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DRONE TERRITORIES: ON THE SPATIAL POLITICS OF MILITARY AND HUMANITARIAN GOVERNANCE WITH DRONES

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Abstract

Drone Territories: On the Spatial Politics of Military and Humanitarian Governance
with Drones

Sarah Cheikhali

This dissertation is about the cartographic, architectural, and infrastructural spatial
politics that enable drone governance. It shows that drones have distinctly *spatial*
preconditions that tie what happens in the air to the politics of the spaces below. These
spaces are charted in terms of a series of — cartographic, architectural, infrastructural
spatial politics through which drone spaces are *made accommodative* of drone use. The
supporting research shows that the ways in which drones remake space rely on a suite
of spatial preconfigurations tied to political processes of neoliberalization. For related
reasons, it further shows that drone governance, both military and humanitarian, is
highly contingent on infrastructural assemblages that make space *targetable* through
shifts caused by broad political-economic trends.

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AlShukru-wal-Hamdulellah!

Introduction

I. Groundless Omnipotence

A. This dissertation is not about drones

"The future is now but, importantly, the future is in Africa. The US and Europe will follow," says Keller Rinaudo, CEO of the San Francisco-based startup drone company Zipline. Rinaudo is referring to how ambitious governments in Africa are "leapfrogging with new technology" and integrating Zipline's biomedical delivery drones into their public healthcare systems, seizing the opportunity offered by drones to overcome the extreme unmet medical needs in their most remote areas. Indeed, in many "remote, developing regions of the world, drones are promised to become one of the most effective solutions to universal health coverage," (McCall 2019). This optimism comes down to what the drone symbolizes: super-human reach over the obstacles of geography. They are, according to a typical booster of the promise of drones, "easily portable and can add value everywhere from the mountains of Nepal to the forests of Guyana," (Jacobsen 2016: 31). This capacity for value-generation means we should expect soon that the "day will come when flying robots will deliver aid to locations too dangerous for humans," (Jacobsen 2016: 31). As a value proposition, it is also a sign of some of the neoliberal common sense about economic value-added metrics that, as we shall see, swirl around drones. But mainly it conveys the far-flung ambition of drone developers and deployers, and the huge claims they make about drones overcoming obstacles to improve the world. Another advocacy article titled

Drones for Good, for example, argues that we should expect the far-reaching capabilities of drones to help us not only in humanitarian and development aid, but also in the areas of art, mapping, public safety, journalism, corporate accountability, and even in social movements and protests, where drones can "serve as another set of eyes monitoring police action, holding the state to account" (Choi-Fitzpatrick 2014: 26).

In the upbeat promotions drones are always presented as exciting new technology, opening up new paradigms for both commercial and government uses. Drones are not just the humanitarian industry's new darling: the military has also long been enamored by the potentials offered up by drones. When the United States Air Force Scientific Advisory Board (SAB) conducted a study in 1996 on the role of drone technology in military operations, its principal conclusion was that UAVs would enhance the ability of the United States to project military power (AFSA 1996). This and later SAB studies reasoned that this technological development had profound implications for the military forces that the US would design and deploy in the future, allowing the US military to "operate deep in enemy territory," (AFSA 2003). Despite the ethical questions raised surrounding their use, drone technology is deeply entrenched in the US military because it frees strategists from the limitations of geography. In one military drone advertisement, defense industry giant General Atomics writes that its drones are "routinely operated over world trouble spots… fly[ing] missions beyond the capabilities of manned aircraft," (Graham 2016). Drones

are seen in this light as game-changers for war in that they fly beyond what was previously thought capable.

This dissertation, however, is not about drones as high-flying vehicles of global omnipotence. Rather it is about drone territories and thus about the spatial politics that actually enable drone governance, and that this "omnipotence" is contingent upon. My research was inspired by an investigative journey of discovery that followed my learning of a statement published by religious and tribal leaders and scholars in February 2013 in Sana'a, Yemen. They wrote the statement in anticipation of the March 2013 National Dialogue Conference, a transitional dialogue brokered by the UN and the Gulf Co-operation Council that would negotiate an agreement for a peaceful transition of leadership in Yemen. In the words of the UN's special envoy for Yemen Jamal Benomar, the dialogue would establish "a new social contract and open a new page in the history of Yemen, breaking from the past and paving the way for democratic governance founded on the rule of law, human rights, and equal citizenship," (UN News 2014). Despite the Conference's stated objective of turning over a new page in Yemen, the authors of the statement were not invited. Their exclusion was the subject of the statement they wrote.

The statement began by citing a Quranic verse (Al-Tawba 122) about the importance of the inclusion of representatives from the religious scholarly class in the polity. After expressing regret that the scholars were not adequately represented, the

statement listed nine points enumerating their concerns for the country. The eighth point contested the existence of any foreign military establishments in Yemen. The ninth contested the unlawful killings performed by drones, stressing the sanctity of Yemeni blood and the blood of whoever else found security on Yemen's soil. The statement concluded by citing textual evidence from the Islamic tradition that reminded readers of the significant status of the Yemeni people and specifically, the *land* of Yemen in the religious tradition. The conclusion thus invoked the security of not only the country but the ground of Yemen itself, thus tying the security of the Yemeni people to Yemen's *territorial* sovereignty. These sentiments, the statement argued, were in danger of being overlooked by the exclusion of the religious scholars from the National Dialogue Conference.

The context of the reminder of the importance of Yemeni soil was religious but also reflected the geopolitical atmosphere that had been brewing ever since 2009. Yemen had since been dealing with domestic instability ever since suspicion spread throughout the country that the government was colluding with the US to facilitate the drone campaign in Yemen. As a result of these rumors, insurgencies broke out all over the country, with militants capturing key cities and territories. The rumors were true: the US was certainly interested in gaining a military foothold in Yemen.

Despite official denials, a US State Department Inspector General's on-the-ground review of the US Embassy in Sana'a in 2009 found that "steadily growing

military elements based at the embassy" were part of an expanding "US military footprint" in Yemen (Scahill 2011). At the same time as this expansion, a US counter-terror drone strike campaign went into full force. These two developments were related: as classified military documents leaked by the *Intercept* (2015) showed, the drone wars depended on there being a grounded presence. One document titled "ISR Support to Small Footprint CT Operations - Somalia / Yemen" compared the tempo and methods of conventional operations in Afghanistan and Iraq, in which US personnel were on the ground in large numbers, to the "shadow wars" in Yemen and Somalia where there was only sporadic US military presence and established networks. What distinguished these operations from similar operations in Afghanistan or Iraq was what was referred to as the "tyranny of long distances to operating areas [which] complicate the 'fixing and 'finishing' of HVIs." These operations were to be conducted outside a defined theater of active armed conflict (ODTAAC), there were active political and legal limits on footprint or allowable US activities, there was less penetration of communication networks, relatively few on-the-ground intelligence networks, and other factors which made the drone wars less precise. Without these drone infrastructures, special operations engaging in systematic and successful kill programs like those in Afghanistan and Iraq were less possible. "When compared to previous operations," reported the document, "the amount of time required to action objectives is literally orders of magnitude higher."

Due to this "tyranny of distance" and seeking to be closer to Yemen without being on the ground, in the summer of 2011 the US sent private defense firms and began the construction of new secret airbases in Saudi Arabia and in permissive areas in the Horn of Africa. While these bases helped the US get closer to its targets in Yemen, there were still far distances that negatively impacted the effectiveness of these man-hunt operations, to the detriment of the lives of many civilians who were caught in the crossfires.

What became clear through the Yemeni leaders' statement and the leaked military documents was something counterintuitive to the popular discourses and critiques on drones. The popularity surrounding drones has to do with this idea that they are omnipotent technologies that can see and do all. This makes drones, in the words of CIA director Leon Panetta, "very frankly ... the only game in town," (Panetta 2009). Like official discourse, the academic literature on drone use also tends to invoke the drone's unique ability to overcome the obstacles of geography and distance. Drones are so effective because they eliminate "distance" as a limitation of the modern battlefield, removing physical barriers to the unlimited projection of power, "nullify[ing] the twentieth-century belief in 'boots on the ground' as a proxy-war necessity," (Mumford 2013: 43). Fukuyama (2021) likewise argues that "the use of drones … undermines existing force structures," in war. Hammes (2016) argues that "many states, and even insurgent or terrorist groups, will be able to project force at intercontinental range." Drones are presented in the academic literature as a form of

"atmospheric warfare" and policing from abroad (Shaw 2016). Drones watch you from above with what Haraway (2020) once called - in her critique of scientific objectivism - "a view from nowhere." In line with the popular drone discourse, then, today's wars are widely viewed as "everywhere wars," (Gregory 2011), and thus not subject to the geographic constraints that traditionally impeded military reach. The critique is that drones represent a strategy of power aimed at generating physical and political distance between intervening agents and their targets to tip the scales of power (Biegon & Watts 2020). The image is that of a military technician in cockpit in a safe zone controlling the strike with their extended human reach and effecting change thousands of miles away from the action. Thus, the unease surrounding drones is due to the enhanced capacity they allow their user for sight and action at a distance.

As much as it makes sense to communities suddenly confronted by drone governance and interventions, there is a weakness in this common critical concern with drones. In short, it is weak insofar it relies on a fetishized imaginary of the aerially suspended drone, an imaginary that reproduces, however unintentionally, the vision that drone promoters tell themselves. This vision is that the drone is uniquely able to govern at a distancefrom any part of the world over any other part of the world; that it represents a strategy of power that is unconstrained by any obstacles of geography. The result is that critics of drones, like those living under them, perceive the drone with similar degrees of geo-fatalism. How can that which sees all and is unhindered by geography be resisted?

However, as much as the literature narrates the all-seeing and omnipotent power of the drone (Chamayou 2013; Gregory 2011), its grounded reality tells a different story. In truth, the drone has a distributed mode of operation that is dependent on highly mature networks of local actors and supportive infrastructures. In fact, drones themselves do not "find" targets, and while their ability to maintain an almost constant "stare" is helpful in tracking down kills or delivering pills, target space emerges due to particular historical circumstances before drones strike. Drones also rely on supportive infrastructures that are typically in close proximity to targets – they are often fallible and thus dependent on partial networks of on-the-ground intelligence and communications infrastructures that let drone operators know where to strike. Drones, therefore, cannot fly anywhere in the sky, but are to various degrees tethered to their targets, bases and supportive infrastructures. In light of this grounded mode of seeing and operating, the apparent "view from nowhere" immediately shows itself to be a view from multiple "somewheres" and reliant on territories and the spatial politics that make them possible in order to fly.

The same narrative of the drone's independence from the constraints of geography applies not only to military killing drones but humanitarian delivery drones as well. On the flip side to the fatalistic attitudes that surround military drones, the emergence of humanitarian delivery drones invokes equal levels of optimism by proponents that see them as solutions to what is called "the problem of the last mile"

in healthcare and humanitarian relief. In overcoming the problems of patchy or otherwise inadequate health service infrastructures and geographic constraints, drones are quickly gaining a super-tech-turned-super-hero reputation in humanitarian techno-solutionist projects. For instance, Emery (2016) argues that with humanitarian delivery drones, "what used to take weeks due to inadequate or damaged infrastructure can now be done in a few hours," (Emery 2016: 157). Similarly, Pulver et al. (2016) suggest that "although there are still many factors to consider, drone networks show potential to greatly reduce life-saving equipment travel times," (Pulver et al. 2016: 378). Jeong et al. (2020) argue for integrating humanitarian delivery drones into disaster response systems in order to be able to reach geographically remote areas.

Interestingly, the same causes for concern about military drones, their ability to see and fly past the bounds of human reach, appear to be the main selling points for humanitarian delivery drones. As for humanitarian drones, the hopeful framings of the drone's ability to extend its user's reach also take for granted the idea of the aerially suspended drone that can overcome the bounds of geography. The "major advantage of small humanitarian drones is that they are cheap, easy to operate, and require little logistical infrastructure on the ground," (Emery 2016: 154). Cautious commentators raise ethical concerns about the possibility that humanitarian delivery drones will be used in improper ways such as for surveillance (Tatsidou et al. 2019). Others point to their ties to long-distance colonial control, for instance, Silva et al. (2019) note that the information captured by drones needs to be protected, warning that the excess data

captured by drones can infringe on the privacy of individuals. Aside from these concerns, however, the discourse around humanitarian delivery drones that deliver medicine and health goods is typically positive.

Despite the positivity and their different purposes, humanitarian drones share many similar capacities with military drones. This results in some remarkable parallels in their dominant framings. In military uses, the emphasis on the way drones augment their users' sight and power is meant to foreground ethical questions about asymmetrical distributions of power. In the case of humanitarian drones, by contrast, it is meant to signal the unheard-of potential we now wield to enact humanitarian governance. Both cautious critiques of military drones as overpowering, and hopeful framings of humanitarian drones as empowering, tend to naturalize the drone and reproduce the story that the drone tells about itself — that drones are powerful and unmatched in their extraordinary capabilities and that this is the basis for the ethical dilemmas that are presented. This is also the basis of their pull on consumers. That is, these narratives are not only found in academic circles; drone companies also employ them to market their services to governments and private consumers.

And in the case of humanitarian drones specifically, what the critique about the ethics of privacy and data ownership leaves intact is the broader critique of the drone's conditions of possibility, a critique which reveals deep structural failings. These are not just the existence of drone-supportive infrastructure, but also the conditions that give

rise to the need for devices that are marketed as able to overcome geographic constraints. Drones operate in space that is both underdeveloped vis-a-vis meaningful health governance and security, and *over*developed in other ways that make it accommodative for drone use. The critique of drones as super-technologies that overcome the limits of geography fails to account for these conditions of possibility.

Crucially, narratives of omnipotence leave us unable to formulate a strategy toward critical political engagement with the drone use of governments or to critique the way that technology is used to solve essentially political problems of disinvestment in infrastructures conducive to meaningful security and health. Both military and humanitarian delivery drones operate in space that is consistently underdeveloped in terms of security and health infrastructure but increasingly *over*developed in terms of drone-accommodative infrastructures and spaces.

B. Intervention and significance

My argument in this dissertation is that the drone does not fly alone above both history and geography. The drone is not omnipotent or overpowering on its own in that a series of historical respatializations and assemblages are necessary conditions of its emergence, and it does not overcome geographic constraints so much as rely on the recalibration of geographic space in order to operate. Drones have distinctly *spatial* preconditions. This means that comprehending what happens in the air begins by

complicating what happens in the space below. This study aims to illuminate some of the ways such spaces are remade. I refer to these spaces respectively as: cartographic, architectural, infrastructural, using the three overarching concept-metaphors as umbrella categories for sub-types of the spatial politics that make drones possible. With each type of spatio-political preparation, we can come to see how the world is *made accommodative* for drone use, creating drone theaters with actors, audiences and targets of opportunity all over the world. These three levels are briefly explained here to clarify the dissertation's argument.

What I am calling the "cartographic" enabling of drones includes all of the texts and discourses (including actual maps, but also all sorts of map-like spatial categorizations geographical imaginations and visions) that contribute to the mapping of different spaces as eligible for intervention via drone. It is how some spaces are discursively mapped as low-hanging fruit for which drone interventions are the most efficient and cost-effective method for administrating governance. At this level, I foreground the way concepts such the exception or emergency, remoteness, and disconnectedness in political speech and writings operate in the discursive cartography of peripheral drone space. I attempt to illustrate how some spaces are mapped discursively as "problems" that drones come to solve, before moving on to critically analyzing how drones respond to this narrative of the problem and present viable "solutions." My research shows that certain spaces are not mere "spaces of exception" but emerge as "entpreneurial playgrounds of experimentation" for drone companies

and drone-wielding actors as the result of the interaction between political spaces of exception with neoliberal discourses that center market rationality.

Next, I use drone "architectures" to refer to the basic spatial foundations upon which social relations (like governance-via-drone) take place. The idea is that not all spaces are targetable by drones. Remote and targetable spaces, as distinct from connected and thus less targetable space, emerge through complex political-economic processes that create patchwork landscapes of underdeveloped spaces. These are the same process that make certain other spaces *un*targetable. The divide between drone space and space immune to drone intervention has a genealogy that runs parallel to shifts in the global political economy. The reason I use the word "architecture," as opposed to drone territories or drone geopolitical-economies is because architecture points not only to the hollowing out of space in the creation of peripheral target space but also to the reconstruction of space (as implied by the dialectical movement of capitalist destruction and reconstruction) in ways conducive to governance by drone. The term also emphasizes the artificiality of this space, its historical contingency, and the significance of the architects of spaces. I also draw inspiration for my conception of architecture from Robert and Sinha's (2019) usage of global health "anarchitecture." The theorists use anarchitecture to demonstrate the structure of contemporary state operations in areas which use drones to deliver biomedical goods. State operations, which historically have been underpinned by expectations of even distribution of services across bounded sovereign spaces, are being reconfigured by provisional

networks (like those traversed by drones) that cut across traditional state infrastructures and are often directed from spaces outside the state they operate in while becoming indispensable to the state's ability to govern. I use the concept of architecture to study the spatial correlate of these processes.

Finally, drone "infrastructures" include the actual technological grids, service assemblages, and actors that enact drone governance. If architectures refers to the underdevelopment of certain spaces, then infrastructures looks at how space has been *over*developed to accommodate some forms of governance (via drones) and not others. The study of infrastructure results in what Bowker (1994) called an "infrastructural inversion" — it foregrounds the hidden work (and workers) that is often operating in the background. Crucially, the study of a thing's infrastructure serves the goal of decentering the thing itself, and this thesis is not about drones but about the spatial formats, projects and politics that actively support drones.

In each of these three levels of space-making there are also political-economic imperatives at play. My argument in what follows is that many of these, including the sorts of value propositions posited by both humanitarian drone developers like Zipline, and military promoters such as Panetta, can be usefully theorized in terms of neoliberalism. That is, different instantiations of neoliberal ideals underlie the creation of the discursive cartographies; they are at work in the making of architectures of unevenly developed and combined landscapes; and neoliberal political-economic

activity underlies the building of drone infrastructures. This research thus draws on and contributes to the broad debate about the definition of neoliberalism and questions about its effects, including where it travels globally, with what forms of adaptation, and transformation, and what kinds of effect. Three features of neoliberalism are explored consistently throughout the dissertation to come to terms with drone spatial politics: namely i) neoliberalism's processual unfolding and political adaptation across space, its ii) macro-politics of class domination and dispossession; and iii) its micro-politics of economization and financialization in the formation of newly entrepreneurial subjects.

First, this dissertation engages with the stream of thinking about neoliberalization as a process that reorganizes space. Critical geographers who analyze the impact of the transformation of productive systems and the international division of labor on spatial relations feature heavily here. This includes Harvey's (1989) argument of how urban governance has shifted from managerial practices which focused on the local provision of services, facilities, and benefits to urban populations to more entrepreneurial preoccupations to encourage economic development and employment growth. Harvey showed how the shift toward urban entrepreneurialism, its associated privatized forms of local governance and creation of enterprise zones, was not a spontaneous process but rather "embedded in the logic of capitalist spatial development," (Harvey 1989: 12). Brenner (1999) also articulated a theory of the spatial dimensions of neoliberalism in his argument that neoliberal globalization involves the reconfiguration and re-scaling

of forms of territorial organization such as cities and states. Peck and Tickell (2002) added further complexity to how processes of neoliberalization reshape space when they identified different moments of spatial restructuring: a period of "anti-regulatory" roll-back moments followed by and intertwined with a series of roll-out neoliberalized state forms. These dialectical processes result in different calibrations of space and uneven development. Throughout this dissertation, this articulation of neoliberalism as a thing that manifests spatially features consistently, especially since drones tend to fly in spaces that have been economically marginalized in the neoliberalization process.

Yet another stream of thought within the tradition that grapples with the question of neoliberalism sets aside the question of its spatial manifestations and instead frames neoliberalism as a political project. Scholars contributing to this tradition have interpreted neoliberalization as a new "articulation of state, market and citizenship that harnesses the first to impose the stamp of the second onto the third," (Wacquant 2012: 71). These scholars conceptualize neoliberalism as a political project that seeks to "re-establish the conditions for capitalist accumulation and to restore the power of economic elites," (Harvey 2005: 19). More precisely, neoliberalization is a political project pushed by states and elite global institutions to create the conditions for heightened forms of capitalist accumulation. Such an articulation of neoliberalism also informs parts of this research — after all, many of the processes that anticipate the rise of drone governance in some regions were often driven by such neoliberal imperatives and discourses of what Harvey calls accumulation by dispossession. For instance, the

Western military invasions into Afghanistan (2001) and Iraq (2003) might all be interpreted as the forceful establishment of the conditions for neoliberal expansion (see Roberts et al. 2003). As for another example, the problem of insufficient public health infrastructures in places like Ghana and Rwanda where drones now administer health governance is also rooted in earlier neoliberal privatizations of public functions that resulted in such structural failures.

While the antecedents of drone space can be found in such neoliberal re-calibrations of space that result in underdevelopment, as well as in the neoliberal imperatives that guided Western military interventions across the globe, it is only the third articulation of neoliberalism that helps explain the operative logics that undergird the use of drones in governance. Inspired by Foucault (2004), scholarship contributing to this third stream of thought on neoliberalism define it as a new regime of governmentality within which they situate the rise of a set of governance techniques and a specific type of rationality. This stream of thought was best articulated by Brown (2015) who defined neoliberal rationality as an ethos, a set of organizing principles that spills over from economic spheres and orders the conduct of previously non-economic spheres of life. All organizations partake in "benchmarking" which "refers to the practice of a firm or agency undertaking internal reforms on the basis of studying and then importing the practices of other, more successful firms or agencies … [it] represents the process of … understanding, distilling, and then implementing the practices that make those [industry] leaders successful," (Brown 2015: 136). The recasting of more invasive

forms of governance into targeted intervention via drone is a result of such benchmarking that prioritizes cost-effective, high bang-for-buck targeted interventions to deal with problems of governance.

This dissertation does not claim fidelity to any of these contending characterizations of neoliberalism but instead uses them to inform different areas of the research into how political-economic processes shape space. In this sense, the research is multi-scalar and multi-dimensional. Through the scaffolding of different levels of space making (cartographic, architectural, and infrastructural) and by drawing off the debates around contemporary political-economic processes, this research thus presents an understanding of drone governance that challenges notions of the drone's omnipotence and its independence from geographic constraint. **This research argues that just as drones rewrite space in their theaters of operation, rearranging and reconfiguring social reality, it is also true that space has been rewritten for drone use in these theaters.** This process of space-making, I want to stress, is best understood against a backdrop of global processes of neoliberalization, even though it is not reducible to neoliberalism as examples like the Yemeni experience and resistance make clear.

