target identification systems just discussed, will be deployed to continually and automatically destroy purported targets in potentially endless streams of automated killing. The dreams 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 (see, for example, Huber and Mills 2001). A 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 just discussed (2004).

In their scenario, swarms of micro-scale and nano-scale 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 robotised counter-insurgency operation with US commanders and soldiers doing little but overseeing the cyborged, interlinked and increasingly automated killing systems from a safe distance. Defense Watch (2004) thus speculate about “a battlefield in the near future” that is wired up with the systems resulting from the CTS programme and its followers. Here

unbound technophiliac dreams of omnipotent urban control blur into long-standing fantasies of cyborganised and robotised warfare. “Several large fans are stationed outside the city limits of an urban target that our [sic] guys need to take”, they begin, and go on to explain that:

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.

“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. (2004 [sic])

Such omnipotence fantasies extend even further to the automated surveillance, through emerging brain scanning techniques, of people’s inner mental attitudes to any U.S. invasion. This way ‘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)

Such dreams of continuous, automated, and robotised urban targeting and killing are far from being limited to the realms of such futuristic speculation, however. Rather, as with the CTS programme, 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 select and destroy targets without ‘humans in the loop’, based on algorithmically-driven ‘decisions’.

Lawlor (2003), 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', i.e. linking 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). Lawlor states that the 'swarming of unmanned systems' project team at US forces JOINT Command Experimentation Directorate, based in Suffolk, Virginia, are so advanced in such experimentation that "autonomous, networked and integrated robots may be the norm rather than the exception by 2025".

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" providing a completely automated weapon system devoid of human involvement. Such plans form part of a \$200 billion project to massively robotise US ground forces known as 'Future Combat System'. Under this program, it is planned that robotic vehicles will replace one third of US armoured vehicles and weapons by 2015.

Lawlor quotes Gordon Johnson, the 'Unmanned Effects' team leader for the US Army's 'Project Alpha', as saying of an automated anti-sniper system that:

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)

Lawlor (2003: 2) predicts that such robo-war systems will "help save lives by taking humans out of harm's way". Here, tellingly, only US forces are considered to fall within the category 'human'.

In addition, unmanned aerial vehicles armed with 'intelligent munitions' are already being designed that will, eventually, be programmed to fire on, and kill, 'targets' detected by US Force's 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 (Kenyon 2004). A programme called TUDLS – or 'Total Urban Dominance Layered System – for example, is currently underway to provide what Plenge (2004) 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."

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" (2003 16). Tirpak (2001), a US air force specialist, envisages that humans will be required to make the decisions to launch weapons at targets only "untilUCAVs 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”.

Nascent Robotisation in Iraq and Palestine/Israel

By 2007, such military discourses and technophilic fantasies were quickly moving towards the first stages of implementation on the streets of Iraq’s cities. In June 2006 the first armed and remotely-controlled ground robots in the history of warfare – so-called ‘SWORDS’¹ machines armed with M249 machine guns – were deployed in Baghdad (Blech 2007). These allow soldiers to fire the systems guns from up to a kilometre away by remote control.

“Many people are fearful that armed robots will run amok on the battlefield,” admits a press release describing trials of this system from the US Armament Research, Development and Engineering Center (2007). In an attempt at reassurance, the piece states that the robots still “employ a ‘man in the loop’ where they are always under director control of a soldier. The soldier issues commands to the robot and weapons through an operator control unit. Commands to rocket and grenade launchers are communicated through a newly developed remote firing and control system.”

Col. Terry Griffin, head of joint US Army and Marine Corps robot program, and tasked with deploying the next armed machine known as ‘Gladiator’, argues that the machines first job will be to disband groups of ‘undesirables’. He cites three stages of escalation: “First the robot issues warnings through a loudspeaker. It fires rubber bullets. Finally, the robot starts firing its machine gun” (quoted in Blech 2007).

In Israel/Palestine, meanwhile, the Israeli military are already deploying robotic and remotely controlled machine gun turrets, part of the “See-Shoot” system developed by Rafael, to deploy lethal force along the 37 mile border with the Gaza strip. Such robotic turrets have also been sold to US forces. “Combined with a Rafael-developed acoustic sensor detection and direction-finding device, [they] essentially becomes a robotic anti-sniper weapon for wheeled or tracked vehicles.” (Opall-Rome 2004). According to Defence News’ Tel Aviv correspondent “each machine gun-mounted station serves as a type of robotic sniper, capable of enforcing a nearly 1,500-meter-deep no-go zone” (Opall-Rome 2007). The guns and their long sensors are “tied in by optic fibre to a command network which will also be able to draw information from existing ground sensors, manned aircraft, and overhead drones.” (Page 2007).

Whilst the longer term shift towards the true automation of firing is envisaged, Initially, at least, Israeli soldiers are required to approve ‘See-Shoot’s’ decisions to fire. “At least in the initial phases of deployment, we’re going to have to keep the man in the loop,” an unnamed IDF commander remarked recently. “We don’t want to risk making tragic and politically costly mistakes with such a lethal system.” (cited in Opall-Rome 2007).

