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Drones and Urban Surveillance

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Drones and Urban Surveillance

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Abstract

This paper uses the metaphor of 'boomerangs' articulated by Michel Foucault to discuss the potential for drones to become the 'next layer' of urban surveillance in our cities. Like earlier Western technologies and techniques of government that were 'tested out' in foreign warzones and then 'brought back' to urban centres (the helicopter and its utilization in Vietnam and its return to urban police forces is a clear illustration hereof), contemporary unmanned aerial vehicles hold the potential to act as proverbial 'Foucauldian boomerangs' and return from warzones in Afghanistan, Iraq, and Pakistan to Western cities. The paper explores how a nexus of Surveillance Studies and mobilities research may be a fruitful way into comprehending this new phenomenon. En route the practical applications of drones as well as the historical importance of aerial power are connected to a situational understanding of mobilities. The paper points at a number of challenges for the future and should be understood as a first tentative attempt to set this on the research agenda.

Introduction

Contemporary drone technology (here defined as unmanned and remote controlled flying devices capable of transmitting long-distance surveillance information as well as carrying weapons) raises international debate about ethical issues related to 'kills at a distance' policies carried out by 'Western' forces in Afghanistan, Iraq and Pakistan. Other zones of warfare and militarized conflicts are also contributing to the increasing awareness of the surveillance potential of contemporary drone technology. Drones, however, are also utilized for more peaceful purposes such as crops surveillance within farming and environmental surveillance of remote areas. This paper explore the potential and scenarios related to the utilization of drone technologies in urban space surveillance (ITS/traffic control, crime prevention, etc.). Like GPS that was developed for warfare, drones might become standard tools in the urban planners' 'toolbox' of the future (already urban planners are utilizing these technologies to measure and survey large urban agglomerations). But the paper will take the more conflict-oriented applications such as the use of drones in foreign warfare as its focus. The point of departure being that these technologies might be 'tested' in warzones but only to be 'imported back' to urban centres of mass agglomeration in a trajectory somewhat similar to the 'boomerang effect' noticed by French philosopher Michel Foucault. In the book *Cities under Siege—The Militarization of Urban Space,* urban theorist Steven Graham (2010) reminds us that Foucault spoke of the 'testing' of warfare technologies in remote warzones followed by a 'return' of the technologies to (predominantly imperial Western) cities and societies. Importantly, Foucault saw 'technologies' as much more than technical devices and included organizational schemes and government procedures to be integrated hereinto (see Klauser 2013b). In relation to drones this dimension is still an

open question since the 'return' of drones in a strict technical sense is already a reality, but the regulatory frameworks and the underpinning dimensions of 'governmentality' are still open and contested terrains. This is in accordance with earlier works of Graham on *Splintering Urbanism* (Graham and Marvin 2001) that bridges Surveillance Studies, urban studies and mobilities research with its in-built interest in technologies, infrastructure, power, and mobility.

The paper explores the hypothesis that drone technologies may be re-installed as surveillance technologies in 'peaceful' societies and thus that they may become 'naturalized' as yet another layer of real-time information in the contemporary city (next to the massive amount of location-aware data created by smart phones and the like connected to discourses of the 'smart city'). The paper explores the discussion related to cities and urban spaces since more than 50 per cent of the world's populations are living within these huge human-made artefacts called 'cities' (UNDESA 2013). Therefore one may assume that the interest (commercial as well as governmental) for utilizing these new technologies for crowd surveillance and general population control will be increasing. Two decades ago urban scholar Mike Davies (1990) claimed in his book, *City of Quartz*, that the Los Angeles Police Department (LAPD) had become a 'space police' by means of their utilization of helicopters for urban surveillance. There is a striking parallel here; the helicopters of the LAPD 'space police' was a 'return of the chopper' from the warzones of Vietnam to US urban centres (another example is the militarization of urban cars in which the solid and almost 'tank-like' qualities are being imitated with the contemporary urban SUV and with the 'Hummer' as the example par excellence, see Graham 2010: 302ff). The paper raises the question of drones as potential 'boomerang technologies' for urban surveillance. The second dimension of the paper relates to the issue of what might be the adequate theoretical framing for understanding this new development. The field of Surveillance Studies as for example Wall and Monahan (2011) who identify a 'politics of drones' or Neocleous' analysis of 'air power as police power' (2013) in most profitable ways meet and exchange with the 'mobilities turn'. Within the last decade the social sciences has taken a 'mobile turn' and much theoretical work has been done to frame what material and digital mobility mean for culture, interaction, and urban life (Cresswell 2006; Jensen 2013; Urry 2000, 2007, 2014). The framing of these technologies will touch upon modern warfare and 'air power' (Kaplan 2006), militarization of urban space (Graham 2010), 'dark sides' of mobilities (Jensen 2013) as well as point towards a discussion about drone technologies as 'mobilities design' for the contemporary network city (Jensen 2014) and discuss drones as yet another potential 'tool' in the ICT toolbox of urban planners and designers (Jensen 2015). By marrying Surveillance Studies and mobilities theories the paper explores the potential of such new framing to increase our understanding of drone technologies in future urban societies.