Drone governance, whether military or humanitarian, is highly contingent on infrastructural constraints, drones do not target spaces but operate in space that is *made targetable*, through political economy and previous foreign corporate or military

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presence. However, this presence is marked by distinctly different configuration from colonial military penetration or settlement of the past. The physical and legal reach of drone governance owes its capacity to a distinctive configuration of military and other affairs in the 21st century, that is, that they are increasingly privatized affairs. The state's biopolitical and necropolitical governance increasingly traverses through corporately laid lines.

Understanding drone governance from the perspective of the space that enables them allows for a particular political response to their use. When the people of Yemen invoked territorial sovereignty, or the right to shape the actual ground of Yemen on their own terms, it was a direct affront to the aerially suspended technology of power by attempting to cut off its support system. Understanding space as constitutive of social relations and power and governance also foregrounds the importance of historical processes that shape any given space. Populations upon whom humanitarian delivery drones are pushed as natural solutions to their problems should also know about the *un*natural, structural and political, processes that have resulted in the problem.

In conclusion, the basic objective of this work is to come to terms with drones within a lineage of neoliberal spatial configurations in and of the theaters in which they operate. This project would pose a challenge to the popular discourse surrounding drones by disputing the standard depiction of the drone as having a special ability to overcome geographic obstacles. It does so by offering an account of the material and

discursive spatial politics that enable the drone and form its conditions of possibility. These cartographies, architectures, and infrastructures, I argue, can only be adequately understood as emerging in the wider context of the neoliberalization of the world economy over the last few decades.

II. Literature

Besides literature relating to the all-seeing and all-powerful dimensions of the drone discussed above, this dissertation contributes to three additional sets of writings. The first is about space as a constitutive feature of governance and power relations, the second is specifically about the role of political economy in the making of space, and the third is on work that defines and links the biopolitical and necropolitical together in ways that deepen our understanding of both.

A. Space as constitutive of social relations

First, this is the first application of critical human-geography concept of space as a constitutive feature of social relations (Gregory & Urry 1985) to the question of the rise of drone-administered security governance in certain areas. To be sure, there *are* already significant contributions to how drones rewrite spatial and thus social relations from above, or how drones function as an independent variable in the constitution of space. Parks (2017) argues that drones are engaged in "vertical mediation," a process by which drones alter the world around them, affecting thought and behavior and ultimately rearranging space. Gusterson (2016) argues that drones tend to "respatialize war" by not only scrambling relations of distance, making them simultaneously more elongated and more compressed but also, by erasing the once clear boundaries between the battlefield and civilian space (Gusterson 2016: 47). Gregory (2017: 42) shows how the United States has used drone warfare in an "attempt to expand the legal perimeter of the battlefield." All of these are examples of the spatial effects caused by drone.

While there are important contributions to the way drones rewrite spatial and thus social relations from above, or in other words, how drones function as an independent variable in the constitution of space, less attention is paid to the way drones themselves operate in what has come to be configured as drone-space. I thus insert this project into the wealth of literature that exists on how states engineer space to facilitate certain types of governmental control as the first set of literature. Examples of such work are those by Oliver Belcher (2014) and Marc Herold (2006) on the afterlives of counterinsurgency in Afghanistan which shaped space in such a way as to be conducive to further military penetration. In this vein, Madiha Tahir (2017) explores the relationship between authoritarian forms of governance and the spatial arrangement left behind by the colonial legacy in the FATA areas. Andrew Cockburn's (2015) work on how Vietnamese battlefields were "bugged" to enable new forms of technical war-fighting capacities also features in this tradition of literature. The concept of the pre-engineering of space to enact certain forms of governance was best articulated in Eyal Weizman's (2012) exploration of the militarized political space created by Israel's colonial occupation that facilitates its further penetration into and control of Palestine and Palestinians. Although these studies may only marginally grapple with the question of *drone* space, all of these studies say something about the way space itself is designed and even weaponized to enact certain kinds of governmental techniques. This dissertation takes inspiration from these studies but considers specifically the spatial pre-conditions of governance-via-drone.

Most work on the space-making that presupposes *drone* governance theorizes from the Agambian category of "exceptional space" and thus takes the space-making feature of the state's politico-juridical power as its starting point for thinking about drone space. For instance, Mahmud (2010: 56) invokes Agambian categories in his characterization of the drone space of the Federally Administered Tribal Areas (FATA) as a "zone where bodies and spaces are placed on the other side of universality, a moral and legal no man's land, where universality finds its spatial limits." Other critical interventions are keen to show that actually, drone governance in the FATA "involves no simple suspension of the law but rather an operationalization of the violence that is inscribed *within* (rather than lying beyond) the law," (Gregory 2017: 30). The existence of clear legal frameworks that at once regulate and enact drone use is also evident in the case of humanitarian delivery drones, as demonstrated by Lockhart et al (2021) in their comparative assessment of the attempt to establish drone programs in Rwanda and Tanzania. The authors demonstrate strong tendencies towards state control and risk-averse regulation of airspace in both countries, thus "challeng[ing] certain myths about African countries as un(der)regulated testbeds for foreign drone companies," (Lockhart et al. 2021: 12-13). This paper takes inspiration from these theorizations of drone space as a historically and geographically produced category but reads the resulting spatial shifts as primarily the reflections of changing the *political economy, and the role of neoliberal political economy in particular* as opposed to the law, as the

main imperative that is substantively supporting and sustaining the making of drone space.

B. Space as shaped by political economy

To make sense of the neoliberal influence on drone space-making, my argument here draws from and contributes to the rising tradition which investigates the political economy's role in space-making. A canonical example of this kind of work is Jamie Peck's work both alone and with others on the neoliberalization of urban space and associated forms of governance or the asymmetrical development of socio-economic space within the boundaries of the territorial state characteristic of capitalist development. Peck and Tickell's (2002) earlier work on the political and theoretical status of neoliberalism began with their suggestion of a process-based analysis of "neoliberalization" which looked at the way different "local neoliberalisms" embedded within wider networks. Significantly, the theorists established a stylized distinction between the destructive and creative moments of the process of neoliberalism, characterized in terms of "roll-back" and "roll-out" neoliberalism. Sparke (2020) takes up the roll-back roll-out stylization in his work on historical global regimes, showing how the initial roll-back regime of Structural Adjustment Programs in the global South which undermined historical goals of universal primary health care systems eventually gave way to a roll-out regime that insisted on prioritizing investment while adapting calculations from global finance to manage global health interventions.

These examples are part of a long tradition of thinking about the political-economic dimensions of space making. For instance, Lipton's older work on administrative decisions that make states and markets biased toward the city in capitalism are the same processes that make remote spaces remote through consistent disinvestments as "private individuals [are] indirectly induced by administrative decisions and price distortions to transfer from countryside to town their own resources, thereby reducing the social (but increasing the private) rate of return upon those as well," (Lipton 1977: 70). More current examples include Paudel and Le Billon's (2020) concept of "geopolitical economies of reconstruction," or Naomi Klein's concept of "disaster capitalism," both theories which illustrate how capitalist imperatives shape post-disaster reconstruction processes thus resulting in the recalibration of space in ways conducive to capitalist accumulation. Yet another example is found in Harvey's (2007) articulation of the "creative destruction" and "accumulation by dispossession" in which surplus capital overflows to new geographies to resolve the contradictions of over-accumulation in centers of surplus capital creation and in doing so destroy non-capitalist systems by naturalizing capitalist production (see Sparke 2008). Finally, the concept of historically produced territory by political-economic activities is best articulated by Lee et al. (2018) in their discussion of how the recently escalated economic competition between the US and China through the US *Trans-Pacific Partnership* and China's *One Belt, One Road Initiative* results in the production of new dimensions of state territory and projections of power across these new scales of territory.

There also exists some scholarship on the question of political-economic space-making and drone governance in particular. Writing on humanitarian delivery drones, Peckham and Sinha (2019: 1206) argue that the use of these technologies to deliver health goods and services creates para-infrastructures in places where the state's reach is lacking, thus undermining historical "expectations of an even distribution of services across bounded sovereign spaces," and further eroding the possibility of the establishment of an evenly distributed architecture. Drones not only can foreclose the possibility of evenly distributed state services through basic infrastructure but crucially, operate in space where such possibilities have historically been marginalized through continuous disinvestments and asymmetrical development. The authors use the concept of "anarchitecture" to underline the transformation of traditional public health architectures that occurs through the introduction of drones into techniques of administering health goods and services. Specifically, the authors show how state operations, which were once underpinned by expectations of an even distribution of services across bounded sovereign spaces, are being reconfigured from without by interventions by actors such as drone companies whose technologies cut across traditional state infrastructures and are often directed from spaces outside the state they operate in while becoming indispensable to the state's ability to govern (Peckham and Sinha 2019).

Akhter (2019) likewise contributes to the tradition of thinking about the spatial dimensions that anticipate rather than result from the use of drones. Specifically Akhter argues that drones operate in a world of "proliferated peripheries," whereby peripheries are conceived as "colonial spaces because of their occupation by what [is] called the 'targeted class,'" (Akhter 2019: 65). Akhter uses his study on rise of militarized drones to analyze and rethink the concept of peripheral space as opposed to broader conceptions such as "the Global South" or the "developing world" or the "Third World." For Akhter, militarized drones provide a "privileged analytical entry point into these reconfigurations of global space into peripheries because they are a technological embodiment of the political and economic imperatives" of state power (Akhter 2019: 65). Besides these aforementioned contributions, there is hardly much work that looks at the political-economic recalibrations that shape spaces in ways conducive to drone-governance, a gap this dissertation addresses.

C. Linking biopolitics and necropolitics

Finally, in bringing together military and humanitarian delivery drone spaces as units of sustained analysis throughout the dissertation, I examine the relationship and parallels between biopolitical and necropolitical modes of governance in modernity. Biopolitics refers to the style of government that regulates populations through "biopower," or the application and impact of political power onto human life and the body. It is "to ensure, sustain, and multiply life, to put this life in order," (Foucault 2008). Scholars such as Achille Mbembe (2006) have since drawn on Foucault to

articulate a concept of "necropolitics" as the flip side of the biopolitical coin. If biopolitical governance is about the administration and maintenance of life processes, then necropolitical governance is about the exposure of populations to and the causing of death. Modern forms of governance that are characterized by the administration of life processes hinge on the development of articulate domestic infrastructures that enable states to wield biopolitical and necropolitical power. Thus Foucault (1980:151) argues that "Doctors were, along with the military, the first managers of collective space." What has emerged throughout this research is that the spatial preconditions, the cartographies, architectures, and infrastructures of both military killing drones and humanitarian caring tend to mirror each other in many ways. This gives credence to the theoretical interrelationship between biopolitics and necropolitics: in modernity, the state's rights to kill and care for populations are exercised through similar channels, across similar calibrations of space. In this dissertation, I focus mainly on the parallel territories and infrastructures through which modern drone care chains and kill chains are operated. Rather than Agamben's Nazi camp or Mbembe's colonized space, contemporaneously these are often underdeveloped spaces which become underdeveloped through broad economic shifts as space becomes increasingly variegated. Investments into these spaces do not support traditional security architectures which help expand state presence or traditional health infrastructures which help the state increase its reach of vulnerable peoples, but instead, investments are into certain compensatory solutions – like drone-supportive infrastructures.

III. Tripartite Structure and Research Design

My study traces three levels of space-making: the cartographic, the architectural, and the infrastructural. These scales represent the making of drone space from the discursive down to the geographic and then to the local and granular. I do not apply a singular methodology in my approach to the study of drone space: although there are broad theoretical concerns that orient the entire study, I pursue a unique methodological approach and consider different forms of data for each of the three scales of drone space. Each of the three large sub-sections of the thesis also features its own literature review as each grapples with different levels of analysis, pursues different questions, and requires a different conceptual framework. Besides what is briefly presented here, a more thorough review of the relevant literature followed by an elaboration of the methods used at each scale can be found under each of the three substantive Parts of this dissertation.

A. On Drone Cartographies

At the first level, *Drone Cartographies***,** I survey the discursive and cartographic materials that enable drone use, paying close attention to the underlying discourse that structures low-footprint governance by drone in comparison to that which structured earlier high-footprint interventions by militaries and aid workers. The task for this Part of the research is to understand the discursive contours of the "problem" posed by the exceptional space of the less developed world and the proposed solution of governance-

via-drone as articulated through political and commercial rhetoric. At this level, I foreground the way concepts such as the exception or emergency, remoteness, and disconnectedness in political speech and writings operate in the discursive cartography of peripheral drone space. I attempt to illustrate how these spaces are mapped discursively as "problems" that drones come to solve, before moving on to critically analyzing how drones respond to this narrative of the problem and present viable neoliberal "solutions." Although the scope of my research is limited to studying the spaces that military drones that kill and humanitarian drones that care, which are typically "exceptional" spaces that straddle the edge of normal political-economic space, it should be noted that drones are beginning to feature in "normal" space as well. In major cities and core capitalist countries, industries are integrating drone technology to film deliver, survey territory for real-estate and for other infrastructural projects. These new developments should be understood as coming after decades of experimentation in politically and economically "remote" space.

The guiding question for this level of the research is how the same problem of the "exception" which once warranted physical military or humanitarian intervention for the purpose of neoliberal regime change as a solution came eventually to call for another solution altogether, that of high-tech low-footprint governance-via-drone. I consider how cartographies of danger are differently mapped out over these two eras (high- and low-footprint eras), and how discourses about the drone's infrastructure-

less, high-tech low footprint innovative targeting capacity respond to these cartographic imaginaries.

For this first scale of analysis, a critical discourse analysis is conducted to trace the shift in discourse that marks the shift from high- to low-footprint interventionism. To trace the narratives that underlie a discourse, and to consider how discourse is transformed into material reality, and most importantly, to discern the interaction between discourse as language and Discourse as a historically and culturally specific way of being (Foucault 1980), primary documents were read closely to understand exactly how space is designated as a problem for which either high-footprint intervention versus drones are the solution. It is found that the distinction between earlier, high-footprint interventions and later low-footprint governance-via-drone is owed not to any waning of neoliberal imperatives but to redrawn cartographies of threat and crisis, which have shifted from entire states in the Global South to only the most remote and far-away places on the map, where governments have "only the most tenuous reach," (Obama 2013). In fact, imperatives arising from global political economic neoliberalizing processes shaped *both* forms of intervention, albeit in different ways. Earlier forms of intervention were justified by the disconnectedness, lawlessness, and economic underdevelopment of these states. These apprehensions ultimately shaped the envisioned solution, which was seen at the scale of cities, with the objective being the integration of cities into the new globalized urban network. As "cradles of neoliberalism," cities were fate-making units — their disconnectedness

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spelled danger and their integration meant security. Integrating cities into globalization often required a series of high-footprint military interventions.

If the retreat from earlier high-footprint forms of intervention toward low-footprint intervention-via-drone is not indicative of the waning of neoliberalism as an organizing principle, then the distinction between these two forms of intervention is not their underlying neoliberal Discourse, but only a difference in cartographic imaginary. That is, while high-footprint interventions saw the threat at the level of states, and solution to disconnectedness at the level of *cities* and the global urban network, low-footprint drone interventions target *geographically remote space* that would be better off isolated as opposed to integrated to maximize international security. The newly drawn geographies of exceptional space notwithstanding, the same grid for determining danger exists as before — remoteness and disconnection. The difference is that now, these areas would not be shrunk, nor was it a cost-effective strategy to shrink them through development because central cities are not at stake but rather peripheries. Managing the most explosive expressions of disconnected space on a targeted, just-in-time basis is the new strategy.

Instead of a discourse of "shrinking the Gap" and increasing connectivity and economic globalization to address the conditions that make places "susceptible to terror" (read: not yet neoliberalized economies) the discursive mode that underlies the new approach to war and governance continues to feature corporate actors as main

players in governance, sees exceptional space as the space for innovative possibility, redefines biopolitical (humanitarian) and necropolitical (counter-terror efforts) as though they were delivery and supply chain issues, and proposes a solution - and a classic neoliberal value proposition - of cost-effective targeting instead of funding for work towards meaningful security or development.

B. On Drone Architectures

On the second level of drone space, *Drone Architectures*, I unpack what makes space targetable through consistent economic underdevelopment, which is the same process that makes certain other spaces *un*-targetable. The divide between drone space and space immune to drone intervention has a genealogy that runs parallel to shifts in the global political economy. A history of spatial reconfigurations that serve as preconfigurations for drone governance had to take place before certain spaces became targetable in the first place. At this level, I focus on the effects of neoliberal economies on spatial relations, and the way large-scale privatization among other things creates a patchwork mosaic of development and underdevelopment in the same countries.

Two case studies are pursued in this part of the research — one on drone space development in Afghanistan and the other on the development of drone space in Ghana. The research generated an account of the underdevelopment of public service infrastructure (for the humanitarian drone) and the afterlives of war (for the military drone) in the two case studies. This section builds off the previous section by

demonstrating the alternative history of these spaces not as dangerous problem spaces where drones intervene, but as spaces that have been made as target spaces through the material effects of shifts in the global political economy. This section assesses the effect that large scale global privatization and the neoliberalization of the world economy had on spaces that were to become drone spaces. A clear correlation is drawn between the material cartographies of a neoliberal globe and the proliferation of drone use in select spaces.

The methodological component of this section is complex due to the fact that there is no singular methodology for approaching the relationship between transformations in the global political economy, the reshaping of space, and the generation of a particular form of governance. As such, I mainly approach this topic interpretively, comparatively, and through the theoretical framework of "genealogy" popularized by Foucault and other post-structuralist scholars. As a genealogical study, this project begins with a present phenomenon (the proliferation of drones in both military and humanitarian settings), and problematizes it by bringing to question its historical conditions of possibility.

In line with such a methodology, for each of my case studies, I consider the pre-neoliberal era, which I argue, was tending toward a trajectory a different spatial organization, before moving on to consider how neoliberal reforms rearranged space to be conducive for a governance style more inclined toward targeted interventions via

drone. I compare the triangular relationship between political economy, space, and governance of two models the political economy-space-governance model of the pre-neoliberal era, and the political economy-space-governance model of the neoliberal era. I suggest the following counterfactual: if the reigning orthodoxy of spatially holistic, popular, grassroots-level development had continued, despite its many issues and failures, drones would not today stand in for issues of governmental reach due to variegated space, either for security or healthcare.

C. On Drone Infrastructures

On the third and final scale of drone space, *Drone Infrastructures*, I present an in-depth exposition of the grounded technological grids and service assemblages or the set of *over*-developments that sustain and support drone use. The idea is that drone programs, whether military or humanitarian, cannot appear anywhere — in fact, the drone war is highly contingent on infrastructural constraints and previous foreign military and current corporate presence. This presence, however, is marked by a distinctly different configuration from that of colonial military penetration or settlement of the past. The physical and legal reach of drone warfare owes its capacity to a distinctive configuration of military and other affairs in the 21st century, that is, that they are increasingly privatized affairs. The state's biopolitical governance increasingly traverses through corporate lines — a large industry erects the infrastructure upon which drone use is contingent.

The challenge of this part of the research was in identifying which units of the drone's infrastructure were the most significant. To summarize the research process simply, the first step was finding and creating a database of military reports, contracts, treaties, press releases, news articles, drone advertisements, drone company webpages, and leaflets produced by drone companies. Next, the documents were categorized into three groups — documents that discuss the specifications of drone bases, documents that focus on communications and digital infrastructures (non-base related infrastructures), and lastly, any evidence in press releases and drone company webpages that document some of the big names in the military that have since crossed over to the humanitarian drone industry. For almost every humanitarian delivery drone company, there were considerable links to the military. Data were compared to look for similarities in infrastructure and then presented to show how these industries parallel.

D. Conclusion: Resisting and Anticipating Drone Space

This dissertation concludes by reconstructing its three major portions and reflecting on the implications of this work. Drones obfuscate the traditional dynamics of power by articulating an authority that is spatially distributed and elusive. However, drone power as a spatially distributed network coexists alongside and makes up familiar centralized models of authority. Drone governance represents what Galloway and Thacker (2013) describe as the critical juncture between sovereignty and networks. Thus, in the conclusion of this research I return to the question of biopolitical and

necropolitical network-sovereign governance from the perspective of resistance and explores how the sovereign power of drones in governance can and is already being resisted from the starting point of networked space. I focus on how questions about the ownership of space are featured in contestations of how space is shaped to be conducive to certain kinds of governance and not others.

Part One. Drone Cartographies: Geostrategic Problems and Neoliberal Solutions

I. Theory and Argument: Cartography and the Exception

A. Where is the danger zone? Who says?
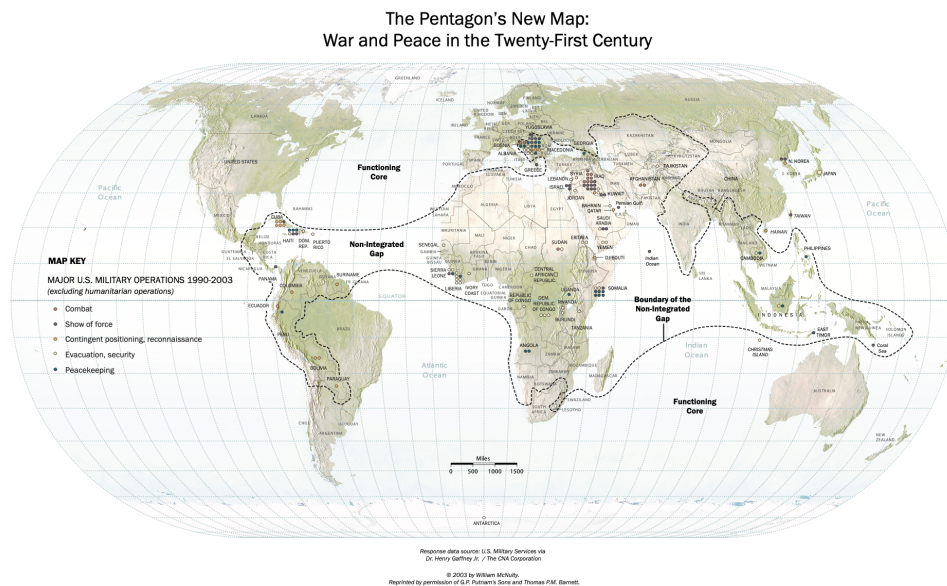
Figure 1.1, The Pentagon's New Map (Barnett 2003).