Israel is also planning to deploy mobile armed robots to support military incursions into Palestinian towns and cities. The hope, according to the manufacturing company, Elbit Ground Systems, is that “such robotic vehicles will become “triggers” which could discriminate between innocent and peaceful activities along the [Gaza-Israel] perimeter, to hostile or suspicious actions, based on the target’s responses” (Defense Update 2007). The

¹ The Special Weapons Observation Reconnaissance Detection System

Israeli military also now operates robotic 60-ton bulldozers to aid in house demolition and landscape clearance in areas that are deemed to hazardous for human-driven bulldozers.

Meanwhile, US investment in the field of armed Unmanned Aerial Vehicles (UAVs) dwarfs that in armed ground robots. Initially, attention is centring on introducing more and more armed drones which are piloted, and fired, by remote human pilots – such as the 'Predator' and its more heavily armed successor – the 'Reaper.' In the case of the Predator, the many attack missions in the Middle East carried out by this drone have actually been 'piloted' by CIA personnel in a US Air Force base on the other side of the world on the edge of Las Vegas.

As with armed ground robots, however, the shift towards autonomous aerial weapons systems is already underway. The US Air Force's emerging Low Cost Autonomous Attack System (LOCAAS), for example – one output of the Future Combat Systems Program – is a jet powered 'stand off' munition which has been designed to "autonomously search for, detect, identify, attack and destroy theatre missile defence, surface to air missile systems, and interdiction/armour targets of military interest" (Sparrow 2007: 63). It will be equipped with a Laser Radar system as well as an Autonomous Target Recognition capability that will allow it to search for and identify targets within a 33 sq. mile area (Sparrow, 2007).

In both the air and ground domains, much effort is already going in to establishing the technologies and ethical protocols that would allow armed robots to use artificial intelligence technologies to autonomously 'decide' to launch their weapons at targets. Integrated within the Future Combat Systems Program within the US military (Sparrow, 2007), efforts here are focusing on the shift from piloted armed drones to ones that automatically fire at targets, at armed ground robots that operate independently, and at armed missiles, bombs and munitions that 'loiter' over a district or city 'seeing' out targets to attack over extended periods of time.

Armed autonomous ground vehicles, labelled 'Tactical Autonomous Combatants' (TACs), are being developed for missions deemed too dangerous, lengthy or simply long for humans. The previously cited Gordon Johnson, 'unmanned effects team leader' at the Project Alpha, cites the advantages of such a strategy for US forces addressing the challenges of future urban warfare:

At the tactical level, TACs aren't going to get hungry, they're not going to get tired, they're not going to get 'Dear John' letters and have their minds concentrating on something other than what they are supposed to be thinking about. They have all the information they require that is available to blue forces at their disposal to help make decisions because they are all networked together. And if they need information that they don't have in their local database, they'll send out a request to 'The Net' and would get the information they need or collaborate with other machines and get the information they need (cited in Lawlor 2003).

A whole universe of 'automated target recognition' software is also evolving here, allowing robots' computers to continuously compare the electronic signatures of 'targets' with those stored on electronic databases. "Before SWORDS fires its first salvo at terrorists in Iraq," writes Jörg Blech (2007) in *Der Spiegel*, "it needs the permission of two human operators. [...] However, it is only logical that decisions over life and death will increasingly be

transferred to the machine – just as soon as engineers have figured out how to overcome the problem of distinguishing between friends and foes.”

This is where software development efforts in the field of automatic target recognition are now concentrating. Geared specifically towards the apparently impossible challenge of automatically picking out individual cars and individuals within the density and confusion of a major city, these techniques, informed closely by experience in Iraq, are now centring on whether spectral imaging, using 70 different wavelengths, can differentiate apparently identical vehicles in cities (McCarter 2005).

Dr. John Kerekes, head of one such programme, labelled RASER, at MIT, explains that, rather than developing software that automatically identifies the signatures of military vehicles, the focus now is on tracking and identifying civilian cars and trucks in urban contexts. “Nowadays,” he argues, “the problems are in a more urban area or a smaller town, but typically not out in the open somewhere, and the nature of the threat is much more elusive in the sense that the enemy may not be driving military vehicles at all.” In such a context, he wonders: “Can you indeed distinguish between vehicles? These are just ordinary civilian vehicles, not of any particular distinguishing characteristics visually. But through this extra-spectral information and these additional channels, there may be features that we can use to identify them and tell them apart.” (Cited in McCarter 2005).