The paper is structured in five sections. After the introduction in section one, the paper moves to section two where we look into more detail as to what the drone technologies de facto are capable of. The paper briefly scans the utilitarian dimension of contemporary drone technologies by looking at what they can do in warzones as well as in peaceful environments. In section three we present a short overview of urban surveillance contextualizing the drone surveillance technologies into the wider historical perspective moving from ancient street-policing to contemporary urban high-tech surveillance systems. This is followed by section four where the paper briefly presents the mobilities turn and its potential relevance to the study of urban drone technologies. This theoretical framing is then followed by the fifth and final section of the paper where the paper embarks on the discussion and reflection about the future need for research.

Drone Technologies and Their Multiple Applications

Here we go a little more into detail as to what the drone technologies de facto are capable of. The paper briefly scans the utilitarian dimension of contemporary drone technologies by looking at what they can do in warzones as well as in peaceful environments. An initial list based on media coverage as well as research literature suggests an impressive array of drone applications:

- Drones helping delivering medicine to rural areas in Africa
- Disaster relief in Haiti
- Battling wildfire in Yosemite National Park
- Pizza and postal delivery
- Border patrolling
- Traffic monitoring
- Police crowd control
- Safe inspection of electrical masts
- News coverage
- Paparazzi photographers
- Land surveillance
- Utility surveillance
- Crop surveillance
- Social drone clubs (i.e. flying for fun)
- Tourism
- Warfare/war against terror
- Criminal gangs using drones to coordinate activities as well as to monitor the police
- Architecture (drones constructing buildings)
- Ballet (dancing with drones)
- Graffiti (art project where drones are doing graffiti)

Such a list can surely be much longer and is, as it stands here, not analytically helpful in any deeper sense. However, it highlights the multiplicity of uses of drone technology as well as illustrating that there are many civil and peaceful drone applications even though this paper focuses more on the 'dark side' issues. But what more precisely is a 'drone'? The official 'drone' definition by the British Ministry of Defence is the following:

> An Unmanned Aircraft (sometimes abbreviated to UA) is defined as an aircraft that does not carry a human operator, is operated remotely using varying levels of automated functions, is normally recoverable, and can carry a lethal or non-lethal payload.
> (British Ministry of Defence 2011: 2-1)

As with any other emerging technology, the question arises as to whether there is actually anything new in this? One has to answer in the affirmative here since the decrease in productions costs and the increase in data processing and transformation capacities has changed dramatically within the last few years, leading to a technology within reach for many agencies and not only super-rich criminals or war-faring states:

> Drones are a combination of the new and the old: a new aerial surveillance and killing system with capabilities previously not offered by conventional air power, coupled with an older cosmic view of air mastery through technological speed, verticality, and vision. Indeed, contemporary discourse about UAVs [Unmanned Aerial Vehicles] often mention how drones can hover higher and for longer periods of time than most surveillance planes can and are more mobile in their transportation and operational capabilities.
> (Wall and Monahan 2011: 241)

Drones have been known for a long time but precisely because of these two factors (low costs and high data capacity) we should expect to see a veritable 'drone explosion' in the coming decade. But drone technologies in the guise of 'unmanned flights' have been around for decades, as Virilio rightly explains here with a reference to US air force practices in the 1960s: '*By 1967 the US Air Force had the whole of South-East Asia covered, and pilotless aircraft would fly over Laos and send their data back to IBM centres in Thailand or South Vietnam*' (Virilio 1984/89). Graham argues that the prevalence of drone

technologies (as well as other high-tech security technologies) increasingly provides models for the reorganization of domestic urban space (Graham 2010: 23). The 'worst case scenario' could then become one where: *'Swarms of tiny, armed drones equipped with advanced sensors and communicating with each other, will this be deployed to loiter permanently above the streets, deserts and highways'* (Graham 2010: xiii). However, the State-led practices applying drone technology will not be the only ones. Increasingly scholars and analysts alike voice concern over the potential of drone technology within organized crime:

> Criminals have also been using drones to circumvent our current security paradigms. Prisons use tall, often electric, fences to isolate criminals for public safety. In Brazil,[1] organized crime gangs used drones to fly cell phones and other contraband right over the fences. Modern security design is failing to keep pace with the flying robots … Frankly, I am concerned about their [the drones] misuse, both by criminals and by governments. Organizations such as the ACLU[2] and the Electronic Frontier Foundation[3] rightfully pose significant questions about the privacy implications of drones. And there are other reasons to be concerned. All drones today are hackable. They are nothing more than flying computers that will liberate cybercrime from behind today's computers screens and launch it into our everyday physical world. And they'll do so in a way for which most of us are entirely unprepared.
>
> (Goodman 2013)

Goodman's description of drones as nothing more than 'flying computers' identify precisely the key issue of data- and information gathering. Moreover, it elucidates the fact that the computational capacity of aerial intelligence is on a historically unprecedented level. Regardless whether the application of drones is coming from within the State or any other sector of global society, there are new challenges on the horizon:

> There are many parallels with drones and what happened with flying machines. First they were science fiction. Then they became science reality, the airplane. Then they were adapted for war. Now, like with the plane coming out of World War I, you see these roles moving over to the civilian side in terms of using the drone for observation or surveillance, whether it's law enforcement using it, or journalism, or search-and-rescue. Drones have gotten smarter, able to do more on their own, which in turn make them easier to use and opens them up for more users. So you're now seeing kids flying them. Go back to airplanes. They were flying literally tens of thousands of airplanes in WWI, but it wasn't until 1919 that civilians came up with the idea of using an airplane to move cargo back and forth. That led to the multi-trillion dollar air transport industry. That came out of someone crossing innovation with profit-seeking. As exciting as a drone for search-and-rescue is, or environmental monitoring or filming your kids playing soccer, that's still doing surveillance. It's what comes next, using it in ways that no one's yet imagined, that's where the boom will be.
>
> (Singer 2013)

According to an article by Allen McDuffee in the journal *WIRED*, drones will, besides handling bombs and cameras, provide a new feature which has been explored by DARPA (The *Defense Advanced Research Projects Agency* of the US Department of Defense). DARPA is now exploring how to utilize drones to carry mobile WiFi hotspots with an equivalent of 4G smartphone connectivity to battlefields in

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[1] http://www.suasnews.com/2012/06/16298/attempted-smuggling-of-cellphones-by-hexacopter-into-brazilian-prision/.

[2] https://www.aclu.org/blog/tag/drones.

[3] https://www.eff.org/foia/faa-drone-authorizations.

remote areas where internet provision is bad or even missing. So the drones will be providing troops with high-quality communication infrastructure in sites and zones where such features are missing (WIRED April 15 2014). The fact that drones are operated (or can be) by sophisticated algorithms and software code adds more complexity to the already rather complex understanding of cities as immersed into 'codespace' (Kitchin and Dodge 2011).

Such multiplicity of drone applications and their omnipresence begs an analytical framework capable of understanding these new and potentially game-changing technologies. To start thinking about an analytical perspective we first turn towards Surveillance Studies, and then later more directly to mobilities studies.

Surveillance and Surveillance Studies—Foam Cities, Panopticon and Beyond

Klauser argues that the notion of 'fortress city' and thus of the city as a defensible space can be dated to 1563 and the attempts from Bernard Palissy to define a *'Ville de Fortress'* or a 'fortress city' (Klauser 2010: 326). The imaginary 'fortress city' had the properties of a 'shell' and was conceptualised as a defensible mono-nucleus. However, today a more adequate understanding of cities and their interests in defence would have to take into account the multiplicity of technologies, networks, infrastructure, and not least the combination of horizontality and verticality as contemporary technologies with the greatest ease transgresses the walls of the fortified city (for an interesting perspective of vertical mobility see Graham, forthcoming). To deal with this contemporary situation of cities Klauser explores the metaphor of 'foam' coined by Peter Sloterdijk. The 'foam metaphor' is an attempt to do away with the alleged two-dimensional and oversimplified 'network' metaphor (Klauser 2010: 328). Klauser argues that; *'the contemporary fortress city is not structured monospherically and all-inclusively, as in Palissy's shell city, but rather as a highly fragmented, polyspherical patchwork of more or less detached and controlled enclosures'* (Klauser 2010: 332). Klauser's application of the foam metaphor points towards a more full understanding of the atmospheric qualities of spaces overviewed by surveillance technologies. This is very important and also a line of connection to the mobilities research to which we shall later turn. The foam metaphor critically engages with a vocabulary of planar metaphors such as rings, circles, networks, border-lines, and passage points. Moreover, the spherical dimension to the foam metaphor suggests that the 'three-dimensionality' needs to be taken into account more explicitly (another touch-point to the mobilities research and to mobilities design in particular). In more detail Klauser puts focus on four dimensions of Sloterdijk's foam metaphor (2010: 330). Firstly, the foam metaphor entails sensitivity to three-dimensional voluminosity connecting to the spatial conditions for being-in-the-world. Secondly, foams may have large or small volumes but no clear centre. Rather, the foam metaphor connects to the multiplicity and pluralism of the contemporary world. Thirdly, the foam metaphor contains sensitivity to a double movement of co-isolation and co-fragility. Cells of a foam structure are mutually isolated from one another in an identity-giving existence which on the other hand is a fragile and delicate balance of co-existence suggesting a form of mediation between the inside and the outside. In other words, foam inherently acknowledges the 'osmosis' and mutual relational dependencies of what may at face value look like isolated entities. Fourthly, the foam metaphor connotes a fluid, open, and process-oriented understanding of being (this is most certainly in accordance with the anti-sedentary ontology of the mobilities turn). Spanning micro and macro phenomena, Sloterdijk's 'foam-cell society' notion is useful to comprehend the larger scale dynamics of, for example, contemporary globalization as well as it connects to the situational and small-scale phenomena and their fragile existences. Klauser's application of the foam metaphor is particularly useful for this paper as it turns towards the urban and 'the foam city'. Here there is an explicit architectural dimension present as well as we see how the fortress city is an ensemble of relatively isolated enclaves. As Klauser rightly argues there is no dearth of illustrations to exemplify the heterogeneous and splintered condition of the contemporary city and mentions gated communities, shopping malls, airports, secured transport hubs, surveyed public spaces, and bunkered private homes (Klauser 2010: 332). Importantly, and based upon the foam metaphor, none of these

architectures exist in splendid isolation. Rather, they are more or less porous and permeable entities in a floating system of temporary stability. So far this analysis may then be applied to a number of 'classic' surveillance cases such as gated communities, shopping malls, sports event etc. However, the foam-understanding carries even greater potential as the backcloth to a situational perspective on mobile practices wherein mobile surveillance technologies such as drones are applied. We shall return to this later, but here the potential for understanding the fragility, heterogeneity, and relational qualities of mobile situations offered by the 'foam city' framing should be acknowledged.