"We are talking about the ends of the earth as far as globalization is concerned," reads a 2003 article published in *Esquire* Magazine describing a belt that encircled the earth's center geographically but consisted of countries that were far from the center in terms of their connectedness to the globalizing world economy. Authoring this now infamous article was Thomas P.M. Barnett, then senior strategic researcher and

professor in the Warfare Analysis and Research Department, at the US Naval War College in Rhode Island. Following the attacks of September 11, Barnett worked as the "Assistant for Strategic Futures" at the Department of Defense, during which time he developed his "Core-Gap" thesis and wrote "The Pentagon's New Map." Discourses of political and economic remoteness such as Barnett's ultimately shaped that decade's foreign military policy toward the aggressive integration of these spaces that exist at the "ends of the earth."

A simplified summary of Barnett's older Core-Gap thesis is that "disconnectedness defines danger," or that geographic regions that make up the "Gap" of the world, regions that he depicts as insufficiently integrated into processes of globalization, are more likely to lack security and to produce threats to the developed and economically globalized countries comprising the "Core." Barnett's concept of "globalization" is multi-faceted throughout the article; he defines it in technological terms, in terms of military ties between countries, but most commonly he defines globalization simply as economic integration. Economic connectedness creates political proximity and therefore security, he argues, and reciprocally, disconnectedness creates distance and therefore danger. The contours which distinguish the functioning Core and the dangerous Gap can be delineated neatly on a map, though some outliers "such as Israel isolated in the Gap, a North Korea adrift within the Core" may exist (Barnett 2003: 176). The causes of international insecurity on the world stage appear first out of the Gap because of its many barriers to globalization, leading Barnett to argue in favor of

the 2003 military intervention to forcibly remove these barriers and "shrink the Gap."

And it was based on this kind of mapping of global security that advisers to President

Bush such as Donald Rumsfeld (himself advised by Barnett among others) made the

case for the US to invade Iraq, an invasion that would last just under a decade and go

on to destabilize an entire region.

Figure 1.2, Image of Taliban checkpoint blocking access to Kabul's international airport
Saturday, Aug. 28, 2021 (Associated Press News 2021).
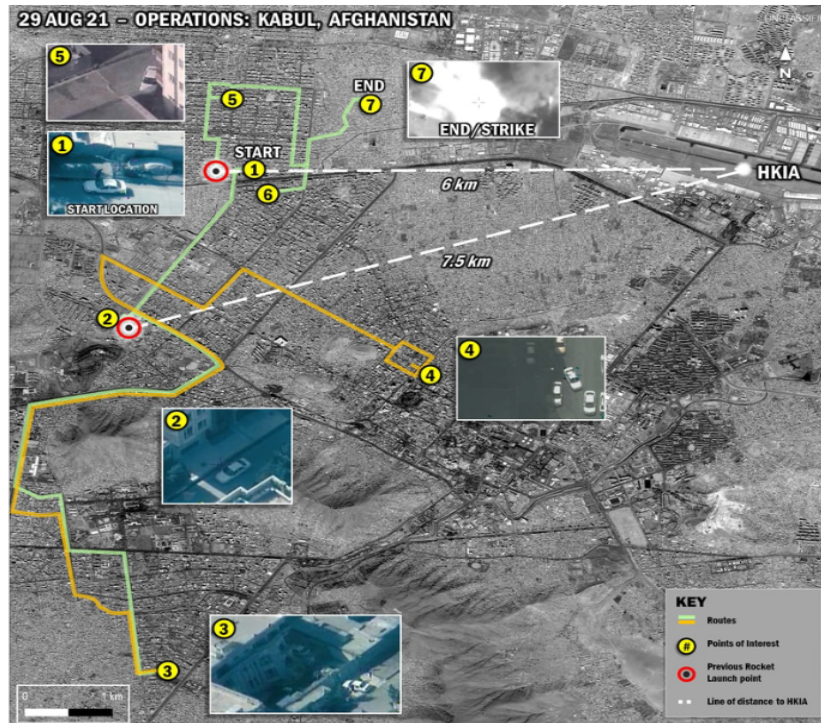
Figure 1.3, US Central Command maps white Toyota Corolla's movement across Kabul on Aug. 29, 2021. (CENTCOM/via Navy Times 2021).

Contrast the "Pentagon's New Map" (Fig. 1.1) drawn by Barnett with these more recent maps used by US Central Command to perform counterterrorism operations in Kabul, Afghanistan in 2021. The first of these (Fig. 1.2) is an incredibly clear image of a Taliban checkpoint that let in suicide bombers to Kabul's Airport on August 28, 2021. The second (Fig. 3) was used to trace the movement of a suspect white Toyota Corolla across Kabul shortly after the incident. After the military tracked down the suspected terrorist driving the Toyota, it was subject to a drone strike. Soon after the strike, it was revealed that the wrong Toyota was targeted, thus resulting in the death of a civilian driver, two adults, and seven children (US CENTCOM 2021). Though both mapping

styles (Barnett's globe and the drone detail maps) were associated with wrongful killings, they are notably different.

Aside from the difference in scale and focus, the dotted line on Barnett's map (Fig. 1.1) encircles the globe whereas the dotted line on CENTCOM's mission map (Fig. 1.3) marks a much shorter and human-scaled line of distance. Barnett's oversimplification of the globe and his correlating mega-map (Fig.1) is different in scale from the granular, zoomed-in mappings of more current military operations like those shown in Figure 2 above, as well as in Figure 3 below.

The missions implied by these two sets of mappings are also different: Barnett's oversimplification of the globe and his correlating mega-map (Fig. 1.1) sought to define the Pentagon's future global strategic posture. He aimed to show why "military engagement with Saddam Hussein's regime in Baghdad is not only necessary and inevitable but good," (Barnett 2003: 174). By forcibly integrating the part of the globe encircled by the dotted line into the rest of the developed world, Washington would "take real ownership of strategic security in the age of globalization," (Barnett 2003: 174). In contrast to this grandiose world-scale security strategy, the second two maps imply a much smaller-scale mission to identify, track down and neutralize a single suspected threat. Their zoomed-in focus conveys a scope that is not global but local and granular. These maps do not define the Pentagon's relationship with the rest of the world, nor do they imply the conversion of states into economically liberalized

democracies. While the first map implied a strategic posture that would inspire many large-scale interventions like the invasion of Iraq, the second two maps implied missions that had more tailored objectives. They inspire interventions that are low-footprint, targeted and swift.

It is this complex and consequential relationship between discursive cartography (map-making) and foreign military policy that is explored in what follows. As the first part of my overall dissertation, this Part starts with two key questions: namely, what are the discursive and cartographic enablers of high-footprint military intervention? And how do they differ from those of low-footprint drone space? By "low-footprint" I am using US geostrategic language to label a shift away from using large numbers of troops and heavy armor on the ground, to more targeted intervention by drone. I am especially interested in this regard in what accounts for the shift to low-footprint preferences and away from the much heavier involvements that were previously associated with the likes of Barnett with the pursuit of wholesale political-economic integration as a solution to international security issues. As we shall see, certain sorts of infrastructural investments in integration have endured to make drones usable. But the switch to using drones as a low-footprint geostrategic approach has also been tied to a notable drop in integration discourses and a countervailing adoption instead of appeals to political isolation, strong borders, and targeted strikes.

My focus in what follows in this Part of the dissertation is all about making sense

of these contrasting cartographies and associated foreign military policy paradigms –

high-footprint intervention vs low-footprint drone strikes. How did US geostrategic

discourse shift in this way from its preceding pursuit of military interventionist

solutions aimed at "Shrinking the Gap?" As I aim to show throughout *Cartographies,*

the answer has to do with the movement from a broad-brush "macro" cartographic

imaginary that securitized entire states and cities as "spaces of exception" toward the

much more narrowly targeted and "micro" securitization of individual inhabitants in

only the most remote and peripheral spaces.

I am equally interested in the cartographic continuities between these macro and

micro regimes of seeing and acting in the "Gaps" that are seen as sites of exception and

danger. Although intervention-via-drones appears as a break from earlier forms of more

physical military intervention, analyzing the discourses that animate both kinds of

solutions reveals their fundamental consistency as ways of thinking, seeing, and acting

in the world that are bound up with neoliberal rationality. Both are equally organized

by a neoliberal *episteme* that operates at a geostrategic level through a concern for the

expansion and preservation of global capitalist forms of political-economy (Slobodian

2018), attention to the material costs and potential "returns-on-investment" associated

with certain forms of foreign policy, a manifestation of the "geo-economic hopes"

associated with achieving international security through forced economic liberalization

(Roberts et al. 2003), and an undergirding neoliberal rationality (Brown 2015) that

orders the geostrategic decision-making process.

It should be noted here that the question of the cartographic space-making that presupposes drone governance and distinguishes it from other forms of foreign intervention applies not only to the use of drones for military purposes. Part of *Cartographies* attempts to show that exceptional, remote space is also a central category for the operation of humanitarian delivery drones. Humanitarianism and the administration of public health have also changed from holistic approaches to more targeted remote approaches. As illustrated by Mark Duffield (2019), while humanitarianism used to "[be] there on the ground" in areas of humanitarian disaster, "professing a face-to-face humanitarian solidarity with its victims," the tendency now reveals a recourse to remote management of such spaces (Duffield 2019: 15). Military drones and humanitarian delivery drones are advertised as solving the same problem of remote, exceptional space – and because this dissertation is a study of that drone space, I include both of these in the analysis.

Cartographies, like each part of this dissertation, is broken down into four sections: 1) the current chapter which is on theory and literature, where the conceptual framework and theory is presented, 2) research design, where the methodology is discussed, 3) discussion, where the evidence is assembled, and 4) the conclusion. The structure of this literature and theory chapter is as follows: first, I define what is meant by discourse, and its relationship to cartography or map-making in the relevant literature. I then explore the relationship between the discursive act of securitization

and the construction of spaces of exception. After a summary of "the exception" in political theory, I am brought back to the guiding question of the discussion chapter that follows: what discourses mark the shift from physical intervention to low footprint intervention-via-drone in the governance of exceptional space if their discursive construction as "exception" remained consistent? The conclusion of this chapter features a preliminary answer to this question through an exploration of Wendy Brown's (2015) theory of "neoliberal rationality." Brown's theory holds that a distinctive feature of the neoliberal political-economy is its tendency to extend a certain "ethos," a set of market-inspired organizing principles, practices, and thinking processes into all social spheres and institutions. This study applies this theory to suggest that while the difference between the two forms of geostrategic intervention styles (high- and low-footprint) involves shifting geographies (the movement of the constructed threat from states and major cities to peripheral space), both of them are structured according to neoliberal rationality.

Therefore, analysis of the discourses involved demonstrates that the apparent "break" between high- and low-footprint intervention is actually more of a continuation than might be first thought. Exploring the shift from physical intervention to intervention-via-drone at the level of discourse demonstrates a continuation of the neoliberal "Discourse" which underlies both. In other words, the methods of war and humanitarianism in the spaces of exception may change, but the underlying logic of exceptionalism and the neoliberal imperatives which structure intervention remain

constant. We see thus how the intertwined geo-economics and humanitarian imperatives that animated high-footprint intervention on the ground are now replaced by devices that operate according to neoliberal market rationales of cost-effective targeting and humanitarian discretion: drones.

B. Discourse, space, and the speech-act of securitization

Barnett's writing is an example of a discourse, a term notorious within the social sciences for the multiplicity of its meanings. In the academic sense, discourse might be distinguished in two ways, through the terminology of "discourse" and "Discourse," (Alvesson and Karreman 2000; Gee 2004). The first, "discourse" refers to the actual phrases and word-choices that are chosen when language is used — it refers to the way issues are framed through texts and speech acts. Upper-case D "Discourse," on the other hand, refers to a "culturally-specific mode of existence," (Dittmer 2010: 275). This type, Discourse, defines the rules of the game — it is the contextual milieux where language, events, actions, and interactions gain their substance and meaning. Perhaps one of the most influential theorists of discourse is Michel Foucault, who adopted the term to denote a historically specific social system that produces knowledge and meaning. According to Foucault, all knowledge is possible and takes place only within a broader network of power relationships that allow that knowledge to come to be in the first place (Foucault 1980). Foucault argued that discourse about that knowledge has material effects and produces "practices that systematically form the objects of which they speak," (Foucault 1972). Thus, a fundamental assumption that discourse

analysis carries is that the way language is used matters — it only emerges out of certain existing power relations and it turns around and has an impact on the constitution of social power relations.

Though there are debates in the literature about what exactly qualifies as discourse, how to categorize different discourse types, and how to conduct a proper analysis of discourse, discourse analysts all agree that language matters. When Barnett envisions a strategy for the US military through his cartographic discourse of Core and Gap, whereby the latter suffers from disconnectedness from globalization, it is a categorical act of describing or framing reality in a specific way that results in specific effects. Pairing danger with this diagnosis of disconnectedness when describing the countries he takes issue with leads to material effects: these countries become bastions of insecurity, necessitating the prescription of military intervention. The link between discourse like Barnett's (which abounded in the rhetoric of neo-conservative politicians during the time) and the material reality of war on the ground in places like Iraq and Afghanistan is unmistakable— the discourse of these places as dangerous went on to produce social and material reality on the ground.

The relationship between discourse and cartography, or map-making, has been explored at length in the work of critical geographers. An earlier critical geographer, J.B. Harley describes the connection between the discursive, or in his words, the rhetorical, and the analysis of maps in his 1989 essay, "Deconstructing the map":

The issue in contention is not whether some maps are rhetorical, or whether other maps are partly rhetorical, but the extent to which rhetoric is a universal aspect of all texts. Thus for some cartographers, the notion of "rhetoric" would remain a pejorative term. It would be an "empty rhetoric" which was unsubstantiated in the scientific content of a map...My position is to accept that rhetoric is part of the way all texts work and that all maps are rhetorical texts.

The steps in making a map—selection, omission, simplification, classification, the creation of hierarchies, and "symbolization"—are all inherently rhetorical. In their intentions as much as in their applications they signify subjective human purposes rather than reciprocating the workings of some "fundamental law of cartographic generalization." Indeed, the freedom of rhetorical maneuver in cartography is considerable: the mapmaker merely omits those features of the world that lie outside the purpose of the immediate discourse...Instead of thinking in terms of rhetorical versus nonrhetorical maps it may be more helpful to think in terms of a theory of cartographic rhetoric which accommodated this fundamental aspect of representation in all types of cartographic text.

Harley's insistence that map-making or cartography is a *categorical* act in that it includes various omissions and classifications implies that such discursive acts are meant purposefully to enact some form of social reality; they enable particular configurations of power. In the case of Barnett's thesis, his cartographic imaginary is especially powerful in this way because it was produced through a very specific discursive device: *securitization*. Securitization refers to the speech-act (literally, an act of discourse) which declares something as a security threat to mobilize certain configurations of power, one of which being the justified political power to neutralize the threat by any means necessary (Weaver 1993). So, not only is Barnett's thesis an act of cartography that carves up and categorizes different spaces on the globe and in doing so contributes to the production of specific kinds of spaces by presuming to provide "the Pentagon's New Map," but his project is doubly impactful in that he uses

security as the ordering principle of his cartography:

> But show me where globalization is thinning or just plain absent, and I will show you regions plagued by politically repressive regimes, widespread poverty and disease, routine mass murder, and — most important — *the chronic conflicts that incubate the next generation of global terrorists*. These parts of the world I call the non-integrating Gap, or Gap (Barnett 2003: 177).

By tying the political, economic, and social non-integration of the Gap regions with the security threat of global terrorism, Barnett securitizes these regions, making them game for military intervention in the name of security. The securitization of these spaces on the map is precisely what enables Barnett's justification of his support for the war in Iraq, which he supports not simply because "Saddam is a cutthroat Stalinist … nor because that regime has clearly supported terrorist networks over the years. The real reason I support a war like this is the long-term military commitment that will force America to deal with the entire Gap as a strategic threat environment," (Barnett 2003: 175).

C. The Exception

Securitization is the technical description in international relations theory of what is understood in classical political theory as the act of "deciding the exception" or declaring that something constitutes an emergency thus legitimating the actions of the state to deal with it. Carl Schmitt (2005), the Nazi jurist and early theorist of the exception, defines it as the sometimes necessary suspension of normalcy and the rule of law, often replaced by martial decree, in the event of a sovereign power's declaration of a state of emergency or war. For Schmitt, the problem with more

liberal theorists of governance was that they did not admit that political sovereignty always at some point requires such exceptions to be made. Furthermore, there could be no legal form of the exception – the nature of the exception meant that it could not be codified in advance and was necessarily based on the *political* decisions made by those in power: "how is it logically possible that a norm is valid except for one concrete case that it cannot factually determine in any definitive manner?" (Schmitt 2005: 14). The relevance of this to the broader discussion taken up here is that securitization or deciding the exception is a political, discursive act that mobilizes certain configurations of power. Barnett's map did not necessarily narrate a truth about the world, but put forth a criteria for deciding what constitutes a danger and security threat.

Many have since drawn on Schmitt to conceptualize theories of the *spatial* dimensions of the *state* of exception, the *spaces* of exception — a physical place that has been designated as lawless. Giorgio Agamben (1995) argued that though it is meant to be a provisional measure, the state of exception assumes a normal paradigm of government and distinct spatiality in the 20th century, and its highest manifestation was in those spaces that existed outside the normal political order but remained a part of it. For Agamben, this was the Nazi concentration camp, and for Achille Mbembe (2006) it was colonially occupied space. Here, the exception was no longer just a suspension of law, but instead, it acquired a permanent spatial arrangement that remains outside the normal state of law. By tying the political *state* of emergency or exception to

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discernible spaces on the globe through his discursive use of "the Gap," Barnett's mapping can be interpreted this way as effectively turning the logic of exception into a map through which the US military could also actually justify and carry out interventions in real-world *spaces* of exception to de-exceptionalize them and integrate them into the lawful Core.

One need not apply Agamben or Mbembe's theses, however, to appreciate the correlation between the securitized *state* of exception and the construction of correlating *spaces* of exception in the extra-Western world as in Barnett's thesis. Schmitt already draws this connection in his *Nomos of the Earth* (2003)*,* where he argues that the line dividing the Western world from the extra-European space of the colonies "set aside an area where force could be used freely and ruthlessly … Everything that occurred 'beyond the line' remained outside the legal, moral, and political values recognized on this side of the line," (2003: 94). For the Europeans, the colonial frontier was already exceptional in that no law was recognizable to them there. In parallel to Barnett's geostrategic vision of integrating the (lawless) Gap into the (lawful) Core, colonial violence was thus law-making violence, sustaining the legitimacy and justice of the colonial project. The lawlessness, the marker of exceptionality, of non-European soil was in fact a foundational aspect of distinction between Europe and the colonial world, as Schmitt put bluntly:

> [non-European] soil was free to be occupied, as long as it did not belong to a state in the sense of internal European interstate law. The power of indigenous chieftains over completely uncivilized peoples was not considered to be in the

public sphere; native use of the soil was not considered to be private property...
(Schmitt 2003: 198).

Schmitt's summary of how European colonists disregarded the "power of indigenous chieftains over completely uncivilized peoples" demonstrates how "lawlessness" is indeed a function of discourse meant to enable certain configurations of power as opposed to an accurate reflection of reality: in this case, military intervention and colonialism. The development of modern international law between European states required, Schmitt argued,

> great areas of freedom [that] were designated as conflict zones in the struggle over the distribution of a new world … The designation of a conflict zone at once freed the area on *this* side of the line — a sphere of peace and order ruled by European public law — from the immediate threats of those events "beyond the line," … The designation of a conflict zone outside Europe contributed also to the bracketing of European wars, which is its meaning and justification in international law. (2003: 97-8).

Here, intervention was a creative act, formative of law and order in both the colonies as well as internationally between the Europeans in the form of European international law. As is well studied, the creative capacity of colonialism was in its economic objectives as well as in its "civilizing" and humanitarian ones – it established the precedents of the liberalized global economy. The point of intervention was to de-exceptionalize exceptional space through legal, social, and economic integration.

It is worth noting that although exceptional space sometimes denotes spaces of military and security concern and sometimes denotes spaces of humanitarian crises, the distinction between these two is often unimportant in geostrategic discourse. Barnett's

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indistinction between underdeveloped spaces and regions that produce military concern (indeed, underdevelopment itself produces military threat for Barnett), and his lumping of all these places into the "Gap" is telling of the parallels drawn between spaces of war and those of economic underdevelopment and humanitarian crises as was argued by Roberts, Secor, and Sparke (2003). They are consistent across Barnett's cartographic imaginary, consistent in their shared history as part of the colonial frontier, and they ultimately endured similar fates of military or humanitarian intervention by foreign actors.

Furthermore, both kinds of exceptional spaces are consistent in terms of the subjects that inhabit them: "bare life" subjects. For populations enduring life in spaces of exception, existence is reduced to "bare life," or, as theorized by Walter Benjamin (1996), life stripped of its extra-biological features (life stripped from political and social "living"). Bare life is the subject matter of the modern humanist "doctrine of the sanctity of life, which [humanists] either apply to all animal and even vegetable life, or limit to human life," (Benjamin 1996: 250). That is, the pre-political doctrine of human rights which applies to subjects in both kinds of settings, in areas of war or in areas of humanitarian disaster is indicative of the exceptional status of both places, and therefore of their commonality. In each case, foreign military and humanitarian intervention was historically the cause and remedy for populations existing in exceptional space. Therefore, intervention into Iraq was "not only necessary and inevitable, but good," (Barnett 2003: 174).

Thus even before Barnett's Core-Gap thesis, the non-Western world has always been constructed in the Western imagination as exceptional space where the normalcy of the law did not apply. The reality of, in the past, boots or aid workers on the ground and in the present, drones in the air is indicative of the common status of such spaces as exceptional spaces, as securitized spaces, as lawless spaces that are dangerous and produce danger: problem spaces. This status is not necessarily intrinsic to these spaces but an effect of discursive practices such as securitization and acts of map-making — their status as spaces of exception is thus not essential but contingent and based in the political discourse of powerful actors. The configurations of power enabled by, and effects caused by discursive cartographies are also not essential — whereas the securitization of these spaces enabled physical intervention in the past, today drones fly above instead. The question is, what explains the difference in approach then?

D. "Drones mark the end of neoliberalism"

The idea that spaces are socially and historically constructed as dangerous or in need of humanitarian aid is particularly useful for the question of drone space production. The discursive framing of drones and the problems that they supposedly solve in the places where they operate is a significant precondition for drone use in an area. The question is, what story is attached to the drone's operation in any given space that differentiates it from areas where drones are not operative? This question is challenging because the drone largely operates in some of the same theaters that once

required large-scale military invasion in Barnett's view, and in the view of colonial powers before him. Its spaces are notably more selective areas compared to the larger swaths of geography intended by earlier geostrategic discourse, but they are not necessarily new.