Once again, it is in the scenarios being proffered by the US military industrial complex that we see the possible future of the nascent architectures of robotised military power in Iraq and Israel/Palestine. Gary Graham (2004), of DARPA’s Tactical Technology Office, introduced a talk at the 2004 DARPAtech conference as follows:

I’d like you to imagine the battlefield of the future. Unmanned combat aircraft dominate the skies above the theater. A swarm of unmanned ground vehicles prowls the forests and fields of our enemies. These vehicles have sensors that can see, hear, and maybe even smell. High above the theater, peering down from space, are spacecraft that are being refueled on-orbit. Their on-board electronics and software are also being upgraded and replaced as easily as sliding a PCMCIA card in-and-out of a laptop. A helicopter glides over the battlefield and drops a box of missiles. This box is identical to dozens of missile boxes that are already in place on the battlefield, many sitting in the rear compartments of Humvees. These boxes of missiles are very different, though. They aren’t attended by human operators, and they already know where they are – each has GPS and a COMM [unications] link. They sit, poised, waiting for command signals. A corporal out in the field sees the enemy coming over the hill. He radios, “I need fire support NOW!” The box just dropped by the helo knows where the corporal is and it knows where the bad guys are. It launches its first flight of missiles. Some are loitering missiles that fly a little slower. They are launched first. They go up and post a highwatch over the battlefield. Next, faster, precision attack missiles are launched and detonate on their targets, and we have lots of smoking holes...but we missed one or two. One of the missiles loitering overhead surveys the scene, detects a surviving moving target, and says, “You missed one; I can take him.” On command, he dives in and takes out his target. The battle is over. The enemy never even knew the corporal was there! But now you have a lot of smoking holes where the bad guys used to be. (cited in Morrish 2004)

Conclusions

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

A large-scale military research and development programme is currently underway in the United States to tailor the ‘Revolution in Military Affairs’ to the specific micro-geographies of the global south cities that many US military theorists envisage to be their main ‘battlespaces’ on the 21st century. Here the cutting-edge techno-scientific efforts and priorities of the world’s dominant military power are being shifted dramatically 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 the burgeoning urban environments of the global south.

Such dreams of omnipotence must, of course, be treated with caution. The US military and its associated complex of R & D outfits have, after all, long held fantasies of superweapons that would deterministically realise 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). As Jeremy Black (2001: 97) suggests, we therefore need to be careful to interpret the RMA, and its latest ‘urban turn’, not as some quasi-rational response amongst US military and political elites to changing geopolitical conditions, but, rather, as “symptomatic of a set of cultural and political assumptions that tell us more about modern western society than they do about any objective assessment of military options”.

Moreover, we must also remember that the ‘U.S. military’ is far from being some single, unitary actor. All of the discourses, projects and programmes analysed in this paper remain extremely contested. Within the vast institutional complex that together constitutes the ‘US military’, and its associated security and military industries and lobby groups, major political battles are underway – fuelled by the ongoing nightmare in Iraq – over the degree to which technophilic dreams of omnipotence, through some urbanised ‘RMA’ or ‘network centric warfare,’ are realistic, even in military terms. Many in the US Army, in particular, are deeply sceptical that the horrors and ‘fog of war’ in bloody ‘urban operations’ like the Iraqi insurgency can ever really be technologised, 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.

Whilst what I have called here the urban turn in the RMA is, of course, being driven by often wild and fantastical discourses, its effects are likely to be very material and profound. Massive techno-scientific efforts to equip the US military so that they can saturate global south cities with real-time surveillance, targeting and killing systems are undoubtedly underway, fuelled by the nascent experimentations on the streets of Iraq’s cities and in and above the West Bank and Gaza. The latest military-industrial-‘security’ research drive is focusing on using new algorithmic surveillance capabilities to try and overcome the ways in which the micro-geographies of global south cities are portrayed as environments that interrupt wider dreams of US military and technological omnipotence. Above all, as the ‘war

on terror' seeks to project notions of war that are unbound in time and space, so the sovereign power to kill is in the process of being delegated to computer code.

Whether such systems will ever function as imagined even in military terms is, then, beside the point. The very existence of a quasi-imperial project for launching the world's dominant military power's high-tech warfare systems into global south cities will – if implemented – seem very likely to lead to widespread civilian casualties. This seems especially so as new algorithmic systems seem likely to emerge that are the actual agents of continuous, autonomous killing as 'kill chains' are 'compressed', 'sensors' are linked automatically to 'shooters,' and the dreams of 'persistent area dominance' achieve full expression through the favourable context of the Bush Administration's large post-9-11 defence spending increases.

To put it mildly, dreams of clinically identifying and surgically killing only 'fighters' within cities, through the use of 'autonomous' computer algorithms and fantasies of 'brain scans', are both dangerously deluded and deeply disturbing. It seems very probable that deploying such systems would result in the death and injury of many civilians. Here we confront the added and deeply troubling development whereby software agency emerges as the ultimate 'intelligence' automatically stipulating who should die and who should live whilst at the same time attempts are made to remove US military personnel as far as possible from risk to death and injury.

In such a scenario, the philosopher Robert Sparrow (2007: 62) worries that it will become increasingly impossible to attribute war crimes to humans at all. "It is a necessary condition for fighting a just war, under the principle of *jus in bellum* [or just war], that someone can be justly held responsible for deaths that occur in the course of the war," he writes. However, "as this condition cannot be met in relation to deaths caused by an autonomous weapon system it would therefore be unethical to deploy such systems in warfare."

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