In many respects the now iconic notion of the 'Panopticon', originally coined by British philosopher Jeremy Bentham in the late 18th Century but since elevated to become the key power technique of Modern society by Michel Foucault (1975), is what springs to mind when one thinks about surveillance in an analytical sense. Bentham's idea was to construct materially and physically a piece of disciplinary architecture for a number of societal institutions. The universalism (or at least Bentham's ideas hereof) is clearly seen in the preface to the 'Panopticon letters' in which Bentham wrote:

> Morals reformed—health preserved—industry invigorated—instruction diffused—public burthens lightened—Economy seated, as it were, upon a rock—the Gordian knot of the Poor-laws are not cut, but untied—all by a simple idea in Architecture!
> (Bentham 1787/1995: 31)

Besides sounding like the much wanted remedy for strained 21st century public sectors and welfare regimes, this all-embracing list also indicates that Bentham thought this particular idea of architectural surveillance design to be much more profound than a technique to discipline criminals. The principle of Panopticism reaches into every corner of wider societal institutions in Bentham's thinking and importantly ties material form and physical design to a set of normative and behaviour-modifying values (a key idea within mobilities design). The road hereto was to create a circular structure with permanent visibility of the surrounding cells from the 'all-seeing' vantage point at the centre of the structure. The disciplining effect would then emerge since none of the inmates would know precisely when (if at all) they were being observed by the all-seeing guard. The underlying idea was that by constantly thinking that one was potentially under surveillance human subjects would change their behaviour and ultimately take on a self-disciplining conduct, or in Bentham's words: *The essence of it [the plan of Panopticon] consists, then, in the <u>centrality</u> of the inspector's situation, combined with the well-known and most effectual contrivances for <u>seeing without being seen</u>"* (Bentham 1787/1995: 43, emphasis in original). The principle of Panopticism has been discussed in relation to more contemporary surveillance technologies such as CCTV (Graham 2010). However, judging from the disorder and crime that still exist even within these camera-surveyed areas, the thesis of self-disciplinary conduct seems hard to validate empirically. CCTV, however, is excellent for crime solving, but not really ideal for crime prevention. The phenomenon of Close Circuit Television (or better known for its acronym CCTV) was established as British police and government bodies' wished for tools and technologies of surveillance and crowd control in relation to football matches where some of the crowds were violent and would pose threats to public order. Surveillance Studies often connect with issues related to sports events and other types of 'crowd behaviour' (Klauser 2013a).

There is an intimate link between the airpower of modern warfare and the success on the 'battlefield' (Neocleous 2013; Virilio 1984/89). Obviously air-dominance is related to the capacity for bombing the adversaries. However, air supremacy also relates to information and intelligence, as the 'all-seeing gaze' from above facilitated knowledge, data, and information about the enemy's whereabouts, capacities, and vulnerabilities. In fact, one may argue that the history of urban fortification was first really challenged by the practices of shooting missiles through the air and into the fortified enclaves. 'Transgressing the wall' as it where, was the first sign of a transformation of the spatial logics of warfare. However, the ability to 'stay in the air', so to speak, that was only developed later with the application of hot-air balloons, afforded not only the dropping of bombs and objects on one's enemy but also the start of the building up

of aerial intelligence (Kaplan 2006; Klauser 2010). Drones represent, thus, the latest technological twist in a long development towards air supremacy in which bombing as well as intelligence and surveillance are the much aspired-to advantages. Clearly air-power also connects to governments' and states' more peaceful surveillance and measuring of their territories (Neocleous 2013: 584). Moreover, both Graham and Neocleous point to the fact that police and military practices and rationalities seem to be converging under the new regime of the global war on terror (Graham 2010; Neocleous 2013).

There is a rich literature within geopolitics, geography, mobilities studies and border studies exploring the transforming nature of the border and nation state territories (e.g. Graham 2010; Neocleous 2013; Urry 2014). This paper cannot possibly entertain a justified reading hereof, but simply acknowledge that 'borders are not what they used to be' and that technologies such as drones are part of this transformation in which borders becomes 'ubiquitous' (Graham 2010: 89ff). Much of this discussion, however, has taken the Nation State as the focus of attention which is not surprising given the fact that the Nation State still is the key unit upholding the 'monopoly of violence over a territory' to quote Max Weber's famous definition of the State (Weber 1968). Also, works by Brenner (2004) and Jessop (2007) illustrate that new state complexities are emerging at both sub-state levels and at transnational levels. However, in this context it is particular interesting that drone technologies further the blurring of scales as they in one moment are part of huge geopolitical interventions and in the next are elements of a new urban surveillance infrastructure. Drones are, in other words, mobile technologies that accentuates the point that old scales of policy-making are being rendered if not obsolete then at least fragile by technologies spanning from the body to the globe. Drones are creating new multi-scalar visuals to be utilized in conflict zones that also tend to blur notions of 'peaceful' versus 'conflict' zones. The literature points at the transfer from conflict to peaceful zone as a particular vulnerable point since this will accentuate the risks of 'violent dehumanization and non-differentiation' of people ultimately leading to a higher risk of civilian and 'innocent' casualties (Wall and Monahan 2011: 243). Here we face the first of two major issues with drones:

> The use of drones in non-combat settings may symbolically transform those sites to arenas of agonistic engagement and further militarize domestic police departments and government agencies to the detriment of individual liberties and the public good.
> (Wall and Monahan 2011: 245)

This is precisely the issue when we think about the 'boomerang' effect and the 'coming back' of drone technologies from war zones towards urban environments. This was what Michel Foucault saw coming decades ago:

> It should never be forgotten, that while colonization, with its techniques and its political and juridical weapons, obviously transported European models to other continents, it also had a considerable boomerang effect on the mechanisms of power in the West, and on the apparatuses, institutions, and techniques of power. A whole series of colonial models was brought back to the West, and the result was that the West could practice something resembling colonization, or an internal colonialism, on itself.
> (Foucault 2003: 103)

In many other areas a strong tradition of circulating 'Western' ideas, imaginaries and concepts has emerged and governing models are amongst the more central ones (Scott 1998). Drones are socio-technical assemblages offering new dynamics of surveillance as well as they challenge institutional, legal, and organizational lines of demarcation by their capacity to blur scales from the local to the global. Military drone proponents have articulated that drones (as well as airpower in more general terms) are vehicles for the 'clean war' and that the idea of 'kills at a distance' will contribute to fewer casualties. This goes hand-in-hand with the techno-optimistic discourse of these technologies as 'precision

technologies' thus supposedly decreasing the number of lives taken during armed conflicts. However, such representations seem to be a far cry from the bloody realities on the battlefields (Chamayou 2014; Graham 2010; Neocleous 2013; Schiølin 2012; Wall and Monahan 2011; Weizman 2006). Rather they are being "*woven up in myths of technological superiority, objectivity, and control that help support their adaptation*" (Wall and Monahan 2011: 240). What happens with the increased policing by drone technology is that: "*Bodies below becomes things to track, monitor, and apprehend, and kill, while the pilot and other allies on the network remain differentiated and proximate, at least culturally if not physically*" (Wall and Monahan 2011: 246). There has also now been a discussion about the repercussions for the physical well-being of 'drone pilots' often located far from combat zones but yet still emotionally related to the 'kills at a distance' that they are conducting (Neocleous 2013; Wall and Monahan 2011). Much seems to suggest that 'drone pilots' engaged in warfare run the risk of extreme fatigue, being emotionally exhausted, and suffering post-traumatic stress syndrome (Schiølin 2012: 85).

The second issue, then, concerns how to increase public security without jeopardizing civil rights. With the prevailing potential of omnipotent surveillance, all 'zones' are loaded with potential for conflict as well as they are subject to a new type of what could be termed 'prophylactic reasoning'. By this is meant that the new surveillance intelligence renders it possible to intervene even before the acts are occurring on the ground (the extreme example being the 'pre-crime' department in the Hollywood blockbuster movie 'Minority Report' based on the novel by Philip K. Dick and starring Tom Cruise). Needless to say, such potential for pre-emptive intervention will increase the burden of accuracy of the intelligence and the stipulation of human agent's motives for future actions. This seems hard enough to assess for humans with long life experiences, so the thought of such assessments being carried out by software and systems relying on complex algorithms are challenging to say the least.

Neocleous argues that the distinction between war and police should be abandoned in favour of a new understanding of a 'war-police nexus' in which the technologies as well as the spatial scales and policy regimes becomes intertwined with the overarching goal of the 'production of order' (2013: 587). Accordingly, drones should be viewed upon not as a new military technology, but rather as a continuation of the 'police logics' inherent in air power since its inception (2013: 589). The case of drones is, according to Neocleous, of particular relevance in illustrating this new multi-scalar logic:

> … drones are unmanned, and thus a new step in the technology of military 'distancing' or 'risk-transfer warfare' … they [the drones] now patrol the skies not just in the lands of Afghanistan, Iraq, and Pakistan but on the whole planet, and not just in 'war zones' but in 'civilian areas'. Thus one finds that they now fly over cities engaged in *police* operations, from managing emergencies caused by natural disasters to spying on foreign drug cartels, fighting crime, conducting border control operations, and general surveillance.
>
> (Neocleous 2013: 588, italics in original)