Roberts, Secor, and Sparke's "Neoliberal Geopolitics" (2003) point out that the "ideas underpinning [Barnett's] new cartography did not spring fresh from his head in early 2003. They have complex genealogies and, as such, reflect much more widespread neoliberal norms, attitudes, and ideologies," (Roberts et al. 2003: 889). If Barnett's cartographic Core-Gap thesis is an example of cartographic securitization cartography, then the broader structure of knowledge and related cultural ways of being that legitimated and gave meaning to this discourse is the broader neoliberal understanding that the imperatives of neoliberalism spell out the only hope for achieving world security, and that the US is uniquely positioned, and thus morally compelled, to realize this utopic future. The ethos of this discourse is most powerfully constructed by Roberts, Secor and Sparke in the following passage:

> Armed with their simple master narrative about the inexorable force of economic globalization, neoliberals famously hold that the global extension of free-market reforms will ultimately bring worldwide peace and prosperity. Like Modernity and Development before it, Globalization is thus narrated as the force that will lift the whole world out of poverty as more and more communities are integrated into the capitalist global economy. In the most idealist accounts … the process of marketized liberalization is represented as an almost natural phenomenon which, "like the dawn," we can appreciate or ignore, but not presume to stop, (Roberts et al. 2003: 887).

In the contrast between neoliberal Globalization on the one hand and Modernity and Development on the other, the authors demonstrate how these systems operate as broader structures of knowledge and related cultural ways of being that give meaning to and legitimate certain discourses. The broader episteme characterized by neoliberalism thus structured and justified such large-scale interventions.

The neoliberal ethos played a role in the cartographies being mapped and also in the correlating warfare strategy at the time. The military during this time was reframing the practice of war from conventional warfighting to "armed social work" or counterinsurgency. The philosophy that guided Western approaches to war in the early 2000s held that the best way to win a war (a War on Terror) was a hybrid approach that included humanitarian elements, isolating populations from militants by offering development and aid, and military elements that involved a heavy footprint invasion populating the area with military, political, and corporate actors in an effort to sustain the population, encourage their development, economically integrate them into globalization processes, and sway their political opinion in favor of the government and Western power. This involved the establishment of multinational corporations and institutions friendly to a globalized economy. Counterinsurgency was thus purported to be a later stage in the overall trend toward the "humanization" of warfare characteristic of an age of liberal modernity. Therefore, echoing earlier justifications for colonial invasion, military invasion in the name of neoliberal imperatives is by these standards a humanitarian enterprise in service of human rights.

And yet, fast-forward almost two decades to August 2021, and President Biden issues an executive act that will go down in history as possibly the most controversial order of his Presidency: the unilateral removal of all troops and US personnel from Afghanistan after a long 20 years of humanitarian war. Terrifying images and videos emerge of Afghans clinging to the wings and wheels of US aircraft as they take off, desperate to evacuate the country for fear of the political situation turning sour as the Taliban take over only one day after the US pulled out. In a demonstration of the dramatic shift that US foreign policy was taking, just nine days after the evacuation, a botched drone strike hits the wrong Toyota Corolla in Afghanistan. At that moment it couldn't have been clearer that the winning hearts and minds mantra of counterinsurgency was to be abandoned for a more targeted approach to dealing with threats. What could explain the sudden abandonment of the "humanitarian" commitments that formed the basis of this intervention twenty years earlier?

In an article titled "US defeat in Afghanistan marks the end of Neoliberalism," author Adam Ramsay (2021) argues that the US retreat from Afghanistan marked the finale of neoliberalism as the "attempt to create a single global market with the US and, to some extent, Western Europe, at its core." This end didn't come as a surprise, Ramsay argues, as signs of the end of neoliberalism were all around us as "authoritarian and nationalist capitalists have taken control of countries from India to Brazil." In this apocalyptic narrative of neoliberalism's end, the same spaces that were once bastions

of danger and havens for terror remain as they once were, but the interventionist attitudes and ambitions to shrink the gap disappear. In their place, drone strikes neutralize budding malignancies and deliver aid to the most vulnerable.

E. Hypothesis: different day, same geostrategic Discourse

I challenge the hypothesis of neoliberalism's end. Not only has neoliberalism endured as a political-economic regime through serial global crises, and not only has it also exploited and exacerbated crises such as Covid19 in ways that suggest complex new ties between market rule and increasingly illiberal and authoritarian turns in politics (Sparke and Williams 2021; Sparke 2022), but in addition, it has persisted as a geostrategic Discourse that organizes foreign military policy. Thus it is still prominent in the discursive construction of drone space and the operational logic of drone use. To be sure, the discursive construction of the geographic regions in question is just as it has always been — the distant, disconnected, and dangerous is still distant, disconnected, and dangerous. The discourse of "the problem" remains the same, with these places representing bastions of danger and havens for threats, but the solution has changed — yet it is still articulated along neoliberal lines.

Here, neoliberalism is understood in the sense outlined by Wendy Brown (2015) as more than just a bundle of economic policies but as a certain kind of *rationality*. Neoliberal rationality is a theory of the ethos, the organizing principles, and the market logic of neoliberalism that informs not only how subjects understand themselves and

their environments, an ethos that spills over and orders the conduct of previously non-economic spheres of life. While high-footprint interventionism was driven by neoliberal imperatives aimed at achieving visions of world peace through economic integration, low-footprint intervention-via-drone is better understood as a function of what Brown (2015) calls "benchmarking." Benchmarking "refers to the practice of a firm or agency undertaking internal reforms on the basis of studying and then importing the practices of other, more successful firms or agencies … [it] represents the process of … understanding, distilling, and then implementing the practices that make those [industry] leaders successful," (Brown 2015: 136).

Instead of a discourse of "shrinking the Gap" and increasing connectivity and economic globalization to address the conditions that make places "susceptible to terror" (read: not yet neoliberalized economies) the discursive mode that underlies the new approach to war and governance continues to feature corporate actors as main players in governance, sees exceptional space as the space for innovative possibility, redefines biopolitical (humanitarian) and necropolitical (counter-terror efforts) as though they were delivery and supply chain issues, and proposes a solution of cost-effective targeting and networked approach as opposed to meaningful security or development. In sum, neoliberal rationality undergirds both foreign policy approaches albeit differently: in one instance, it drives foreign policy in service of a utopic vision, and in the other, it structures interventions based on market principles of cost-effectiveness, network-centrism, and targeting.

Furthermore, if what makes both high and low-footprint approaches consistent is that they are structured by the same neoliberal discourses, the difference between the approaches is in their geographic scale and how they differently emphasize neoliberal ideals. While high-footprint interventions saw the solution to disconnectedness at the level of *cities* and the global urban network, low-footprint drone interventions target geographically remote spaces that would be better off isolated as opposed to integrated to maximize international security.

II. Cartographies Research Design

A. Discourse analysis

So what are the discursive contours of the "problem" posed by the exceptional space of the less developed world? And how can we best unpack the proposed solution of governance-via-drone as articulated through political and commercial rhetoric? The next pages are dedicated to answering these questions by exploring how these spaces are constructed discursively as "problems" that warrant foreign intervention, before moving on to critically analyzing how drones respond to this map of the problem and present viable "solutions." The guiding problem is the question of how the problem of the exception which once warranted physical military or humanitarian intervention as a solution came eventually to call for another solution altogether, that of high-tech low footprint governance via drone.

To understand the contours of the discourse of "the problem," I trace how geographic regions are painted as dangerous and disconnected, and how distance and danger become tightly linked in discourse, making up these spaces as spaces of exception. For this there exists a wealth of data — fear-mongering about far-away places "where the danger lies" is a cornerstone of Western political rhetoric, dating back to pre- and early modernity, as a guiding rhetoric for exploratory, colonial, military, and humanitarian expedition. While the divide between the realms of security and the realms of danger has a long history in the Western cartographic imagination, my scope here is limited only to the contemporary era, the late 90s and 2000s until

today, as the United States becomes heavily involved in drawing up cartographies of insecurity in the places that are today drone spaces, both as war drone spaces and humanitarian drone space.

It is also the era when neoliberal discourse factors into these cartographic imaginaries, where the narration of disconnection and danger is met with the fantasy of global integration initially, and the strategy of remote targeting later on. The conflicting combination of integrative globalization with the carving out of certain spaces is, as shown by Wendy Brown (2010), a modern paradox in our era. The paradox of increasingly walled off spaces in the name of security, exclusion and stratification that sits alongside growing discourses of globalization, universalization and the flattening of borders, "one featuring networked and virtual power met by physical barricades," (Brown 2010: 20).

The following discussion portion is split into two parts to comparatively assess the cartographies of exception in question (the older high-footprint and newer low-footprint intervention space). In the first section, I've narrowed my focus to consider the way "geopolitical fears" surrounding spaces of exception intertwine with "geoeconomic hopes" of economic integration (Sparke 2007). This part, titled "A. Mapping the Gap" reconstructs the cartographic imaginary found in discourse produced by the government officials consisting of speeches made by politicians, military publications, work produced by military scholars, USAID publications, the

discourse of neo-conservative doom-geographers and their neoliberal counterparts.

This section is broken down into three sub-sections. In the first, I briefly consider how the discourse of lawlessness operates in the justification of drone wars, and in the second I trace the origins of this discourse to earlier depictions of the Global South as dangerous lawless space that warranted intervention. I argue that notwithstanding the discourses of globalization and borderlessness that were popular at the time, the cartographic imaginary of threat designated bounded *states* in the Global South as bastions of insecurity. In the final sub-section, I argue that although the cartographic imaginary at the time designates entire states as exceptions or geopolitical problem spaces, the solution of geoeconomic integration to remedy international insecurity was typically imagined at the scale of *cities* as "cradles of neoliberalization," (Pinson and Journel 2016). Intervention at the scale of cities and the correlating warfare strategy of the city, counterinsurgency, made sense for interventionism that was guided by geoeconomic imperatives toward integration into the neoliberal global urban network.

The second substantial section, "B. The Threat Goes Remote*,"* demonstrates the continuity of neoliberal organizing principles in the use of drones for governance in military as well as humanitarian settings, and argues that the distinction between the high-footprint intervention of the past and the low-footprint intervention of today lies less at the level of enabling neoliberal discourse and more due to shifting geographies of threat. This section is broken down into two sub-sections. The first shows how from

a neoliberal standpoint, exceptional space no longer invites intervention and dreams of urban integration, but from a corporate perspective, is a place for innovation and experimentality, and a problem that might be tackled as though it were a supply chain issue. After this, I map the current cartographies of danger: I show how the discursive construction of the exception no longer encompasses the entire former frontier or entire states and major cities, but exists acutely in only the most remote and disconnected regions where the state has little reach or power. The solution in this scenario is no longer envisioned at the level of cities and their conversion into an integrated urban network, but instead the solution is articulated as addressing the "problem of the last mile" of biopolitical and necropolitical governance through cost effective, targeted solutions.

Textual evidence is assembled from various sources, namely, speeches made by politicians that contribute to the mapping of global territory, military publications such as national defense and counter-terror strategies, publications of military scholars, and discourse produced by drone companies through advertisements, publications, webpages, and so on. Because of the proprietary nature of some data pertaining to drone usage, a broad range of sources were consulted to complete an illustration of the discursive production of drone space. I sifted through a) Presidential speeches, the discourse of public government and military officials; b) reports produced by government agencies and think tanks; c) work produced by former and current military intellectuals and academia; d) the webpages, brochures, and other publications

produced by drone companies.

These documents were loaded into a qualitative data organization software to look for repeated phrases and tropes in the data, looking for the keywords shown Table 1 below:

Table 1.1 Keywords for Discourse Analysis

Keywords related to exceptional space	Keywords signifying market-based/neoliberal logic
Lawless	*Just in time*
Disconnected	*Last-mile*
Danger	*Opportunity*
Out-of-reach	*Innovation*
Periphery	*Experiment*
Remote	*Supply Chain*
Rogue	*Market*

While exceptionalism persists throughout both eras of comparison (high-footprint and low-footprint intervention eras) the difference is that the former discourse is legitimated by geopolitical discourses about the danger of rogue states to justify military intervention, while the latter discourses tend to recast the original problem as more of a business-issue as we reach a maturing of neoliberal rationality in spheres of thought and action in governance. I hesitate to say that the distinction is between pre-neoliberal and neoliberal because earlier intervention strategies were legitimated by globalist neoliberal visions of integration – they were however animated in the first moment by distinctly geopolitical fears (Roberts et al. 2003). Though these keywords

have been classified as words that either point to a discursive practice of denoting either exceptional space or as keywords that point to the neoliberalization of governance strategies, they are not so easily categorized. For example, consider the use of the word "experiment" in UN documents to describe the practices of drone companies in under-regulated spaces as test-beds for their technologies. Experimental underregulated space is not connotatively different from exceptional space where typical regulations don't apply. Similar parallels can be drawn for many of those words, as neoliberal rationality structures not only markets but other spheres as well (Brown 2015).

However, this step could only loosely structure the data and could not step in for the closer reading required. Even the strongest discourse analysis can only see what is there, but cannot read between the lines for the paradigmatic qualities underlying these discourses. To trace the narratives that underlie a discourse, and to consider how discourse is transformed into a material reality, these documents were read closely to understand exactly how space is designated as a problem for which drones are the solution, all of which is undergirded by neoliberal rationality.

As with each scale of drone space that this thesis discusses, I look at the creation of both types of drone space — military and humanitarian drone theaters. They are often one in the same in terms of theaters, and the discourse of both kinds of drone programs exhibit unmistakable parallels, there is also heterogeneity of discourse that is interesting and adds complexity to the theory of drone space creation, as well as paints

a clearer picture of the discursive modes inherent in the other.

III. Cartographies Discussion

A. Mapping the gap

i. "A US citizen, on US soil"

The Supreme Court has long made clear that a state of war is not a blank check for the President when it comes to the rights of the Nation's citizens. *Hamdi* v. *Rumsfeld,* 542 US 507, 536 (2004); *Youngstown Sheet & Tube Co.* v. *Sawyer,* 343 US 578,587 (1952). But the Court's case law and longstanding practice and principle also make clear that the Constitution does not prohibit the Government it establishes from taking action to protect the American people from the threats posed by terrorists who hide in faraway countries and continually plan and launch plots against the US homeland. The decision to target Anwar al-Aulaqi was lawful, it was considered, and it was just (Holder 2013).

This passage from a letter written to Chairman Patrick Leahy on the Senate Judiciary Committee from Attorney General Eric Holder grapples with the complexities of the situation involving Anwar al-Aulaqi, a senior member of al-Qaeda who was killed by US drone strike in Yemen. Holder defends the legality of drones targeting where "terrorists hide" in "faraway countries," an issue that was made complex not because of the rule of law in far away countries that might prohibit the use of force by the US, but because al-Aulaqi was an American citizen. Holder's letter followed a now famous speech given at Northwestern University, where he took up the same issue of the legality of the drone strike. There he argued that although the strike that killed al-Aulaqi was outside of an area of formal conflict like Afghanistan, that US "legal authority is not limited to the battlefields in Afghanistan," when it comes to matters of US security. In the speech he also argues that a balance between civil law and martial law could be used to pursue terrorists and that, as made clear in the letter

above, the state of war is still no "blank check" when it comes to the rights of US citizens.

John Yoo (2013), Bush Administration Lawyer, Professor of Law at the University of California at Berkeley, and political pundit at the American Enterprise think tank praised Holder's stance in the fight against al-Qaeda and the Attorney General's defense of the legality of drone strikes but critiques Holder for "the fundamental mistake" of "conceding that terrorists on the battlefield have due process rights at all," (Yoo 2013). Although Holder was clear that the strikes were conducted outside of a recognized battlefield, in Yoo's mind and in the minds of many, the battlefield followed al-Aulaqi almost wherever he went. Yoo (2013) ends his critique of Holder by contrasting Attorney General's over-generosity in conceding "unprecedented rights to terrorists" with the General's "distort[ion of] American law by suggesting that the administration can target American citizens walking down Madison Avenue."

In this last comment, Yoo is referencing an earlier letter from Holder concerning drone strikes to Senator Rand Paul that caught plenty of infamy in the right-wing media. In this letter, Holder was responding to the Senator's question as to whether it was legal for the US government to use lethal force, including by drone, on Americans on American soil. To this, Holder replied:

> It is possible, I suppose, to imagine an extraordinary circumstance in which it would be necessary and appropriate for the President to authorize the military to use lethal force within the territory of the United States. For example, the

President could conceivably have no choice but to authorize the military to use such force if necessary to protect the homeland in the circumstances of a catastrophic attack like the ones suffered on December 7, 1941, and September 11, 2001.

One day after Holder sent this letter, a Senate Judiciary Committee hearing was held where Texas senator Ted Cruz invited Holder to further elaborate on his response. During the heated hearing, Cruz posed a hypothetical scenario to Holder to clarify his position on whether or not it would be legal to strike a known terrorist on American soil who happened to be sitting at a coffee shop at the time of the strike:

> He's not pointing a bazooka at the Pentagon, he's sitting in a cafe. Overseas, the United States government uses drones to take out individuals when they're walking down a pathway, when they're sitting at a cafe. If a US citizen on US soil is not posing an immediate threat to life or bodily harm, does the constitution allow a drone to kill that citizen? … Let me tell you I find it remarkable, that in that hypothetical, which is deliberately very simple, you are unable to give a simple, one word, one syllable answer: "No." (CBS News 2013).

The back and forth between Holder and his critics makes one thing clear: for the most hardline positions taken up in the war on terror, it isn't whether the target was American or not that grants him the protection of the law, but rather his geographical location was the determining factor. This is why the battlefield would have theoretically followed al-Aulaqi *almost* anywhere — anywhere that was not US soil. That any kind of law is suspended in the case of dealing with "terrorists on the battlefield" even where there is no battlefield but a rural village in Yemen, hints at the way that some places in non-Western world, the "Gap" in Barnett's terminology, are "exceptional" space, perceived as having no institutions such as citizenship and rule of law, and therefore

none of the markers of people who have rights. After all, even as the US and Europe produce many 'homegrown terrorists,' (military) drones do not hover over US or European soil. Nor do they strike in major cities across the globe, but border zones, villages, and those "hard to reach" areas.

What should be understood by Cruz, Yoo, and company's critique about the prospect of drones striking American terrorists on American soil and the accompanying scorn toward the extension of any rights of due process to American terrorists hiding in lands far away, whether they are formal battlefield spaces or not, is a clear distinction in the status of not the terrorist themselves but in the status of the land or space where they operate. The cartographic imaginary is clear: the US is "normal" political space, while a rural village in Yemen is the exception: dangerous, lawless, and fair game, demonstrating the importance of "where" in the estimation of a drone strike's morality.

ii. Where is the exception? Geopolitical fears

What is the nature of those spaces that makes them susceptible to strike? How do they differ from spaces susceptible to boots-on-the-ground invasion? This section illuminates the contours of the exception as per a Western imaginary via the discourses of lawlessness, poverty, and disconnect *before* drone use. This helps illustrate through contrast how the spatial configuration of the exception changes in the present day to accommodate for the use of drones as opposed to earlier strategies of full-blown invasion, even as both kinds of theaters are technically "exceptional space."

To figure out how both kinds of intervention are different, the question of how they might be the *same* should be addressed, to demonstrate the continuities and rule them out as potential variables. Explored here are two basic continuities that exist: for one, the "state of nature" of the non-Western world, its condition as an endless battlefield, and its lawlessness is an old, but persisting, trope. As put by UK PM Tony Blair's advisor, Robert Cooper (2002): "among ourselves … we keep the law but when we are operating in the jungle, we must also use the laws of the jungle," which, incidentally, are no laws at all. Second, neoliberalism appears to be a consistent factor as well: neoliberalism serves as the underlying rationality legitimating the re-organization of geographic space, and informs the design of techniques used to respond to crises caused by this re-organization. While the legal and political status of target spaces is always thought of as ambiguous in the justification for both high- and low- footprint interventions, an unavoidable difference between them is their geographic scope — all drone space is in the former Gap, but the former Gap was drawn in broad cartographic strokes that categorized entire swaths of the map, while drone space seems to be confined to peripheries.

As for the earlier contours of the exception, it was holistic in its inclusion of almost all areas of Barnett's "Gap." Barnett was not alone in his cartographic broad strokes; who could forget Samuel Huntington's famous clash of civilization thesis and the correlative map, where he categorized large swaths of geography into "cultures" and

predicted**,** essentially, an unavoidable race war.
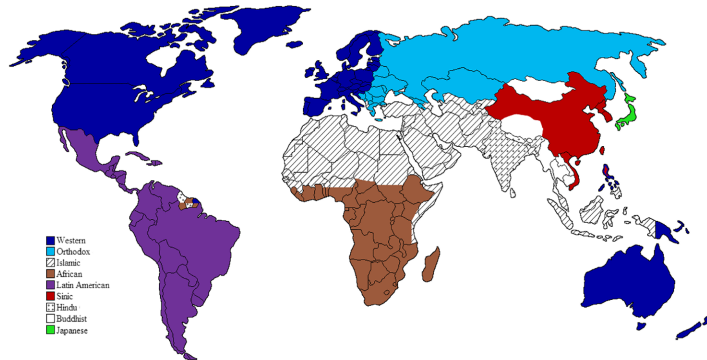
Figure 1.4. The Clash of Civilizations and the Remaking of World Order, (Huntington 1996).

Governments, like the mega-mapping geographers of the likes of Barnett and Huntington were pedaling the same sorts of cartographic discourse: the US Army's Tradoc Handbook: *A Military Guide to Terrorism in the 21ˢᵗ Century* (2005), gives this prediction as to the nature of the future security environment:

> … [This] model predicts the failure of numerous current nation-states in the developing regions of the world. Unable to exert authority, protect their citizens, or control their borders, they are disintegrating. Many of these countries are splintering into tribal and ethnic factions that might coalesce into a new, more stable form, or continue to devolve through violence into lawless zones of minor warlords and bandits.

This specific prediction references an influential journalist and strategic author by the name of Robert Kaplan. While Barnett defined his cartography on the basis of "Disconnectedness" equaling "danger," Robert Kaplan was in 1994 writing in detail on the content of that danger. His argument can be summed up in one statement in the above quote: "they are disintegrating." In an article-turned-book that was reportedly

recommended several times by Bill Clinton to the White House staff titled *The Coming Anarchy,* Kaplan (1994) illustrates with graphic detail "how scarcity, crime, overpopulation, tribalism, and disease are rapidly destroying the social fabric of our planet." In particular, Kaplan focuses on the scarcity, crime, overpopulation, tribalism, and disease that emanates from the Third World that will soon surely infect the West. Kaplan's article marked the beginning of the contemporary cartographies of danger in need of intervention in the post-Cold War era, writing:

> West Africa is becoming the symbol of worldwide demographic, environmental, and societal stress, in which criminal anarchy emerges as the real "strategic" danger. Disease, overpopulation, unprovoked crime, scarcity of resources, refugee migrations, the increasing erosion of nation-states and international borders, and the empowerment of private armies, security firms, and international drug cartels are now most tellingly demonstrated through a West African prism.

Kaplan writes that "empires arise at the fringes of consciousness, half in denial," (Kaplan 2006: 6). Simon Dalby (2007) explains in reading of him that Kaplan envisioned historical imperialism as a "series of accidents and the activities of traders and military campaigns to pacify remote regions," (Dalby 2007: 592). Ironically, in Kaplan's view America's ascension to empire was inevitable and happened regardless of any intentionality – ironic because it is exactly the kind of cartographic activities that Kaplan and friends were doing that scaffolded the foundations of empire. Discourse is not devoid of intentionality: as Dalby notes, Kaplan's writings provide "the on-the-ground eye-witness cheerleading" for the effort to imperialize the globe, an effort justified by "globalization, which supposedly involves the expansion of economic freedom with the promise of prosperity for all," (Dalby 2007: 598).

All doing their part to cheerlead for empire, in their conviction that the Third World War would come out of the Third world, cartographers of this era continuously made a tight correlation between disconnectedness from economic globalization or underdevelopment and danger. As Blair (2003) put it in a speech on the causes of terrorism to the US Congress: "The threat comes because, in another part of the globe, there is a shadow and darkness where not all the world is free, where many millions suffer under brutal dictatorship; where a third of our planet lives in a poverty beyond anything even the poorest in our societies can imagine … and because in the combination of these afflictions, a new and deadly virus has emerged." The linking of violence and poverty resulted in interventionist motivations that were out to remedy this economic disconnectedness and were justified by the exceptional status of such places, driven by neoliberal imperatives toward integrating the exception, or "shrinking the Gap" in Barnett's terminology.

While the "geo-economic" solution was envisioned in terms of unbounded economic globalization to integrate those that are in danger of disintegrating, the problem itself was still originally distinctly "geopolitical," or understood at the scale of states. Therefore, although it was fashionable in political rhetoric and academic scholarship to point to the deterritorialized nature of the new security threat and the War on Terror, in practice, the concept of the terrorist "safe haven" was still intimately tied to a geopolitical imaginary that saw states as the main actors and belligerents in

international relations. The 2003 Strategy for Combating Terrorism grappled with the limits of the globalization discourse in its clear statement that "the international environment defines the boundaries within which terrorists' strategies take shape … Terrorists must have a physical base from which to operate. Whether through ignorance, inability, or intent, states around the world still offer havens [where] terrorists need to plan, organize, train, and conduct their operations," (The White House 2003). Thus, the "global" War on Terror would proceed in kind, as former President Bush declared that "we will make no distinction between the terrorists who committed these acts and those who harbor them." This conflation was a necessary compromise due to the reality that the world was organized by states, but also, a strategic posturing as Cheney indicated "in some ways, the states were easier targets than the shadowy terrorists," (Elden 2007).

Under the imperatives of processes of neoliberalization, if a country was unlucky, it received a military invasion. If a country was luckier, it received what I call Friedman's McDonald's treatment (more on the McDonald's treatment below): Western companies, foreign direct investment, and structural adjustment programs, which in earlier decades bullied many African and Latin American states into privatizing their public functions. Even though the causes of extreme socio-economic inequality among and within countries were often exacerbated by the neoliberal restructuring of the world economy and pressure toward governmental privatization through the IMF and World Bank's structural adjustment programs in Third World

Countries, the geopolitical fears that these regions represented to the developed world were to be remedied with more aggressive neoliberalization — one that often relied on military means. Thus was the case of most military interventions, especially when push came to shove and one year into the start of this century "[t]he world's wild zones and safe zones collided over New York City," (Gregory and Pred 2006) fueling motivations to establish the law through economic connectivity in the world's wild zones once more.

iii. Shrinking the gap: Geo-economic hopes

As argued by Sparke (2007), the point of military invasion was not simply to punish belligerent states but to establish a change of regime based on economic neoliberalization that would enable international security in the long run. Sparke shows how groundless fears about Saddam Hussein's weapons of mass destruction and his ties to AlQaeda underwrote the geopolitical threat that Iraq posed to US security. These geopolitical fears were married to geo-economic hopes of spreading free-market freedoms that the American military intervention was going to bring to Iraq (and the rest of the Middle East) to remedy the issue and justify war. The proposed affinity between economic neoliberalism and international security was concocted by neoliberal thinkers such as Thomas Friedman. Friedman's own "Golden Arches Theory of Conflict Prevention" (2000) succinctly captures this idea:

> Every once in a while when I am traveling abroad, I need to indulge in a burger and a bag of McDonald's French fries ... as I Quarter-Poundered by way around the world in recent years, I began to notice something intriguing. I don't know

when the insight struck me. It was bolt out of the blue that must have hit somewhere between the McDonald's in Tiananmen Square … in Tahrir Square in Cairo… in Jerusalem. And it was this: No two countries that both had McDonald's had fought a war against each other since each got its McDonald's. I'm not kidding. It's uncanny… I was intrigued enough by my own thesis to call McDonald's headquarters in Oakbrook, Illinois and report it to them… armed with this idea, I offer "The Golden Arches Theory of Conflict Prevention."

While fears were often articulated using the geopolitical optics of belligerent states, because the solution was neoliberal economic integration, geoeconomic hopes often played out at the scale of *cities.* Hence, a common theme with the doom geographers of this era is the particular focus on the fate-making qualities of cities — the degree of development and connectedness of country's major cities were indications of impending doom or salvation. Kaplan (1994) focused his analysis on the "cities of West Africa," which he argued are "some of the unsafest places in the world. Streets are unlit; the police often lack gasoline for their vehicles … The government in Sierra Leone has no write after dark." He then extended his map of doom from Sierra Leone's cities, which was a "microcosm of what is occurring, albeit in a more tempered and gradual manner, throughout West Africa and much of the underdeveloped world: the withering away of central governments, the rise of tribal and regional domains, the unchecked spread of disease, and the growing pervasiveness of war," (Kaplan 1994).
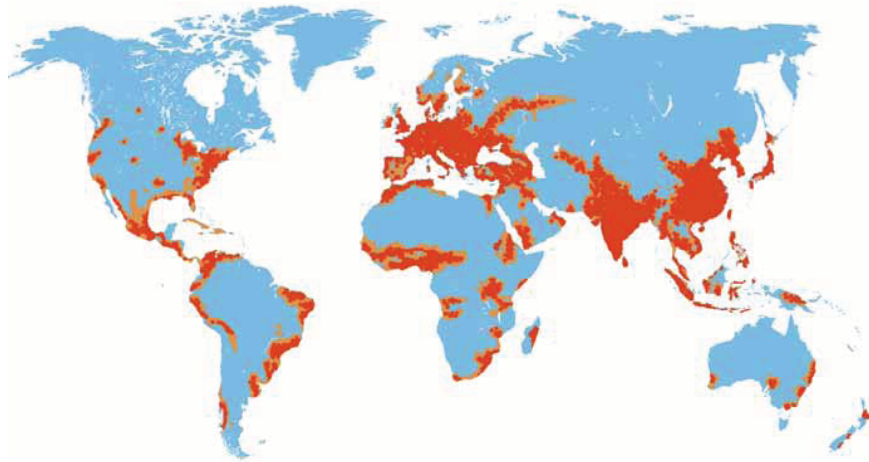
Figure 1.5. Urbanization Map, (Barnett 2003).

Barnett also saw cities as microcosms, but not of what was occurring throughout West Africa and much of the underdeveloped world but for what they could be in the future. The solution for integrating the Gap would be to integrate cities and *change* them to make them insertable in global urban network. In one of the many posts chronicling his Core-Gap thesis on his website, he posted the above map and the corresponding caption:

> But then you look at this urbanization map of the world and you realize that when it comes to shrinking the Gap, there ain't all that much ground to cover really. You just need to connect the mega-coastal cities with good rules, good supply chains, good infrastructure, good transpo [*sic]* and people movement and media, etc., and you've got most of the situation basically covered. The "contiguity" argument from "Blueprint" seems to hold: there's no leapfrogging. You have to move in chunks that connect to other chunks.
>
> What the… map says to me: There are several Africas that link up to various other parts of the world. West to West, East to Asia, Horn to the Middle East, the north to Europe, etc. Integrating Africa will go much faster than I previously anticipated. Indeed, my past pessimism on that score is my biggest miscall of the last decade.

So, while the problem was often articulated at the scale of *states* and the safe havens belligerent states might provide, because the solution was thought to be a sweeping neoliberalization of strategic-threat states, the solution was to be applied at the level of *cities*. As shown in much scholarship, "neoliberalism does not only land in cities or impact urban governance; cities are basically crucial *cradles* of neoliberalization," (Pinson and Journel 2016). Because cities are networked in the way that they are under neoliberal capitalism, connected by "good supply chains, good infrastructure, and good, transpo," they are crucial vectors whose fate determines the fate of other cities. It is for this reason that "military engagement with Saddam Hussein's regime is not only necessary and inevitable, but good," according to Barnett (2003) — transforming Baghdad would be the first of a longer domino effect on cities in the Middle East and the rest of the Third World.

If the problem was constructed as the entire Gap, with states acting as the main antagonists, and if the solution was scaled down to the level of the city and up to the level of global urban networks, then the relationship between Gap and Core was that Gap could eventually become Core through neoliberal economic reform to plug in to globalization's urban networks. It was a policy of integration; and it was represented in discourse, in cartographies that depicted and categorized every country on the globe, and crucially, in the mode of warfare that was coming back in style in this era. An integrationist policy was deeply consistent with the US military's wholesale pivot

toward urbanized warfare, a shift toward counterinsurgency.

Counterinsurgency, a notoriously urban form of warfare, was perfect for the neoliberal ethos animating these wars because it held that securing key areas such as major cities was the first step of an infectious security which would spread throughout the region. In the best-selling FM 3-24 Counterinsurgency Manual, David Petraus writes that "COIN efforts should begin by controlling key areas. Security and influence then spread out from secured areas. The pattern of this approach is to clear, hold, and build one village, area, or city — and then reinforce success by expanding to other areas," (US Army 2006: p5.18). To achieve this goal, COIN was a two-pronged strategy — the first pillar focused on the kinetic confrontation between military forces and enemy combatants, and the second focused on winning the political support of the population centers, which meant living among them in their cities and enacting security. The idea was to shift to non-kinetic, development directed warfare aimed at construction rather than destruction to win over "hearts and minds." In his writings on counterinsurgency warfare, David Kilcullen (2011), Australian military official and prolific thinker and proponent of counterinsurgency wrote that although less glamorous than raids, civil construction would be a better way to displace enemies:

> The road provides an alternative works project to prevent people joining the Taliban, the improved ease of movement makes business easier and transportation faster and cheaper, and thus spurs economic growth, and the graded black-top road allows friendly troops to move much more easily and quickly than before, along the valley floor, helping secure population centers and drive the enemy up into the hills where they are separated from the population—*allowing us to target them more easily and with less risk of*

collateral damage, and allowing political, intelligence, aid, governance, education, and development work to proceed with less risk. (Kilcullen 2011: 91).

Humanitarian liberal nation-building efforts that re-engineer social space in this way do so in pursuit of military objectives: liberal development and "road building" could reshape space in ways conducive to security by creating economic opportunity, securing populations, and chasing away extremists. In its focus on the wellbeing of populations, counterinsurgency was thought of as the latest phase of the humanization of warfare and a hallmark of the liberal order's progress.

A more likely reason for the cross fertilization between military and humanitarian discourses and objectives, however, was the idea that underdevelopment in the Global South made countries more prone to violence and terrorism. This second thesis is more likely when one notices that not only was warfare undergoing a process of "humanization," but on the other hand, humanitarian relief programs were undergoing processes of militarization. For instance, the branch of the U.S government concerned with international development, USAID, began to see development as an antidote to conflict and "violent extremism" (USAID 2011), and also led the agency to increase its presence in conflict areas in three "frontline states," Iraq, Afghanistan, and Pakistan. Although the agency did work to expand its presence in remote areas, its main focus was creating projects in main cities that would attract workers and enable urbanization. Like the neoliberal imperatives that drove this era's military incursions, USAID's projects should be seen during this era against a broader backdrop of structural

adjustment programs perpetuated by the World Bank and IMF, that began in the 1980s and continue for decades later which included imperatives that governments downsize and leave room for private industry to take up traditional governance roles such as aid and healthcare. The neoliberal restructuring of aid and health which ran parallel with efforts to develop the global network of urban centers, was in many ways symmetrical to the counterinsurgency missions — they both saw insecurity as caused by underdevelopment and security as achievable through the global integration of peripheries.

In sum, as for the whereabouts of the "exception" in the era of high-footprint intervention, it was in underdeveloped states of the Third World, and the solution for both military and humanitarian agencies was understood to be at the level of cities — thus justifying different forms of aggressive economic or military intervention. This mapping showed up in both legal language and in geostrategic texts at the time. But the question remains if efforts to replace strategically unfavorable political-economic regimes with strategically favorable ones through either trade policies, urban development, or counterinsurgency style war were prompted by neoliberal geo-economic imperatives, does the retreat from these countries, the replacement of heavy intervention to "light" intervention via drones, represent the end of neoliberalism? Does the retreat from this robust approach to international security and foreign politics indicate a change in the global political-economic winds? If states and cities suffering underdevelopment invited either American militaries or American companies, or both,

then how do drones represent a continuation or break from this mission? In a think piece in Foreign Policy titled "Think Again: The Pentagon" (2013), Barnett's opinion regarding this question is clear:

> Wake me up when drones can set up local government elections in Afghanistan or reconfigure Mali's judicial system.
>
> So, yes, drones are spectacular for finding and targeting bad actors (and other drones, eventually), but if your robot war requires a no man's land to unfold (say, the tribal regions of Pakistan), then all you can "control" in this manner are no man's lands — or patches of ocean. If you really want to get your hands on what lies below (hydrocarbons, minerals, arable land), you still have to send in some bodies — eventually. That's why they call it blood *and* treasure.

Evidently, Barnett laments the shift in strategy towards drones and away from nation-building military intervention, and all the blood and treasure thus lost. However, Barnett's lamentation offers a clue as to the difference between the drone interventions of today and the heavy presence interventions of past decades. Drones operate in new geographies — they do not strike over capital cities and urban centers but in "tribal regions," in "*no man's lands*." The 'problem' that drones remedy is not economic disconnect, but what happens in places that are outside of the realm of connected and disconnected. Contrary to Ramsay's (2021) contention of the retreat from Afghanistan signaling the end of neoliberalism, the next section shows how neoliberal imperatives continue to inform Western foreign policies in the global South, even as older forms of intervention have been replaced by drones. What has changed is the geographic distribution of threat, away from cities — which have more or less been secured — and toward the most remote places on the map.

B. The threat goes remote

To Barnett's dismay, the era of US nation-building abroad came to a close. An era of counterinsurgency and on the ground humanitarian aid programs gave way to the alternative: low-footprint governance by drone. A case in point of the turn away from urban forms of warfare was the recent decision to shut down the institutions that were formed to facilitate those kinds of wars: including the little-known but greatly influential Asymmetric Warfare Group (AWG), a group whose purpose was to help the US conduct "modern" warfare, the Army's University of Foreign Military and Cultural Studies, a center whose purpose was to study the best ways to reform the military to fight such wars, and the Marine Corps' urban warfare experiment called Project Metropolis (Spencer and Beehner 2020).

Though it might be considered as signaling a waning of neoliberalism as the ordering rationale of the global political economy (Ramsay 2021), a few things hint that that is not the case. What might look like a waning of importance in liberal peace-building in cities, actually is the result of cartographic shifts in discourses of danger that decenter cities as areas of threat, thus diminishing the popularity of urban warfare styles. What started as roll-back neoliberal discourses of liberalizing the gap from danger and tyranny, hollowing out those governments that were obstacles to global integration are replaced with roll-out neoliberal strategies to manage tyrants with entrepreneurial tools and tactics as the geographies of threat become more acutely

located in only the most remote areas. This section first follows the pro-drone targeting rhetoric of the Obama Administration to trace the new cartographies of threat in political discourse. Next, I challenge the contention of neoliberalism's end by considering the way neoliberal market rationalities continue to pervade all elements of the new governance-via-drone, by showing the involvement of private actors and the market-based logics that inform drone use and drone cartographies. That is, just as high footprint interventions were, low footprint intervention strategies also can be explained as instances of neoliberal rationality, though they emphasize different ideals. The distinction between them is less their underlying neoliberal geostrategic discourse and instead the geographic designation of threat correlating to each of their eras. I contend that Kilcullen's (2011: 91) road building efforts had their intended purpose of "secur[ing] population centers and driv[ing] the enemy up into the hills" — of rewriting the geography of spaces so that the centers are secured and the threat is sequestered in the most remote places.

Indeed, what is actually revealed in the retreat from military intervention/liberal peace-building toward targeted low-footprint intervention via drone, or from a "shrink the Gap" strategy toward "managing the outliers" is the real effects of liberal peace-building through the neoliberalization of cities. This was not necessarily meaningful economic development and political stability, but efforts towards globalized connectivity through the development, exponential growth, and deep incursion of private industries globally, exemplified in the boom of highly networked neoliberal

cities. That is, so long as corporate industries had extended reach into developing countries, the "Gap" was considered shrunk and the exception was transformed into acute exceptional space — confined to only the most remote outliers, to the "last miles" from centers within countries, where danger was now concentrated.

i. The new exception

The discourse and cartographic imaginary correlating with drone use in military counter-terrorism efforts shows a shift away from discursive constructions of the entire non-Western world as dangerous, lawless, and disconnected, from states as belligerents and cities as the critical nodes and vectors of either violence or prosperity, to specific geographic remote areas where "the state only has the most tenuous reach into the territory." This was how President Obama (2013) described the new geographies of the War on Terror and where he would be sending drones to strike. If the previous mapping of the global exception was the entirety of developing countries, with the main hubs of danger the entirety of rogue states and their underdeveloped cities who needed to be reformed and integrated, then the new cartography of the exception is the rural, remote, and almost completely un-developed empty space. In almost every speech on the controversial drone program, Obama returns to the fact that strikes were against terrorist operatives that took refuge up in "very tough terrain," (AlJazeera English 2012). Such geographic optics legitimated the need for drones, but also, demonstrated a clear shift away from the earlier COIN doctrine that sought to "isolate the terrorists from the neutral population" — the political discourse instead takes the terrorists'

geographic isolation as a starting point. Juxtaposing these discourses begs the question of whether this new discourse represents a break or whether it emerges as a result of the success of the earlier strategy.

In his famous 2013 speech on America's drone policy at the National Defense University, the President demonstrated a dramatic shift away from the earlier discourses which paint states as the main belligerents and targets in the War on Terror. He begins by emphatically declaring that America "must define the nature and scope of this struggle, or else it will define us," (Obama 2013). Indeed, throughout the speech Obama *re*-defined a once clearly delineated scope: if the problem-solution during the Bush era could only be conceived at the scale of states and major cities, territories that needed to be controlled, the new parameters of the threat shrink considerably from this scale and are acutely manifested in the most rural, the most remote, the "most distant and unforgiving places on Earth," (Obama 2013). While the President (2013) conceded that "in some cases, we continue to confront state-sponsored networks," in most cases, counter-terror efforts "will involve partnerships with other countries." The problem with delegating the War on Terror to now trusted allies which formerly made up the "Gap" is that in many of these places,

> such as parts of Somalia and Yemen — the state only has the most tenuous reach into the territory. In other cases, the state lacks the capacity or will to take action. And it's also not possible for America to simply deploy a team of Special Forces to capture every terrorist. Even when such an approach may be possible, there are places where it would pose profound risks to our troops and local civilians — where a terrorist compound cannot be breached without triggering a firefight with surrounding tribal communities, for example, that

pose no threat to us; times when putting US boots on the ground may trigger a major international crisis, (Obama 2013).

The threat is increasingly portrayed as one requiring surgical sensitivity, when the entire name of the game only a few years prior to this was for the army to integrate and become familiar and friendly with surrounding local civilians. The effort then was to "isolate the terrorists from the neutral population" by winning over the population's hearts and minds, placing the threat squarely within the realm of society, whereas now, the President emphasized,

> Al Qaeda and its affiliates try to gain foothold in some of the *most distant and unforgiving places on Earth.* They take refuge in remote tribal regions. They hide in caves and walled compounds. They train in empty deserts and rugged mountains… So neither conventional military action nor waiting for attacks to occur offers moral safe harbor, and neither does a sole reliance on law enforcement in territories that have no functioning police or security services — and indeed, have no functioning law, (Obama 2013).

The Obama administration's newly recast optics and geographic location of the terrorist problem were continued by the Trump Administration. Assistant to the President for Homeland Security and Counterterrorism, John O. Brennan followed a line of argumentation for the necessity of drone strikes that was a continuation of Obama's:

> Moreover, after being subjected to more than a decade of relentless pressure, al-Qaida's ranks have dwindled and scattered. These terrorists are skilled at seeking remote, inhospitable terrain, places where the United States and our partners simply do not have the ability to arrest or capture them. Targeted strikes are wise. Remotely piloted aircraft in particular can be a wise choice because of geography, with their ability to fly hundreds of miles over the most treacherous terrain, strike their targets with a astonishing precision, and then return to base. (Video of Brennan posted by WoodrowWilsonCenter 2012).

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The link between geography, specifically treacherous terrain, and the justification for drone use is emphasized by more than just American politicians and US foreign policy circles: in fact, the discourse is globalizing. Even Chinese military scholars have emphasized the importance of "mountain anti-terrorism operations." A group of scholars from the National University of Defense Technology in Wuhan, China note that a

> large number of terrorists are hiding in the mountainous border areas in order to make a comeback. At the same time, some international terrorists often enter my country through the border mountainous areas. Therefore, the mountains will be an important battlefield for our country's future anti-terrorism operations. The complex terrain and harsh natural environment in the mountains have brought great difficulties to counter-terrorism operations, and UAVs will certainly play an important role in mountain counter-terrorism operations due to their flexible mobility, strong environmental adaptability, and suitability for performing dangerous tasks (Wenxin et al. 2021).