So we are on the brink of an age which could be described under the heading of 'urban drone surveillance'? This is reflected in the rising numbers of drone permissions given by state authorities and government bodies within most Western countries (Gettinger et al. 2014). State practices are different here since one for example still has to have ad hoc permits in Denmark whereas over 120 companies in the UK have been given 'blanket permission' to operate minor drones for surveillance purposes (Neocleous 2013: 588). At the time of writing, drone regulatory frameworks are being discussed but within individual nation states and transnational regulatory regimes such as the European Union. In terms of regulation Singer poignantly warns us that technological change happens at exponential pace, whereas governments move at glacial pace (Singer 2013). So the need for new regulatory frameworks and practices will stand in some sort of juxtaposition to the level of insights and preparedness from the governing bodies. For example in Denmark the current law is the Air Regulatory Framework BL9.4 which specifies that all drones must be kept at a distance of minimum 150 metres from built-up areas and roads. However, an increasing number

of engineering and consultancy firms, real estate agents and other commercial actors are putting pressure on the public authorities. For now the Danish authorities are granting ad hoc permissions even to the police and fire brigade. In the US, civilian drone use is limited to government agencies and universities but the FAA (the authority granting permission to aviation technologies) estimates that within five years of gaining broader access, about 7,500 civilian drones will be in use (Naples Daily News, March 30, 2013). In particular the new and complex surveillance technologies are stimulating the dreams of new and technologically potent military doctrines:

> Essentializing all cities, everywhere, as mere spaces working to camouflage threats secreted into quotidian urban life, is proving essential to legitimize very heavy investment in new surveillance and targeting systems in state militaries and paramilitarizing security forces: new micro-drones, swarms of half-manufactured, half-organic cyborgian insects; myriads of robotic devices spread generously through the 'urban battlespace' which use computer code linked to vast databases to automatically define and even destroy 'targets'. Such emerging technoscientific complexes … are being designed to permanently permeate and systematically unveil urban environments, so allowing military theorists to fantasize once more about long-standing dreams of verticalized omniscience and domination.
>
> (Graham and Hewitt 2012: 86)

Coming from this admittedly short overview of the surveillance perspective we want to argue that the current theory development and conceptualization taking place within the before mentioned 'mobilities turn' may be consulted as a fruitful framing of drones and urban surveillance.

The Mobilities Turn

As mentioned this work is based within the 'mobilties turn' research field. What this means in greater detail cannot be explained here, but the work that has been influential as inspiration has predominantly been the work of scholars such as Cresswell (2006) and Urry (2000, 2007, 2014).

Leading 'mobilities turn' theorist John Urry explores drone technologies as a feature of a more general global trend towards 'offshoring' (Urry 2014). The proliferation of border crossing technologies and evasion of national regulatory regimes create a new situation in which drones play one (albeit a smaller) part. In his compelling and critical analysis Urry argues that:

> Drones do the dirty work of surveillance and killing at a distance. They are normally operated by 'desk pilots' based in their 'home' territory and often dressed in 'flight suits'. Indeed, such drone pilots normally live close to their homes and loved ones. These 'pilots', brought up on a childhood of video games and screened efforts to kill as many 'enemies' as possible, can surveil and kill for real and then return for a refreshing beer.
> (Urry 2014: 143)

On a geopolitical note, drones may prove to be counterproductive in relation to the public perception of warfare and much seems to suggest that Western drone attacks in for example Afghanistan have not been able to diminish interest in Taliban or al-Qaeda activity (Urry 2014: 144). Alas, one might say that "*the drone genie has been let out of the bottle*" (Urry 2014: 146). What this precisely means no one knows for now, but it begs some serious questions:

> What will happen when every country processes thousands of drones and each border is buzzing with them? Jenkins indeed argues that the greatest threat to world peace is not now from nuclear weapons but from the exceedingly rapid proliferation of drone warfare,

which cannot be easily reined in or put into reverse. To some degree even guided missiles were regulated by international law and protocol. But drones are ungoverned by law or protocol and their use is mostly illegal.

(Urry 2014: 146)

How we may deal with this geopolitical transformation induced by offshoring and drone technology is difficult to say. This paper's focus is still on the 'return of the drone to the city' but it is clear that the huge economic gains that lie within this globally spanning system of de-regulated economies and technological innovation is the precondition for further development of the drone technology in the very first place.

As argued elsewhere new mobile technologies of surveillance (GPS, drones, RFIDs, etc.) alter the conception of power from one predominantly related to confinement and enclosure as in the well-known historic practices of imprisonment towards adding a layer of 'tracking' (Jensen 2013: 133ff). The new technologies may render confinement obsolete (in many cases but of course not always) since what really matter is; 'knowing where things are' ('things' being human subjects, containers, or other types of goods). Klauser seems equally to agree that in many instances of urban surveillance the issue is not so much 'access control' but rather "*the continuing localisation and management of people and objects on the move*" (Klauser 2013a: 290), or in the words of Michel Foucault:

> [the problem] is no longer that of fixing and demarcating the territory, but of allowing circulations to take place, of controlling them, shifting the good and bad, ensuring that things are always in movement, constantly moving around, continually going from one point to another, but in such a way that the inherent dangers of its circulation are cancelled out.
>
> (Foucault quoted in Klauser 2013a: 294)

Coming from such a perspective, the key to understanding 'how drones work?' would be to engage in an exploration of how they facilitate and engage with specific situations where human subjects are enrolled into a relational configuration with a drone (which can be as surveyed or as informed agent). Within the mobilities turn analytical frameworks with focus on particular situations of mobility offer to engage with these issues. To fully present a research agenda for the merging of surveillance and mobilities studies transgresses the confinements of this paper. But here we shall suggest the direction. A 'situational approach' to mobilities (Jensen 2013) means to understand how the situation is spanned out between a material setting of infrastructure, technology and built environment; social others present in mobile situations; and always as an embodied practice. In other words; mobile situations always take place, in interaction, and as an embodied performance. The actual drone technology (hardware as well as software) and the way it connects to the wider digital networks through data transmission must thus be seen as a part of the mobile assemblage through which both the surveyed and the surveyor are linked.