Like the US, the authors attribute Al Qaeda's survival to the "complex terrain environment in mountainous areas" which "provides a natural barrier for terrorists to hide," (Wenxin et al 2021). China's terrorists are not Al Qaeda but Muslims from the autonomous region of Xinjiang, who, similar to the new victims of the drone wars, "hide deep in the mountains." Whether American or Chinese, the insistence of governments and militaries on the whereabouts of the terrorist threat is a far cry from earlier rhetoric that placed terrorists squarely within populations and thus advocated for more social forms of warfare such as COIN.

Seven years after his famous drone speech, Obama's later reflections written in his post-presidency memoir on the drone program and his counter-terrorism efforts are

especially telling of the newly shifted geographies, where he again emphasizes the "sanctuary" for terrorists of the "remote, mountainous, and barely governed region straddling the Afghanistan-Pakistan border," (Obama 2020; 902). These geographies are consistent with Obama's reflection on the evolving role of the US in Afghanistan, which moved from grand dreams of transforming Afghanistan "into a modern, democratic state that would be aligned with the West," (Obama 2020; 322) toward a more limited counterterrorism strategy. He writes "in the 1970s, Kabul had been not so different from the capitals of other developing countries, ragged around the edges but peaceful and growing, full of elegant hotels, rock music, and college students intent on modernizing their country," (Obama 2020; 124). The original ambitions of a grand modern revolution in Afghanistan began when the

> United States had brought Karzai and his advisors back and installed them in power — functional expatriates … [who] with their impeccable English and stylish dress … did their best to persuade us that a modern, tolerant, and self sufficient Afghanistan was within reach so long as American troops and cash continued to flow. I might have believed Karzai's words were it not for reports of rampant corruption and mismanagement within his government. Much of the Afghan countryside was beyond the control of Kabul, and Karzai rarely ventured out, reliant not just on US forces but on a patchwork of alliances with local warlords to maintain what power he possessed, (Obama 2020; 124).

His reflections on the possibilities suggested by 1970s Afghanistan, juxtaposed by his dismay that the trajectory it suggested never came to fruition, were central to the revised counter-terrorism strategy in Afghanistan. Due to his disillusionment with the US foreign policy dreams for transforming Afghanistan "into a modern, democratic state that would be aligned with the West," (Obama 2020; 322), Obama felt that it was important to redefine and hone in all aspects America's counterterrorism strategy. That

meant not only retracting on any foreign policy approach that had regime change as a goal, but thinking about the implications of "defining the threat as an open-ended all-encompassing "War on Terror," … [and] fears about vast terror networks," (Obama 2020: 674). Such an approach made the US "administrators of inhospitable terrain and bred more enemies than we killed," (Obama 2020; 442). Instead, the former President wrote that he wanted to remind the world of the narrowness of the objective — a narrowed vision that required a narrower, more targeted approach. Redrawing the geographies of threat and relegating them to the most remote regions of Afghanistan was thus in harmony with this shift in foreign policy strategy.

The strategic shift from shrinking the gap to maintaining the contours of the gap and targeting outliers that hide behind "treacherous terrain" is telling of an approach that does not see any strategic value in integrating the new gap spaces in the way that integrating cities into the global urban network was. This is what explains the shift from high-footprint counterinsurgency to targeted counterterrorism — it is not the retreat of neoliberalism as an organizing principle but the newly drawn up cartographies of danger, cartographies that are themselves resulted from past neoliberal excursions. Though the president lamented the contrasting condition of Kabul with the "small villages of mud and wood that we saw from the air … with barely a paved road or an electrical line in sight," (Obama 2020: 124 - 125), he recognized that "the issuance of massive US contracts to some of Kabul's shadiest business operators" (Obama 2020: 322) might have had something to do with the high levels of corruption in Kabul and

the disconnect between the center and the rest of the Afghan people. Despite his regret, the severely uneven development in Afghanistan, the narrower foreign policy, and the new geographies of threat, were the ultimate consequence of earlier neoliberal regime-change wars.

ii. Still neoliberalism: Private actors

If earlier forms of high footprint intervention were often justified by neoliberal imperatives toward the global integration of urban centers, then it might appear that the contemporary targeted approaches that do nothing to integrate but instead manage outliers indicate the waning of the importance of neoliberalism. However, neoliberal market rationalities continue to pervade all elements of the new governance-via-drone. Three tendencies make this clear: the role of private actors in drone governance, the logic and discourse of "targeting" that informs the operative logic of drone use, and the catalyzing effects of the interaction between neoliberal discourses of market rationality and political discourses of exceptional space.

First of all, the involvement of private industries at every level of the drone strategy is an unavoidable reality of this era of governance. In an op-ed titled *To Keep America Safe, Embrace Drone Warfare* written in the New York Times, Michael V. Hayden defends the use of drones in American foreign military policy saying, "The program is not perfect. No military program is. But here is the **bottom line:** It works," (Hayden 2016). Hayden's defense of the drone program might be seen as authoritative given his

impressive credentials: he is a retired US Air Force four-star general, former Director of both the NSA as well as the CIA. Hayden wrote this polemic defending the drone program all the while detailing the unfortunate collateral damage such as the murder of a child in a mission targeting his grandfather:

> Throughout the campaign, civilian casualties were a constant concern. In one strike, the grandson of the target was sleeping near him on a cot outside, trying to keep cool in the summer heat. The Hellfire missiles were directed so that their energy and fragments splayed away from him and toward his grandfather. They did, but not enough.

> The target was hard to locate and people were risking their lives to find him. The United States took the shot. A child died, and we deeply regret that he did. But his grandfather had a garage full of dangerous chemicals, and he intended to use them, perhaps on Americans, (Hayden 2016).

What appears to be a regretful balancing of concern for the security of Americans and the civilian casualties of drone strikes becomes questionable when one considers how Hayden's business commitments shape his ethical standards. What Hayden failed to disclose in this morally questionable polemic the fact that he sits on the board of at least three companies with strong ties to the drone industry. Hayden was at the time the acting principal of the Chertoff Group, a consulting company that advises defense industry clients on how to obtain government contracts — or, as advertised on the company website, using their "unique understanding of the security marketplace" to advise clients on how to "translate security insights into value creation," (Chertoff Group 2022). Hayden also was on the board of Motorola Solutions, a defense contractor that has investments in drone production companies, where he was paid a quarter of a million dollars for his term in 2015 (Galbraith 2016). Finally, Hayden failed to disclose

his service on the board of Alion Sciences, an information technology firm that was awarded a $24 million contract to develop unmanned weapons systems for the US Navy.

When questioned about his involvement in these companies by AlJazeera journalist Mehdi Hassan, who asked if Hayden thought it was wrong to "suggest to the reader that you're approaching this issue merely as an impartial former intelligence official … rather than as someone who nowadays sits on the board of three companies that make money off of drones?" Hayden had this to say:

> "Look, I don't make any money from any companies involved in the kinds of drones that are used in targeted killings. I do however make use of my experience, and I feel justified in talking about my experience … I see no connection between what it is I do probably for business, and what I believe to be an accurate historical record. By the way, three's too big a number. I don't think I have that many companies" (AlJazeera 2016).

The military official-private industry connection should come as no surprise: indeed, there is an unabashed integration of private industry at *every level* of US military counter-terrorism strategy. The below chart (Fig 1.6) is extracted from the 2018 National Counter-Terrorism Strategy, and provides a visual representation of the strategy. Each of the six symbols represents a particular method of the strategic objectives, with the handshake on the end which permeates throughout each level of the strategy representing the role of "public sector partners [and] private sector partners" in helping to prevent terrorism.

LINES OF EFFORT

Pursue terrorist threats to their source	✋				☣	🤝
Isolate terrorists from financial, material, and logistical sources of support	✋	💵			☣	🤝
Modernize and integrate a broader set of United States tools and authorities to counter terrorism and protect the homeland	✋	💵	🚫		☣	🤝
Protect United States infrastructure and enhance preparedness	✋		🚫	🛡	☣	🤝
Counter terrorist radicalization and recruitment	✋		🚫			🤝
Strengthen the counterterrorism abilities of international partners	✋	💵			☣	🤝

Figure 1.6. 2018 National Counter-Terrorism Strategy.

The degree in which private industry is involved in international counter-terrorism strategy has steadily become apparent over the last decade — with one headline after the other revealing the scandalous news that the army has been using private contractors in their launch and recovery of drones. However, that drone technologies are developed by private industries contracted by the military has never been a secret. The first predecessor to the Reaper was developed by private company General Atomics, with Lockheed Martin, Boeing, and other private companies following suit. The same is true for drones working on humanitarian delivery projects, with the big names being Zipline, Deloitte and Wingcopter.

iii. Neoliberal effects: Entrepreneurial playgrounds

The involvement of private actors in governance practices as corporations become auxiliaries for governments raises the question of how this involvement affects those practices. Here I focus on the first of two effects of this neoliberalization of governance: first is the emergence of "entrepreneurial playgrounds of experimentation" as a result of the interaction between neoliberal discourses that center market rationality and the phenomenon of politically exceptional space, second is how the administration of bio-and-necropolitical governance is recast as a supply chain issue which correlates with the emergence of unique cartographic mode that focuses on the local and granular as opposed to the broad and global, thus allowing for more 'targeted' approach to governance.

As for the first effect, by "entrepreneurial playgrounds of experimentation," I refer to the fact that the use of drones in governance is owed to a neoliberal estimation of the potentials offered up by exceptional space, that is, its potential as a landscape of experimentality and innovation. The lawlessness discourse that prompts foreign government intervention and pacification performs an altogether different function from the perspective of corporate actors — exceptionality functions as a space for *entrepreneurial experimentality*.

In his book *The World is Flat*, Thomas Friedman wrote: "In a flat world, you can innovate without having to emigrate," (Friedman 2007, 216). By this, Friedman meant

that due to the possibilities offered up by technologies such as the internet, "people in rising nations like India and China will be able to innovate without having to emigrate" to the United States in search of a decent engineering job. Friedman's argument focuses on the effect innovation and progress had on cultures of the world: in search of opportunity and the means to innovate, global emigration patterns from South to North cause one to "give up his or her native dress, native cuisine, native music, and extended family—all the things that make up a native culture," (Friedman 2007, 497). In the new era of connectivity, people can now stay in their countries and preserve their own culture while participating in the globalized economy, and even if they do travel west, they are still able to "take advantage of the flattening of the world to hold on to many aspects of their local culture … thanks to their ability to read their local newspapers online, to communicate with family and friends by phone, to watch daily news from Cairo or Calcutta," all of which he refers to as the "globalization of the local," (Friedman 2007, 497).

Though this account inspires many critiques, I will focus on just one. In his conviction that pre-Flat World innovation could only happen when people "uproot themselves from developing countries to go west," (Friedman 2007, 216), Friedman failed to account for the more some of the more common emigration patterns that (flat world) neoliberal imperatives tend to drive: those from the Global North to the Global South that corporate entities traverse in their search for experimental space. Even USAID recognizes this tendency of humanitarian drone delivery companies to test and

refine their drone technologies as they station in far-away places:

> Regulations in many countries remain largely unfavorable toward UAVs, and restrictive UAV regulations could inhibit development of global health use cases… the lack of policies in some countries has created the opportunity for experimentation (USAID 2017a: 14)

In this case, the "globalization of the local" or the universalization of the particular is owed less to the ability of expats in the West to engage in their home culture, and more to the nature of experiment as a process from which universal principles can be derived from controlled models. New drone startups are therefore not only attracted to low-regulation havens, which upon closer inspection are not actually devoid of regulations (Lockhart et al. 2021) but averse to the prospect of regulations at all. One reddit user writes on his meeting with CEO of drone start up Zipline, Keller Rinaudo:

> The one thing I was not a fan of is that this same guy was so intensely anti regulation that he refuses to operate in the USA. This guy thinks he should be allowed to do whatever he wants. The company and its practices are awesome but the CEO needs to get a little perspective on why regulations exist. (SoundisPlatium 2021).

Usually, framing technological developments in aid as "innovative" as opposed to "experimental" avoids the acknowledgement that these programs are still untested. The conceptual affinity between them is clear in the excerpt quoted above extracted from USAID's Center for Accelerating *Innovation* and Impact's report; it is telling that authors consider policy-scarce areas in some parts of the Global South as opportunities for accelerating *experimentation*. USAID understands that this process might be controversial, stating in another report titled *UAV Landscape Analysis: Applications in the Development Context* (2017b) that

The technology and operationalization of UAVs for cargo delivery is still in the development phase … Many of the Companies that are based in Europe or the United States that are developing cargo UAVs have already sought or are seeking to first operationalize their technology in development contexts, possibly due to less stringent regulations … to provide proof of concept or gain a competitive advantage by gaining experience with prototypes.

During the development phase of UAVs in humanitarian projects, it has been quite common for UAV companies to provide their technology free of charge to humanitarian organizations and/or local ministries/governments for them to test their solutions and perfect their technology in field conditions and in countries where regulations are more favorable compared to the "home market," (USAID 2017b: 15).

This is why while both military and humanitarian delivery drones may heavily operate in the African continent and the Middle East, the job market for producing and operating drones is largely absent from those areas and most heavily concentrated in the US, as shown by the map in Figure 1.7.

TOP5 Drone Job Categories by Segment 2019
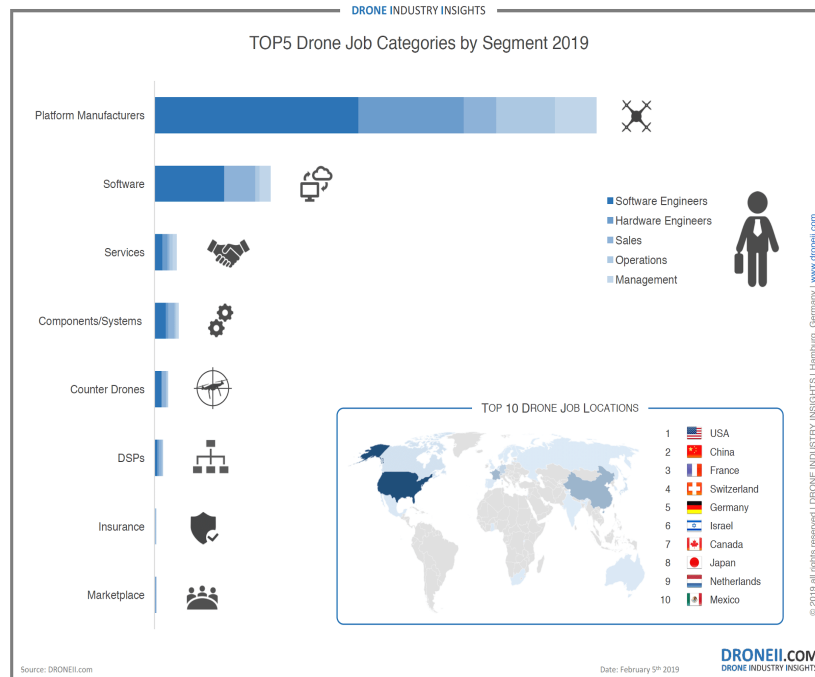
Figure 1.7, Top 5 Drone Job Categories (Drone Industry Insights 2019).

African countries are notably absent from this map, but as shown in Figure 1.8 in a map produced by Grey Dynamics, a London-based private intelligence firm that specializes in geopolitics, drone activities — which start off usually as testing activities before they graduate to regular operations — are heavily scattered across the continent. While this mapping is keen on showing the use-value for drones in spheres such as humanitarian aid, the article that this map appears in admits that while highlighting positive innovations of drones in Africa, it is nevertheless "negligent not to assess the factors involving drone warfare, and the negative consequences possible" (Ersozoglu 2021). The self-consciously cautious but optimistic article ignores the negative consequences, however, of drones operating in these countries supported by a political-economy of actors from outside of those countries, based in Silicon Valley and other

tech hotspots. In other words, there is no cautiousness about the "anarchitectures" being established, where drones are reconfiguring state operations and the distribution of services from without, "cutting across traditional infrastructures and … often directed from spaces outside the state they operate in, [and are] indispensable to the state's ability to govern" (Peckham and Sinha 2019: 1206).
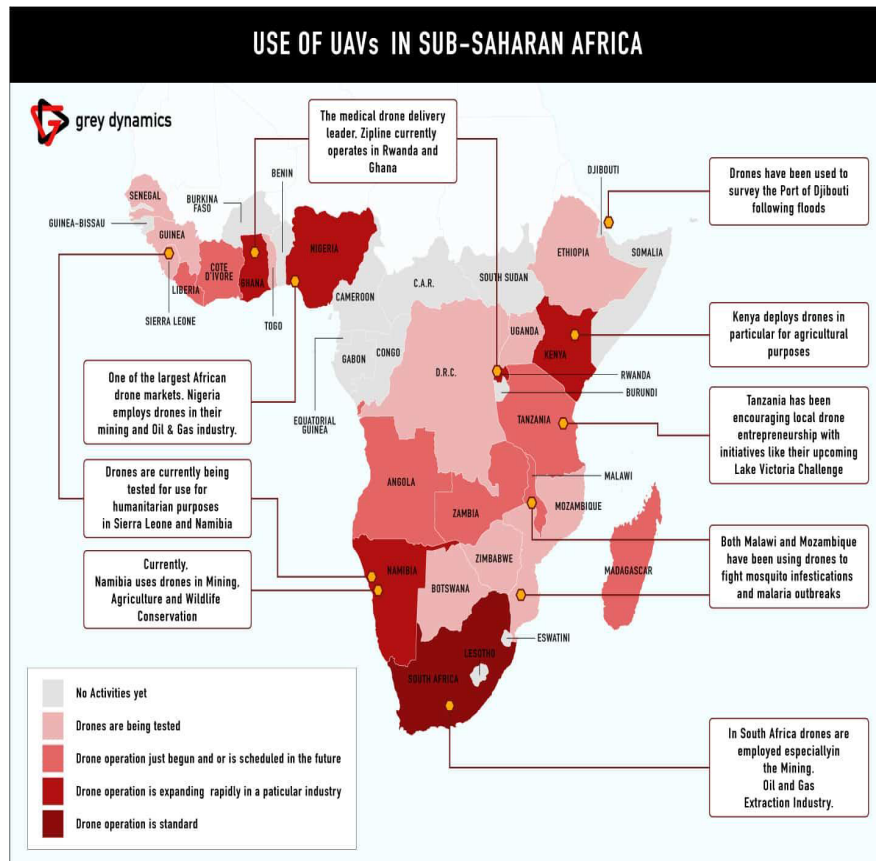
Figure 1.8. Grey Dynamics. Use of UAVs in Sub-Saharan Africa. (Ersozoglu 2021).

Figure 1.9. Aftermath of the Akinci drone strike. Twitter, captioned: "terrorist Mehmet Erdoğan, the so-called Mahmur-Kerkuk-Süleymaniye field general manager of the terrorist organization PKK/HPG, was neutralized in Mosul in northern Iraq." (Yasemine Serbez, 2022).

On the military side of things especially, the relationship between exceptional, or policy-scarce space and drone innovation peaks in the discourse of "combat-proven" drones. The Akinci drone, produced by Baykar Defense and recently delivered to the Turkish Armed Forces recently took the internet by storm in military and weaponry fan-base websites and subreddits. On April 18, 2022, Turkish Armed Forces used the Akinci armed UAV for the first time in the "Pençe-Kilit" or "Operation Claw-Lock" in northern Kurdistan-Iraq, targeting members of the PKK (Southfront 2022; DailySabah 2022) (Fig. 1.9.). Just five days after the strike, the Turkish Defense YouTube channel reports that now, the Akinci is officially "combat-proven," (Public Defense 2022).

Figure 1.10, "Akinci UAV Successfully Completed its First Combat Mission and became Combat Proven." (Public Defense YouTube Channel 2022).

The buzzwords of "combat-proven" and "battle-proven" signal to the industry that, as products, these drones offer a competitive advantage to prospective drone shoppers. The purpose of Operation Claw-Lock was thus two-fold. On the one hand, it was a regular Turkish counter-terrorism operation against Turkey's long-time foe, the PKK in northern Iraq. However, this campaign was also an *advertising* campaign. The purpose of this campaign was not only counter-terrorism, but the expansion of the Turkish drone industry into new markets. With neighboring countries like Ukraine and Azerbaijan dealing with military problems of their own, drones produced by Turkish companies like the Akinci have been keen to demonstrate and report on their capacity through experimental targeting operations in northern Iraq. It has been working — Turkish drones are so popular to other markets outside of the Turkish government now

that Ukrainian forces have even composed a folk song about them (Kronika24.pl 2022).

In another example, in an advertisement on the General Atomics website, the company presents a new product, the "Gray Eagle," which they boast is an "innovative and technologically advanced derivative of the *combat-proven* Predator®," (General Atomics 2022a; emphasis added). Another one of General Atomics' drones, the new MQ-9A Reaper is, according to their advertisement, "a highly sophisticated development built on the experience gained with the company's *battle-proven* Predator RPA," (General Atomics 2022b; emphasis added). The frequent reference to the older models is testament to the reputation built by those models (the Predator and the Reaper — the latter of which is just the name of any Predator equipped with weapons) in combat, mostly in Afghanistan, Iraq, Yemen, and Somalia.

The same discourse of "combat-proven" technology is abundantly present in the advertisements for Israeli drone technology. The occupied territories of Palestine and the Gaza Strip act as the perfect areas of exceptional space where the experimentality necessary for innovation and entrepreneurship for Israeli defense firms can occur. Again, the reasons for the tremendous success of Israeli technology is the fact that these drones are considered in the industry, according to Israeli drone giant, IAI, "combat-proven." These defense firms use Gaza and other places in the Middle East as a testing ground for new aerial attack technologies, and then boast on their websites and advertising platforms of the way their drones have already "excelled in the battlefield,"

(IAI 2022). The success of the Turkish Baykar Defense company, General Atomics and the Israeli drone industry is demonstrative of the unique environment offered up by exceptional space, which in its consistent war-status and lack of regulatory protections, becomes perfectly situated for innovative technologies to experiment and flourish. Political spaces of exception that military drones service, like those humanitarian crises or medical supply deserts that are serviced by drones are, a kind of spatial exception that is defined by its lack of connectivity and its being in a place where the law is not understood as a strong organizing force. Therein lies the connection between exceptional space and neoliberal imperatives of innovation — innovation often relies on the permissiveness of peripheries.

iv. Neoliberal effects: Zooming in and targeting the last mile

Besides the clear benefits both defense and humanitarian drone companies reap from using politically and legally exceptional space as "innovation" space to experiment in, the rhetoric which justifies drone use in these areas continuously reproduces such space as exceptional though the discourses of targeting, remoteness, and in the case of humanitarian delivery drones in particular, as spaces that exist "at the end of the last mile." The last mile is a phrase widely used in the telecommunications and internet industries to refer to the final stretch of the networks that deliver telecommunication services to the end-user's premises, and has recently been used to explain issues of the global supply chain whereby the 'last mile' of delivery poses the most difficult problem for supply chains. Head of drone giant

Matternet, Andreas Raptopoulos, explicitly makes the reference in his justification for drone use in delivery health and other goods. When asked "why create a network of flying drones at all?" Raptopoulos said

> You have the technology that can help the most difficult part of delivery: The last-mile problem. You have a lightweight package going to a single destination. You cannot aggregate packages. It's still way too complicated and expensive. It's very energy inefficient. UAVs or drones deal with the problem of doing this very efficiently with extremely low cost and high reliability. It's the best answer to the problem. The ratio of your vehicle to your payload weight is very low, (Madrigal 2013).

When corporate actors are involved at every level of biopolitical and necropolitical governance, it is no surprise that reaching those hard to reach, less governable populations might be modeled as a supply chain issue: "Zipline's on demand, end to end delivery service doesn't just integrate seamlessly into your supply chain — ," reads the medical delivery drone company's website, "it transforms it," (Zipline 2022). As Cowen (2014) argues, just-in-time delivery services" reflect profoundly political forms of knowledge and calculation that present themselves as purely technical" (Cowen 2014: 4). There is a two-way movement between military violence and commercial logistics – in the first move, military violence relies on the deployment of high-tech, just-in-time delivery techniques to bring equipment and necessities to soldiers on the front-line, and in the second move, commercial logistics inherit these techniques to optimize their own systems. In this case, UAVs which were the perfect military solution to deliver necropolitical effects as well as optimize military supply chains become are perfect humanitarian solution due to their ability to provide "meaningful benefits to global health through improved supply chain performance," reads USAID's *UAVs in*

Global Health report, "UAVs can fly over vast distances and challenging terrain, enabling *just-in-time delivery* of life-saving medical supplies to those in hard-to-reach communities,"(USAID 2017b: 5, emphasis added). This combination of discourses, the neoliberal one which underwrites promises of "just-in-time delivery" with the discourse of remoteness underwriting places that are "hard-to-reach," is demonstrative of the reasons why drones appear as best solutions. It is because these hard-to-reach places and people represent a *supply chain issue,* and not a *development* issue as previous characterizations of underdeveloped space once did.

The neoliberal recasting of the problem into a supply-chain issue for which targeted, efficient, or cost-effective interventions are necessary is evident by the associated cartographies that support such targeted interventions. Two tendencies of these cartographies are apparent. First, mappings used for medical delivery drone operations in particular largely emphasize the supply-chain dimensions of health governance. Second, the neoliberal targeted, bang-for-buck approach to governance necessarily results in more intimate, zoomed in cartographic renderings where such surgically precise interventions can be made, as opposed to the larger scale mega-maps drawn up by the likes of Barnett and company. In what follows, I demonstrate these two tendencies first in the mappings used by humanitarian delivery drones and then in mappings more relevant to military drones.
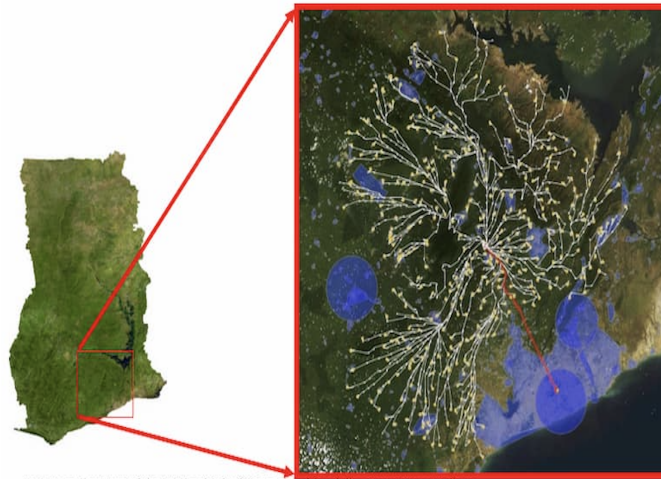
Figure 1.11, 400 health facilities in rural and suburban areas, Eastern Ghana (WeRobotics 2020).
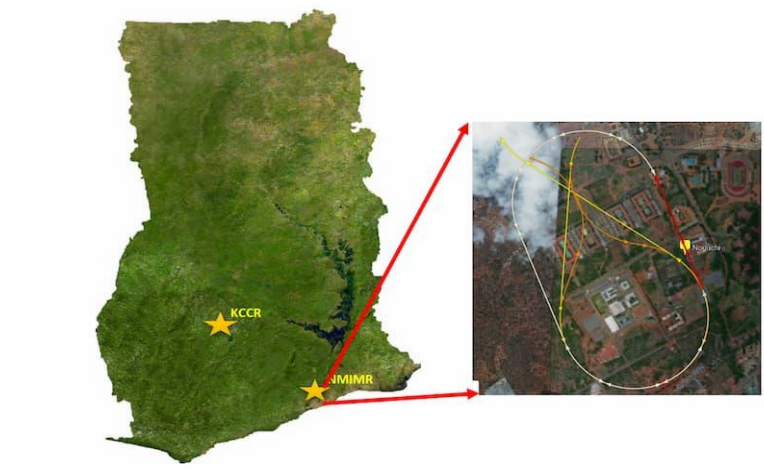
Figure 1.12, Ghana's two medical research facilities. (WeRobotics 2020).

The first graphic (Figure 1.11), produced by Ghana Flying Labs on behalf of Zipline, maps out over 400 health facilities in the rural and suburban areas of eastern Ghana (WeRobotics 2020). The next (Figure 1.12) maps out specifically the two medical research facilities, The Kumasi Centre for Collaborative Research (KCCR)

and the Noguchi Memorial Institute for Medical Research were the only two centers fully equipped to undertake mass testing for the Covid-19 virus in Ghana, where all samples collected for testing around the country had to be transferred. In mapping these connections between health centers and the research centers, Ghana Flying Labs helped Zipline gain an understanding of the drone delivery undertaking mission it was up against in Ghana.

What is troubling is that this framework stands in for more comprehensive, meaningful approaches to healthcare which are not delivered "just-in-time" but permanently there, as they are in Western settings. This would require investments in healthcare infrastructure, building more medical research facilities, and substantially integrating remote peripheries to more developed centers — a possibility which drones tend to foreclose. Proponents of the use of drones to connect those peripheries to the developed centers like USAID and Zipline and its partners consistently define problem areas in terms of remoteness as though it were a natural condition, while in reality it is the disproportionate investments in cities and private industries that have exacerbated and essentially created remote space. The problem that drones address is envisioned almost entirely in terms of the disconnection between the center and "the last mile," almost entirely as a supply chain issue. Only in this case, drones are facilitators not of merchandise but of biopolitical and necropolitical governance that looks to deliver 'just-in-time' to the end of the last mile. If neoliberal imperatives once justified the forcible neoliberalization of economies, the privatization of public functions, and war

to kick-start these processes, they now bank off maintaining exceptional space as it is in the periphery, and offering cost effective, profit making, targeted solutions to managing it.

Furthermore, what is distinctive about these maps is not only their intimate rendition of what is on the ground and the normative, drone supply-chain based solution they propose, but that they center Zipline's activities and decenter the fact that Ghana is dealing with a serious lack of resources and centers equipped to deal with the problem. This centering of the drone company and the recasting of public health in a country as a supply-chain issue is summed up in Figure 13, a map produced by Zipline of its distribution centers in Ghana. This map quite literally defines space and health access in terms of its relation to the 'center' of the Zipline distribution centers.
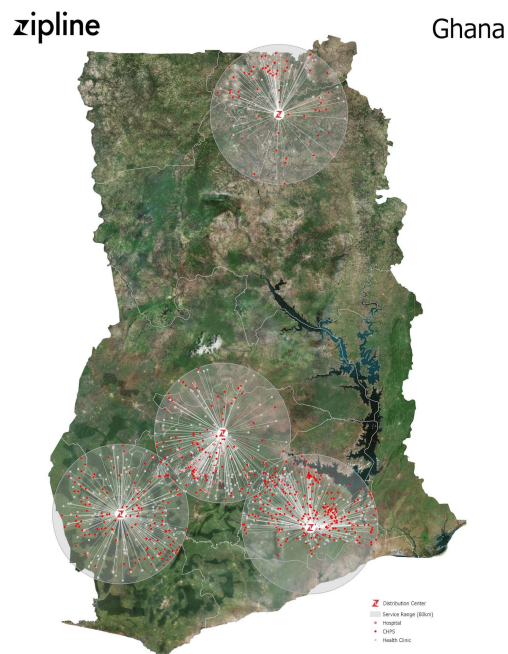
Figure 1.13. Zipline's four distribution centers in Ghana (Zipline Website).

The shift from addressing the problem of healthcare and humanitarian relief through international development to an exclusive last mile supply chain problem parallels a similar shift on the military side: the shift from counterinsurgency to counterterrorism. Like the spaces of humanitarian emergency which exist in peripheral geographies as opposed to developed cities, terrorists are now similarly imagined not in the center of Baghdad but in the most remote, far away places. Also, in line with the neoliberalization of necropolitical governance, these places are mapped in intricate detail in order to deliver the most decisive, cost-effective, 'surgically' precise interventions.

Consider the two kinds of mappings presented at the start of *Drone Cartographies.* The first was Barnett's mega-map (Fig. 1.1), the Pentagon's "new" Map — a map scaled up to the level of the entire globe which in broad strokes categorized certain countries as Core and others as Gap. This map and the others, such as Huntington's Clash of Civilization map (Fig. 1.4) and of the global urban networks (Fig. 1.5) were characteristic of a kind of foreign policy approach that narrated the "problem" at a global level where states were the main antagonists, and the solution was the integration of these gap spaces into the core through the integration of urban areas into the globalizing network of neoliberal cities. It was a kind of foreign policy approach that inspired large-scale intervention in an effort to enact the kind of regime change necessary for that type of integration.

The second kind of mappings presented at the start of *Cartographies* were the ones more characteristic of more current approaches to governance, that is, drone administered governance. The image below (Fig 1.14) which was presented at the start of *Cartographies*, of the map which traced the movement of a vehicle (wrongfully) suspected of being driven by a terrorist and was used to deliver a drone strike was discussed in a press briefing by US CENTCOM. These maps zoom into to the local; they are bird's eye, intimate renditions of what is on the ground. When used for security operations in the case of military drones, they often show every car, every building, every road and alley way. They are necessary for the kind of targeted, cost-effective interventions that are carried out by drone.

In fact, after decades of unrestrained spending on the wars in Iraq and Afghanistan, Commander of CENTCOM, General Kenneth McKenzie cited the lack of resources as a reason why no other vehicle was tracked as closely as the wrong Corolla: "we didn't track anybody as we — as — as closely as we did this because of the limitations on our resources," (CENTCOM 2021). This, McKenzie said was because "we no longer have a presence on the ground in Afghanistan. Our involvement in that war on the ground is over," (CENTCOM 2021). While the cost in resources was spared, the cost in lives totaled up to 9 reported deaths.
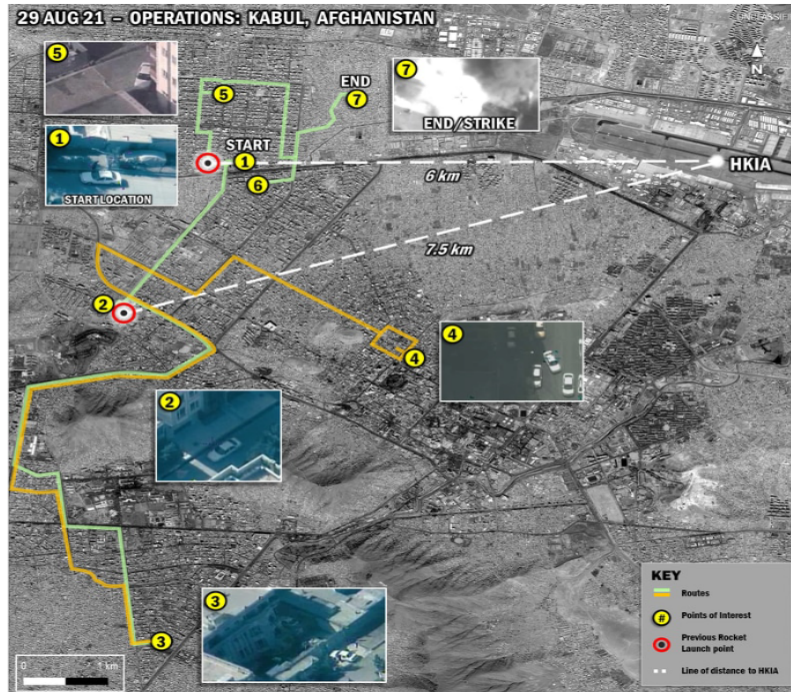
Figure 1.14, US Central Command maps movement across Kabul of white Toyota Corolla on Aug. 29, 2021. (CENTCOM/via Navy Times).

Where the practice of governance is underwritten by neoliberal rationality that tends toward targeted, cost-effective, efficient interventions as opposed to large-scale and costly ones, the associated cartographic needs also shift to facilitate that approach. The result is maps that zoom into the very intimate in order to allow for a targeted intervention. While such zooming in is undoubtedly the result of advancing technology which allows for such detailed images, it should also be considered in relation to the style of governance that has developed alongside this cartographic style.

To summarize this cartographic style, and the argument of *The Threat Goes Remote*: first, this new cartographic zooming can only be understood against a

backdrop of shifting geographies of threat – while the exception used to refer to entire states, it is recently designated to the most remote spaces on the map. Second, although neoliberal imperatives toward global economic integration legitimated the high-footprint interventions associated with earlier renditions of rogue-state exceptional space, the retreat to low-footprint interventions does not necessarily represent their waning away but their transformation. What was once a mission changing regimes in different states as a roll-back neoliberal project is now replaced with a strategy to manage only the most acute threats in the most remote of geographies. Finally, three things suggest that neoliberal rationalities continue to permeate these new strategies. These are: one, the central role of private actors in drone governance. Two, the logic and discourse of incisive cost-effective "targeting" that informs the operative logic of drone use, including the re-coding of remote space as "last mile" space in some instances. Three, the catalyzing effects of the interaction between neoliberal discourses of market rationality and political discourses of exceptional space. Here, I argue that exceptional space is still exceptional space, but as neoliberal rationalities mature in the techniques of governance exceptional space becomes recast as an "entrepreneurial playground" of innovation – which is just a business way to say experimentation.

IV. Cartographies: Conclusion

To re-iterate the central argument of *Drone Cartographies*, I contend that the distinction between earlier, high footprint interventions and later low footprint governance-via-drone, is owed not to any waning of neoliberal imperatives but to redrawn cartographies of threat and crisis, which have shifted from entire states in the Global South to only the most remote and far-away places on the map, where governments have "only the most tenuous reach." In fact, imperatives arising from global political economic neoliberalizing processes shaped *both* forms of intervention, albeit in different ways. Earlier forms of intervention were justified by depictions of the supposed disconnectedness, lawlessness, and economic underdevelopment of these states. These mappings ultimately shaped the envisioned solution, which was seen at the scale of cities, with the objective being the integration of cities into the new globalized urban network. As "cradles of neoliberalism," cities were fate-making units — their disconnectedness spelled danger and their integration meant security. Where aggressive neoliberal restructuring and privatizations of government functions through structural adjustments were not taking place, large scale interventions and regime changes, such as the 2003 Iraq war, were needed to forcibly integrate disconnected areas.

It was during this era that we witnessed a cross fertilization between military and humanitarian objectives — if economic underdevelopment was a cause for military insecurity, then not only was the popular form of warfare at the time,

counterinsurgency, seen as a humanitarian project, but USAID saw its work as conducive international security. The affinity between these two projects could be boiled down to their both acting as instruments in service to neoliberal imperatives integrative globalization and liberalized markets, which promised development and thus security. They were in a sense, two prongs of the same larger strategy driven by neoliberal principles.

As Sparke (2020) argues in his work on evolution of global health regimes as they were informed by earlier neoliberal imperatives of hollowing out the state and later neoliberal imperatives of selective investment in the highest return-on-investment activities, neoliberalism has shifted and changed but continues to inform policy in different ways over the course of the last few decades. In the military sphere too, the complete retreat from heavy footprint approaches to low footprint intervention-via-drone in both spheres is a change but it is not indicative of the waning of neoliberalism as an organizing principle to approaches to both war and humanitarianism, as neoliberal rationalities continue to pervade both approaches. Aside from the fact that drones are seen as cost-effective, targeting machines, corporate actors are active at every level of the development of governance-via-drones programs. From the perspective of corporate sensibilities, exceptional space serves two purposes — first, it recasts governance as a supply-chain issue. Where governments are unable to reach remote areas to administer either biopolitical care or necropolitical killing of terrorists, drones bridge those gaps that exist at the end of the last mile. Second, the use of drones in

governance is neoliberal is in the way that these programs manage the explosive outliers that are left after historical processes of the neoliberalization of space, and they do so in ways enabled by the interaction of neoliberal imperatives and rationalities with politically exceptional space. That is, the development of the drone program is contingent upon a neoliberal culture of *innovation*, and innovation is contingent upon a spatial-juridical order that is largely unregulated or "lawless," so as to serve the experimentality that innovation calls for.

If the retreat from earlier high-footprint forms of intervention toward low-footprint intervention via drone is not indicative of the waning of neoliberalism as an organizing principle, then the distinction between these two forms of intervention is not their underlying discourse, but actually a difference in cartographic imaginary. That is, while high footprint interventions saw the threat at the level of states, and solution to disconnectedness at the level of *cities* and the global urban network, low footprint drone interventions target *geographically remote space* that the targeting justifications treat as being better off isolated as opposed to integrated to maximize international security. The newly drawn geographies of exceptional space notwithstanding, the same grid for determining danger exists as before — remoteness and disconnection. The difference is that now, these areas would not be shrunk, nor was it a cost-effective strategy to shrink them through development because central cities are not at stake but rather peripheries. Managing the most explosive expressions of disconnected space at a targeted, just in time basis is the new strategy.

Finally, these cartographies are not merely rhetorical. Contrary to the distant, god's eye view cartographies we have been reviewing here, these areas are risky areas to inhabit in flesh and blood. In the next section, I look at the material development of these remote places, doing so in a way that also aims at offering a genealogy of lived danger in the danger zones by focusing in on the political economies that create targetable space.

Part Two. Drone Architectures: The Making of Targetable Space

I. Theory and Argument: Space and Target Production

A. Where the drones are

Instead of an even distribution across the territory of effected states, scholars have shown that drone activity is often concentrated in specific zones designated as "remote," both geographically as well as socio-politically from the center of states (Munro 2014; The Bureau of Investigative Journalism 2006; Weizman 2017). The spatial distribution of drone activity, according to Munro (2014: 244), "correlates with either bounded political and administrative sub-state units or regions, with distinct topographical zones like mountainous areas or island, or with some combination of the two." Mapping targetable space is a process that begins with the question of what makes some spaces targetable, and others un-targetable?

Drone Architectures: The Making of Targetable Space relates a story of these spaces, probing the question: what are the processes which make drone-targetable space? How are different scales of governability and modes of governance distributed across a state's territory? How did the material effects of political-economic trends result in the creation of target space within a state's territory, or space that is "remote" both economically and politically? While the previous section, *Drone Cartographies*,

focused on the discursive construction of space and the neoliberal discourses that underlie the drone's operative logic that respond to these discourses, *Drone Architectures* takes a historical orientation and considers the material genealogies of those spaces.

My intervention in *Architectures* is that the causes for target space, whether it is target space for military or humanitarian drones, can be found in large-scale shifts in the global political economy that result in socio-economic spatial variegation. This section defines geopolitics, geoeconomics and explores their relation because it argues that target space is space that has been consistently "made" into peripheral space through complex articulations of geopolitical-economic productions of state territory. Peripheries have proliferated as a result of geoeconomic forms of statecraft that prioritize open borders and foreign investment, and the emergence of drones to deal with the "proliferation of peripheries," (Akhter 2019) represents a revival of older forms of geopolitical governance techniques aimed at territorial consolidation. Unlike older geopolitical governance techniques, however, territorial consolidation is not achieved not through holistic models of integrated regional development as in earlier eras but through the use of corporate actors and technologies as auxiliaries to state rule. In other words, tending to peripheral and remote spaces requires further neoliberal incursions of private business into governance as partnerships between government and private industry emerge as the best ways to combat the problem (that was itself originally caused as an externality of capitalist development). The incursion of neoliberal imperatives and corporate interests into governance reduced to a series of

cost-effective, targeted interventions. "Targeting" as a best practice approach has a distinct lineage in both military and humanitarian settings that has its roots in the turn toward neoliberal efficiency and cost-effective interventionism. *Peripheral spaces* are thus married to *targeting approaches* to finally result in "target spaces." Unfolding this story of target space production finds out not only where the drones are, but what is distinctive about drone space that differentiates it from "normal" political space.

Architectures, like each part of this dissertation, is broken down into four sections: 1) the current chapter which develops the conceptual frameworks through the relevant literature, 2) research design, where the methodology guiding the empirical research in *Architectures* is discussed, 3) discussion, where I apply the theoretical traditions and conceptual frameworks to the data (in this case, two case studies), and 4) the conclusion. In this section on theory and literature, I develop the conceptual framework for *Architectures* through traditions of thought that explore a) the historical contingency of territory through geopolitical and geoeconomic productions of space, and b) literature on the role of "targeting" in security and health governance.

Apart from this introduction, this chapter on theory and literature is broken down into two broad sections. The first defines explores the tradition of literature that studies the historical contingency of state or governable territory. This is because the main premise of *Drone Architectures* is that a state's territory is a historically contingent phenomenon, and that state territory exhibits different degrees of governability that emerge historically. While my focus is on the geopolitical-

geoeconomic production of space, I do here consider other theorizations of drone space production such as those on legal productions of space. This section defines geopolitics, geoeconomics, and explores work that investigates their interrelation. It also identifies three patterns found in the literature that elucidate the relationship between geopolitical-economic activities and space-making: the urban bias, political economies of reconstruction, and lastly, the way that geopolitics and geoeconomics are implicated in the discourse of "targeting" such that target space is fashioned out of remote space.