The reason why the 'mobilities turn' would fit the drone surveillance even more precisely than, say, the fixed and immobile CCTV surveillance systems is precisely due to the fact that we are dealing with mobile surveillance technologies. The surveyed subject is not the only mobile 'object' in this assemblage as the surveillance technology itself is mobile. This creates new opportunities for surveillance indeed but also requires explicit 'mobile theorization' in order to be understood properly. The 'in situ' mobility regardless if one is contemplating a drone-surveyed subject or a subject on the ground relying on data and intelligence transmitted via the drone speaks to a new complexity. The moving assemblage of subjects, drones, and data furthermore necessitates a new vocabulary to deal with 'stretched situations' (Jensen 2013) in which we are beyond immediate face-to-face relationships. The mobile situation of a drone interacting/communicating ground trooper would then be an example of how new digital technologies alter and change the relationship between the near and the far, between the proximate and the distant by altering the 'proximity-connectivity nexus'. In no insignificant way is the surveillance perspective then

supplemented with sensitivity to how the situations are defined through mobile media, materiality, sociality and embodiment. Obviously this is at the micro-scale. However, one should remember that even huge geo-political doctrines and conflicts are de facto played out in the pragmatic and mundane situation. This is in accordance with Green and Zurawski when they argue for more ethnographic studies in surveillance research as this connects better to materiality (2015: 38). So the two perspectives of Surveillance Studies and mobilities research supplement by linking the understanding of surveillance as governmentality and expressions of power to the detailed and situational understanding of mobile situations. This is in clear accordance with surveillance scholar Klauser's call for future research into "*the ways in which people experience and cope with the splintering urban spheres of security on an everyday level*" (Klauser 2010: 338).

Besides the obvious fact that mobile drones are suitable for framing within the mobilities turn due to their mobile capacities, there is another reason why Surveillance Studies may benefit from the mobilities turn when it comes to comprehending a contemporary phenomenon like drones. This has to do with the sensitivity to material, physical, and architectural features that certain parts of the mobilities turn has made their hallmark. On a more general note Adey et al. argue that:

> Mobilities research is at the forefront of developing new ways of thinking about the politics of matter. Whilst people are mobile, the equally differentiated mobilities of information, capital, goods, and services that are essential for contemporary life are as sustained feature of mobilities research. Indeed one of the defining characteristics of mobilities research is its attention to the mobilities of multiple materialities, both human and non-human … materialities that have different qualities, different properties, different capacities, and are formed of different relations … A focus on mobile materialities problematizes simplistic distinctions between humans and non-humans and instead retunes attention towards the assemblages of matter that move.
>
> (Adey et al. 2014: 264, 266)

As a direct prolongation of such a call for the study of 'assemblages of matter that move' is the new and emerging sub-field to mobilities research labelled 'mobilities design' (Jensen 2014). From the perspective of mobilities design the complex assemblages of technologies, artefacts, and systems that embed an increasing amount of mobile practices may profit from an increased sensitivity to materials, spaces, and design. Evan Rawn who writes for *ArchDaily*, a web-based architectural blog, describes in even more detail how the material infrastructure of the three-dimensional city needs to be 'inscribed' as it were with visual clues and 'routes' for drones in order to function and argue very much in line with mobilities design that:

> In everything from the design of skyscraper facades with integrated drone landing pods, to invisible urban infrastructure for government zoning, to the nuanced design of private residences, it is clear that the technological revolution sparked by drones will have widespread architectural ramifications.
>
> (Rawn 2015)

In the case of drones utilized for urban surveillance, the turn to mobilities design opens up a dimension of Surveillance Studies with focus on materiality as well as on everyday life experiences that Klauser called for above. We will end this paper by shortly exemplifying how mobilities design coupled with Surveillance Studies may increase the understanding of how a technology such as drones are 'Foucauldian boomerangs' by virtue of their re-assembling into mundane everyday life practices in the contemporary city. Admittedly these are imaginary and speculative examples that need a specific and concrete empirical research strategy to be explored. Here the aim has been to suggest the merging of two frames of analysis. The next step will be to carry out detailed field studies of drones in contemporary cities.

To exemplify with a reference to drones, the mobile subject being under surveillance may or may not be aware of this. However, the drones conducting surveillance (and perhaps ultimately a violent assault) are part of the material and physical conditions of the situation 'on the ground'. Any such situation would then also be acts of social interaction and embodied performance. If the example was an urban police officer rather than a surveyed subject then we could more easily see that the way the drone becomes enrolled into the mobile situation is part of a 'mobilities assemblage'. Such an assemblage would imply that the officer on the ground would be engaging with data and information through software and code (or what we may term 'staging from above') but would always have to rely on his or her own interpretation and options of choice for immediate action (a 'staging from below'). A mobile situation of surveillance with the advent of drone technology will be afforded in at least two significant ways. One is through a central drone command and control centre which will be able to operate a drone above the situation on the ground and thus providing the police officer with real-time data and information mediated 'from afar'. However, we have also seen that drones may be operated by the 'officers on the ground' themselves, thus extending the surveillance technologies of the mobile situation significantly and ultimately providing the police officer with extended aerial vision controlled by him or herself. From the long list of drone usages presented earlier we may imagine a number of other situations where mobile surveillance could be explored. From a quick search through the headlines on the internet related to drones we see how the field expands and proliferates as we speak: *Drones in India; Use of drone on the rise in Germany; 'We see ourselves as the vanguard': police force using drones to fight crime; The San Jose PD Says It's Sorry for Not informing the Public about its Drone; The drones come to Paraguay; Drone and CCTVs for Everyone: Surveillance Tech Expands Across Latin America; Drones for 'urban warfare'; 'Ubiquitous as pigeons': Imagining Life in the City of Drones.* These are but a few of the internet headlines that illustrate an increasing interest and activity in applying drones in urban settings across global geographies.

Much more theoretical development may be necessary in order for connect Surveillance Studies with the new mobilities turn. However, here the main point has been to raise the awareness to the fruitfulness of merging these two disciplinary approaches and further to suggest their successful application to an empirical phenomenon such as drones and urban surveillance.

Discussions and Reflections

Klauser argue that "*... space must be considered as one of the constitutive dimensions of surveillance (as both the product and the producer of relevant practices and techniques) rather than a static background structure*" (Klauser 2013a: 290). Given this there is a strong affiliation between ideas about relational space, new mobilities, uneven urban geographies, and the multi-scalar understanding of places (Jensen 2013).

The political application of drone technology reaches from the urban neighbourhoods towards the international arenas of geopolitics. The material technology becomes a key nexus for understanding the multi-scalar nature of contemporary aerial power. Besides these scaling cascade effects we are facing new challenges in terms of regulatory framework and issues of 'drone politics'. Already there are massive interests from commercial actors wanting to apply drone technology for business purposes. Also private citizens are engaging with drone technology in playful and ludic ways that ultimately will require some sort of public regulatory framework in order to prevent an aerial surveillance chaos and anarchy. Government agencies will need their regulatory frameworks for utilizing drone technologies regardless if we think of traffic regulations, disaster management, public utility surveillance or any other application. Finally, the fact that organized crime has taken on the drone technology also begs questions of legal frameworks as well as policing regimes (recently the media reported that drug dealers in Denmark's famous 'free city' of Christiania were seen to operate drones in order to disclose any police interventions). Next to these regulatory challenges the drone technology needs a theoretical interpretative scheme that appreciates the fact that we are dealing with mobile technology. This may sound banal but opposed to

fixed cameras and other types of traditional surveillance technologies the fact that the camera and computer move makes all the difference. This is a general point connecting to the theories and concepts within the mobilities design.

One obvious risk in applying drone technologies for urban surveillance is the further contribution to what has been termed the 'militarization of urban spaces' (Graham 2010; Wall and Monahan 2011). This then collides with the dilemma of a general interest in increased security and peaceful public places. If this only can be achieved by the application of technologies such as drones we face a serious discussion about the nature of cities and the proliferation of multiplicity and civil rights as their hallmark (Finn and Wright 2012). This is rightly spotted by no other than the British Ministry of Defence under the heading of 'moral and ethical issues' related to drone technologies:

> Unmanned systems pose more than just legal dilemmas. The ethics and morals-related questions of when, where, and how automated or autonomous unmanned systems may be used, have been tentatively explored in academia (and in popular science fiction), but we are only now starting to require real-world answers. Many of the dilemmas apply to the use of unmanned systems in any environment, not just in the air. Beyond the question of whether an action is legal there is now the concern of whether an action is morally justified. Will the advent of increasing autonomy raise complex dilemmas centred on the moral and ethical justification of our actions? For instance, will future wars be fought remotely, at least initially, with little or no loss of friendly human life? Is human nature such that the next arms race will seek to pitch increasingly complex unmanned systems against other unmanned systems or humans?
>
> (British Ministry of Defence 2001: 5-8)

There surely is a need to uncover the destructive potentials of drone surveillance and drone technologies through a 'politics of visibility'. Moreover, the positive potentials must be explored as well. In the arts both areas are being pursued rapidly and social research needs to join in on this effort to gain a deeper understanding of a new dimension of the digital and technological layer of the contemporary city which threatens to become very socially excluding:

> We have already seen evidence that similar racialised marginalisation as well as class, gender and political marginalisation is occurring in relation to UAS [unmanned aircraft systems] surveillance in civil applications. Furthermore, the potential for UASs to carry weapons raises more immediate safety and ethical concerns about the right to life.
>
> (Finn and Wright 2012: 190)

As we saw above, Klauser called for research into the small-scale situational experiences with surveillance technologies. So far this paper has tried to engage with this request through suggesting a merging of Surveillance Studies and mobilities studies. The potential presence of drones as tools for urban surveillance will surely accentuate this need and call for research into the mobile, urban everyday life practices and how they are intertwined with new mobile systems of control and surveillance. Urban drone surveillance systems potentially emerge as hybrid socio-technical assemblages of complex three-dimensional, non-hierarchal foam city space that may be explored for their capacity to act as new Foucauldian boomerangs!

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