The next section probes discourses of "targeting" in military and humanitarian circles. This is an exploration of the "targeting" logic that makes "target" spaces as opposed to just problem or remote spaces. The target-based approach to warfare has a long history in the military that develops first as a precise way to wage interstate war in urban settings to debilitate the state (mainly in the context of Operation Desert Storm). Neoliberal imperatives which subject processes to "value-chain" thinking, which prioritize realizing value at each step, and cutting costs in target-based approaches are the reason for the move from urban settings to remote space in the context of counterterrorism as geopolitical affinities among states against terrorism make the practice of this method in urban space (where it originally emerged) too politically costly. I suggest that similar trends that mark the evolution of targeting in the military sphere are also present in the evolution of targeted approaches to health and humanitarianism. That is, targeting discourse developed in both spheres with the increasing primacy of neoliberal estimations of value and cost effectiveness, as well as

the increasing primacy of information and data-based assessments. "Value-chain" thinking has also structured contemporary approaches to modern health, and has indirectly contributed to the making of target space out of remote space. In the final section I conclude by defending the use of the word and conceptual framework of "architecture" as opposed to territories or simply spaces in this investigation of targetable space. The reason I use the word "architecture," as opposed to drone territories or drone geopolitical economies is because architecture points not only to the hollowing out of space in the creation of peripheral space but also to the reconstruction of space in ways conducive to governance by drone. The term also emphasizes the artificiality of this space, its historical contingency, and the significance of the architects of spaces.

B. The geopolitical and geoeconomic production of space

The premise that space is "made" targetable emanates from the broader trend in political geography that conceives of space and territory as historically contingent as opposed to a natural and pre-existing condition. Studies that challenge the fixity of borders and boundaries (Newman 2006), or that show the contingency of territorial sovereignty (Elden 2006) are pioneering contributions to this theory. As part of this project to historicize space, a broad tradition has emerged which implicates the practice and discourses of *geopolitics* and *geoeconomics* in the history of space-making. It is from within this tradition that I seek to come to terms with the historical development of "target space."

To be sure, while the geopolitical calculations that are implicated in the drone wars have been thoroughly explored, with scholars investigating how drones indicate a novel shift in the nature and practice of geopolitics (Graham 2004; Bialasiewicz et al. 2007; Shaw 2013), there is little work on the geopolitical-economic creation of *drone space,* besides Akhter's (2019) work on how drones operate in a world of "proliferated peripheries," whereby peripheries are conceived as "colonial spaces because of their occupation by what Lisa Parks (2016) calls the 'targeted class' — populations subject to state violence surveillance and/or control based on racialized assumptions," (Akhter 2019: 65). In fact, most work on drone or target *space* situates its theorization within theories of Schmittian or Agambian "exceptional space," and thus focuses on the space-making effects of the law, as opposed to the political-economic activities of states, as its central category.

Work on the legal contours of drone-space is nonetheless a crucial contribution as it often disrupts the narrative of the simple lawlessness that is attributed to exceptional space. For instance, while Mahmud's (2010: 56) characterization of the Federally Administered Tribal Areas (FATA) as a "zone where bodies and spaces are placed on the other side of universality, a moral and legal no man's land, where universality finds its spatial limits," might resonate with Agambian notions of exceptional space where populations are deliberately exposed to death through the removal of legal protections available in normally governed space, critical interventions are keen to show that actually, drone governance in the FATA "involves no simple suspension of the law but

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rather an operationalization of the violence that is inscribed *within* (rather than lying beyond) the law," (Gregory 2017: 30). Rather than exceptional space being lawless, Gilani (2015: 371) notes that actually, the former FATA is subject to "an overabundance of law … the most regulated of all the spaces comprising the territory of Pakistan." While discourses of lawlessness may justify intervention via drone, violence is actually operationalized through the law and thus acquires a permanent juridical arrangement.

The existence of clear legal frameworks that at once regulate and enact drone use is also evident in the case of humanitarian delivery drones, as demonstrated by Lockhart et al (2021) in their comparative assessment of the attempt to establish drone programs in Rwanda and Tanzania. The authors demonstrate strong tendencies towards state control and risk averse regulation of airspace in both countries, thus "challeng[ing] certain myths about African countries as un(der)regulated testbeds for foreign drone companies," (Lockhart et al. 2021: 12-13). The politics and practices of airspace regulation in countries where humanitarian delivery drones are being deployed convey apprehensions around the problem of "rogue" aircraft that "in trying to 'make space for drones' — regulators attempt to resolve through new spatial orderings, technologies, rules, and protocols," (Lockhart et al. 2021: 2). The strong social and spatial control exerted by Paul Kagame government's security apparatus and regulatory regime to create selective drone permissive corridors points to the *facilitative* role of law and centralized governance in enacting drone space. Like the work on the legal production

of military drone space, this study points to the creation of certain kinds of (drone governable) state territory through the extension of a particular juridical-spatial arrangement, again challenging conceptions of strictly lawless exceptional target space.

This dissertation takes inspiration from these theorizations of drone space but takes geographic manifestations of shifts in the political-economy, and of the political-economic activities of states and corporate actors, as opposed to the law, as a central category in the making of target space. Just as the inception of target space entails no simple suspension of law, it is no simple political-economic abandonment of certain peripheral spaces that solidifies their peripheral status. Instead, specific historical processes of geopolitical-economic space-making create remote spaces which are then exposed to the incursion of private actors and industries that respond to them to result in target space.

First, some definitions. Commonly, geopolitics is understood as an account which "posits an (often) unproblematic use of geography as a causal or influential force in the shaping of international politics," according to Sharp (2011). Geopolitical calculations are implicated in space-making in a myriad of ways — through war and conquest the state expands and creates new territory, through international law new states come into being and borders become disputed objects, through sovereign power a particular arrangement of the legal regime can result in "normal" political space versus "exceptional" space within the bounds of one domestic geography, to name a few.

While the domestic orientation of this final possibility challenges the tight association typically made between geopolitics and "the international," upending the binary between the domestic and the international, or the intimate and the global, in debates on geopolitics has been a central project of feminist geopolitics (see Sharp 2000, Hyndman 2001, Pratt and Rosner 2006). Thus, the space-making practices of the territorial "geopolitical state" across its own territory should still be considered central to the study of geopolitics, which is, after all, the study of geography and power. The "geopolitical state," with its domestic and international space-making activities, or its literal practice of "geo-graphy" (Sparke 2005), becomes more discernible against its so-called foil, the "geoeconomic state." While the geopolitical state is concerned with maintaining spatial fixity, the integrity of its borders, and military projections of power, the geoeconomic state is imagined as overcoming these limits and prefers spatial fluidity, capital flows uninhibited by borders, and economic projections of power.

Geoeconomic forms of statecraft can undermine geopolitical ones, as shown by Sparke (1998), who argues that market liberalization facilitates the deterritorialization of capital, posing a critical challenge to the geopolitical state's territorial integrity. The competition between the two forms of statecraft has also been explored by Chacko & Davis (2015), who show how the geoeconomic strategies and discourses assumed by India and Myanmar have failed to facilitate rapprochement between these two countries as the persistence of older "regimes of citizenship" associated with geopolitical strategies based on territoriality stifle the emergence of particular types of de-

territorialized citizenship regimes to facilitate the mobilization of capital across territorial borders. On the other hand, geoeconomic and geopolitical forms of statecraft can reinforce and transform one another. For instance, Kutz (2017) shows the dialectical movement between geoeconomic and geopolitical forms of statecraft through the example of southern Spain where city-regions responded to the 2008 financial crisis by shifting spatial development away from the conventional neoliberal urbanization that is typically embedded in geoeconomic statecraft. This shift and the associated gatekeeping activities that municipalize political control over cross-border investment flows in turn reshapes state territory and sovereignty, and thus geopolitical relations, between EU states (Kutz 2017).

Beyond accounts that demonstrate either their discord or their harmony, is the simple argument that both geopolitical and geoeconomic forms of statecraft should be interpreted as being fundamentally entangled with one another, even as geoeconomics is sometimes plainly defined in contradistinction to traditional military geopolitics as the use of economic instruments in the course of interstate competition (Luttwak 1990). While the formal distinction between the two might provide some analytical clarity, as Sparke (2013: 189) describes, they are "geographical representations … [that] reflect the tensions of uneven development but in ways that tend to abstract particular territorial problems or ideals out of the processes of historical geographical transformation that produce them." Sparke gives the example of the way a "'disputed border' might be seen as causing geopolitical instability; while a 'free trade region' or

'green zone' might be idealized as bringing geoeconomic peace and prosperity," (2013: 289).

Because of the often dialectical and intertwined relationship between geopolitical and geoeconomic discourse and forms of statecraft, any characterization of a distinct, period-specific geopolitical or geoeconomic state, such as Cowen & Smith's (2009) account of the displacement of the "geopolitical social" as an assemblage of territory, economy, and social forms that are the foundation of geopolitical activity by the emergent "geoeconomic social," risks overlooking their ongoing interrelation. Still, distinguishing between the discourses and strategies associated with each of geopolitics and geoeconomics is analytically useful, if not for the purpose of identifying what configurations of power are mobilized as states traffic in one set of discourses or the other. Crucially, it is worth investigating how the discourses animate different space-making activities which interact with each other. For instance, geoeconomic forms of statecraft might prioritize open borders and foreign investment that might concentrate in certain hot spots and leave peripheries remote and marginalized, and geopolitical forms of statecraft might intend to reconsolidate the centers and peripheries by targeting remote space through drones.

As such, much critical work on geoeconomic productions of space is attuned to the complex interactions between geopolitics and geoeconomics. Examples of work that explores the geopolitical-geoeconomic interplay in space-making is Cowen's

(2014) investigation into geopolitical military violence that undergirds the history of logistics and supply chains, or Gaillard et al.'s (2008) work on how imperial expansions of geopolitical power can likewise transform geographies to create the conditions of possibility for capitalist expansion. The concept of historically produced territory was best articulated by Lee et al. (2018) in their discussion of the how the recently escalated competition between the US and China through the US *Trans-Pacific Partnership* and China's *One Belt, One Road Initiative* which represents the coupling of geoeconomic and geopolitical strategies in dialectical, sometimes competing ways which result in the production and extension of state territory. That is, these hegemonic countries produce new dimensions of state-territory and thus state power in their geopolitical-economic activities, showing territory to be a historically produced and fluid category as opposed to a given category with fixed attributes.

Because articulations between geopolitical and geoeconomic logics of power are "often disjointed, interrupted, or transformed," Lee et al. (2018) underline the difficulty that arises in any attempt to construct a general theoretical framework to elucidate the role of the geopolitical-economic activities of states in the production of territory. However, there are three related patterns between geopolitical-economic state activities and space-making that underwrite the geopolitical-economic production of specifically target space. The first identifiable pattern that elucidates the role of the geopolitical-economic state in the production of certain spaces is captured by the idea of the "urban bias," in development (Lipton 1977) or the asymmetrical development of socio-economic space within the boundaries of the territorial state, characteristic of

capitalist development. Drawing on Kautsky (1899) Lipton writes that the "state is acting as an executive committee, but for managing the common affairs not of capitalists but of townspeople: not a bourgeois state but a burghers' state," (Lipton 1977: 117). The administrative decisions that make states and markets biased toward the city are the same processes that make remote spaces remote through consistent disinvestments as "private individuals [are] indirectly induced by administrative decisions and price distortions to transfer from countryside to town their own resources, thereby reducing the social (but increasing the private) rate of return upon those as well," (Lipton 1977: 70). All modern states are affected, not the least developed countries as they strive to accumulate capital and compete with one another, but also, poor countries experienced severe unevenness as a result of colonialism as cities parasitic to the remainder of the national economy were established, or even in post-colonial states where strident nationalism was propagated by city elites, (Lipton 1977). Lipton's exposition of the uneven segmentation of space demonstrates at least one general theoretical framework that elucidates the geopolitical-economic production of uneven space. This theory is especially useful for theorizing about the geopolitical-economic production of drone space since the urban bias that makes remoteness more acute is the same process that eventually produces "target space." The dynamic of the development of the global urban network as a function of global neoliberalization, and the parallel creation of pockets of remote space, is explored at length in *Drone Cartographies.*

The second pattern is captured by the theoretical framing of "geopolitical

economics of reconstruction" as articulated by Paudel and Le Billon (2020), under which exist a range of theorizations on the relationship between capitalism's destructive and reconstructive tendencies. This is an apt, though initially counterintuitive starting point for thinking about the conditions of possibility of remote-turned-target space. It is counterintuitive because although underdeveloped space is not necessarily associated with any reconstructive activities of capitalism but potentially the opposite, it is precisely the relationship between destruction and reconstruction implied by geopolitical economies of reconstruction that makes this a useful perspective for thinking about economic underdevelopment and remoteness and its pair, compensatory drone governance by private actors for states. Examples of work in this tradition are numerous. Harvey (2003) and others describe the "creative destruction" and "accumulation by dispossession" in which surplus capital overflows to new geographies to resolve the contradictions of over-accumulation in centers of surplus capital creation and in doing so destroys non-capitalist systems by naturalizing capitalist production (see Sparke 2008). Other scholars such as Gaillard et al. (2007) mentioned above have shown how imperial expansions of geopolitical power can leave in their destructive paths new geographies to create the conditions of possibility for capitalist expansion. Similarly, in her writing on "disaster capitalism," Klein (2007) explores how destructive disasters and the post-disaster reconstruction processes that accompany them have become defining moments of the dialectical relationship of deconstruction and reconstruction capitalism, whereby moments of high profit accumulation by corporate interests thriving from these crisis and wider socioeconomic

and political restructuring occur. In the context of drone space, the results of the destructive processes of global capitalism that result in the "proliferation of peripheries" are but opportunities for the drone industry to offer their services to states. Thus, the destructive and reconstructive activities of geopolitical-economic actors, which not only states as states play a critical role in territorialization (Brenner 1999), but also increasingly corporations, are centrally important for the analysis of the creation of target space.

While the above explores how different scales of governability can become distributed across a state's territory as geopolitical and geoeconomic activities reshape space in particular ways, making some spaces potentially targetable and others not so, it does not yet clarify how spatial variegation becomes the basis for *targeted* interventions. This brings me to the third way that the geopolitical-economy is implicated in the making of target space. Up until now, drone space is only really "remote space," and it isn't until a neoliberal discourse of *targeting* is applied to the problem of remote space do target spaces emerge as a particular way of viewing the problem. In the following section, I elaborate by first tracing how discourses of targeting have evolved in military discourse to address security threats before moving on to trace how targeting discourses apply in humanitarian circles. In doing so, I aim to problematize the move from "remote space" which is the result of historical political-economic re-spatializations, to "target space."

C. Targeting

The following section first traces the development of targeted approaches to warfare to get to the bottom of how targeting has come to define the technique of force exertion in ungoverned or remote space. What I call "target space" is otherwise known in the military as the "kill box," a concept which has developed hand-in-hand with "effects-based targeting" doctrine. Historically, kill boxes and target-based approaches both developed in the context of operation Desert Storm as techniques of urban warfare which conceptualized states and societies as networks of systems with select targetable nodes. Hitting these crucial nodes would achieve the maximum effect for a minimum intervention within a designated space.

Target-based approaches are driven by two things: first is the primacy of intelligence as a central pillar of war-fighting strategy (and the increased capacity of intelligence gathering afforded by enhanced technological capabilities and on-the-ground intelligence networks). Increased intelligence explains the capacity for more incisive interventions, but it does not necessarily explain the rationality behind it. This is explained by the increasing preoccupation with decreasing the material and political costs of war by conceptualizing the enemy's sustaining apparatus as a complex set of networks with select vulnerable points of "high-payoff" interventions, which if targeted, would produce the maximum value for minimum effort. This is the second tendency of target-based approaches – they are underwritten by a neoliberal rationality that exemplifies the economistic use of rankings and metrics in contemporary

governance (Darian-Smith 2016). To realize value, the military pursues "high-payoff" or "high-value" targets which are defined as targets of incisive strikes whose killing will provide maximum value to realizing mission goals. While high-value targets initially developed in the context of the War on Terror as persons whose capture would provide valuable intelligence to broader counter-terrorism goals, strategic thinking has evolved alongside the capacity to generate intelligence through technological means. The military doesn't need to uncover and destroy the entire operation through the capture and detention of high-value targets, but to take out core functions that can include recruitment, fundraising, logistics, leaders, effectively transforming the high-value target into a target whose kill (as opposed to capture) would disrupt of destroy the terrorist organization (Lushenko 2015). Kill, as opposed to detain, ensures the highest bang-per-buck. In line with neoliberalization of military rationality, the original "kill-chain" has been recast as a "value-chain" in some military circles.

As for how the philosophy of targeting and the kill box have since been abstracted from their original context of interstate, urban based warfare and transplanted to remote or "ungoverned territories" (RAND 2007), I contend that the crucial difference now is that the striking state (typically, the US) and the host states are often in geopolitical affinity and have harmonious counterterrorism concerns. As a philosophy that subjects military strategy to cost-benefit analyses, and envisions targets as part of a larger "value-chain," too much targeting and establishing kill boxes in their traditional urban settings to counter terrorism, *even if terrorists operate in urban settings*, would be met

with hostility by the host state and diminish their partnership. In other words, it would incur high political costs, whereas targeted approaches and kill boxes erected in remote spaces are often welcomed and enabled by the host state. Both the striking state and the host state would rather manage outliers through targeting as opposed to meaningfully extend the host state's governance capacity into "ungoverned territories." To avoid the political costs of war, striking states exploit the discourse of targeted killings as less destructive to human life than conventional wars, and often foreground the proposition that capture, not kill, is the preferred policy, though the real rate of killing to capture is actually 30:1 (Hines 2015).

This discourse allows the US to continue on as its role of global police, managing outlier problems without the costs associated with outright regime change – an old strategy that used to create more outliers, indeed, the outlier problems that are now managed by targeted strike. What we see now with the drone wars is the marriage of a value-chain driven targeting philosophy whose main elements is to achieve the highest strategic effect for the lowest costs, with remote space (whose development was discussed above as a result of geopolitical-economic activities of states). The result is target space.

Following this exploration of targeting philosophy in military strategy, I consider the historical development of targeted approaches in humanitarianism and health in remote spaces. The development of targeting in humanitarian practice, which has its

roots in "selective primary healthcare" follows a similar conceptual schema to military targeting: it is a strategy that evolves alongside the primacy of "data" (as analogous to military intelligence) and cost-effective interventions aimed at cutting costs and realizing value as the defining factors. Targeting in healthcare is driven by theories of, not the city as a complex set of systems and vulnerable targetable nodes, but of ill health as a "complex multi-faceted problem, an amalgam of many diseases with multiple causes," whereby the "greatest immediate efforts in health care in less developed areas should be aimed at preventing and managing those few diseases that cause the greatest mortality and morbidity and for which there are medical interventions of relatively high efficacy," (Walsh & Warren 1980: 145-146). In other words, targeting in humanitarianism is another "highest bang for buck" exercise, an approach that stands in for more comprehensive forms of health governance. States would rather manage outliers through targeting as opposed to meaningfully extend the host state's governance capacity into peripheries. Just as in the military sphere, the conceptual framework of the "value chain" has since been proposed as a means to overcome such targeted vertical solutions to public health crises. While the "care delivery value chain" (Kim et al. 2013) represents a notable improvement on strictly vertical approaches, as a "diagonal" approach it still betrays older ambitions of health through meaningful development.

i. Military Targeting

My argument in tracing the development of military target space rests on the

premise is that remote spaces do not become target spaces for military drones because militants operate there. In fact, as shown by the image comparing terror attacks and drone strikes in Pakistan (Figure 1), the drone strikes do not shadow all areas of terrorist activity, but only some. As reported by the *New York Times,* confidential documents show that counterterrorism officials defend drone strikes in a certain area according to a "simple logic: people in an area of known terrorist activity … are probably up to no good," (Becker & Shane 2012). Besides artificially deflating the number of civilians killed by drone, Obama administration's casting of "all military-age males in a strike zone as combatants," (Becker & Shane 2012) shows that it is not the combatants that make the strike zone, but the strike zone that makes the combatants. What makes the strike zone, then?
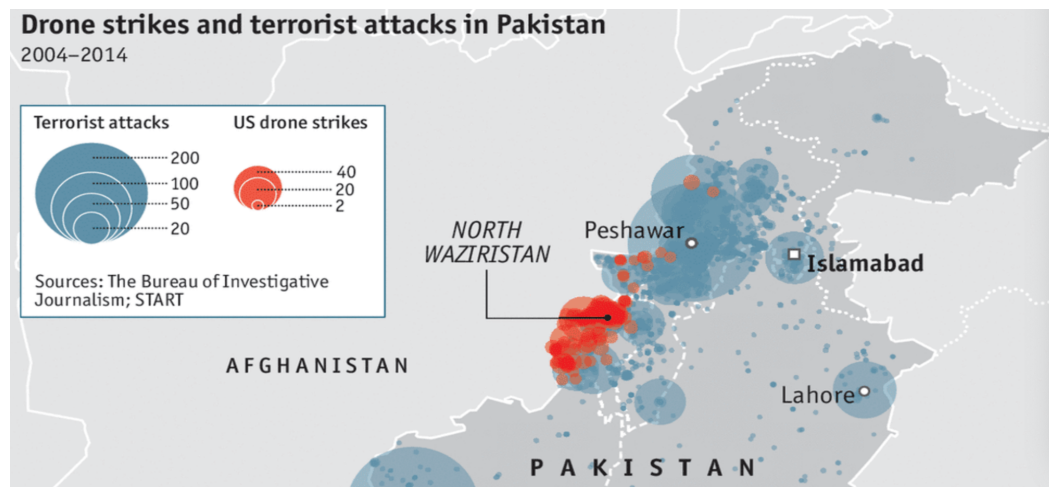
Figure 2.1. Drone Strikes and Terrorist attacks in Pakistan. (The Bureau of Investigative Journalism 2020).

Such spaces are constructed as "target-rich," to use the words of General Schwarzkopf who was advocating for an aggressive aerial bombardment campaign

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during Operation Desert Storm (Bush & Scowcroft 1998: 328). These areas, as described by President Obama are the "most distant and unforgiving places on Earth… that have no functioning police or security services — and indeed, have no functioning law," (Obama 2013). According to RAND's *Ungoverned Territories* report, territories are considered ungoverned in so far as they exhibit low levels of state penetration into society, the state's monopoly on the use of force is diminished, the state lacks control over its borders, and the state is subject to external intervention by other states (RAND 2007: 3). One of the most evident indicators of the first condition of state penetration is the extension of physical infrastructure as well as formal, as opposed to informal, economic activity (RAND 2007).

However, political and economic remoteness is only a contemporaneously a condition for describing a zone as "target-rich." In fact, by going after places that are "target-rich," General Schwarzkopf was talking about "going after Baghdad directly," (Olsen 2003: 90). By "target-rich" the General was referring to what Stephen (2007) calls a philosophy of war where the object of "targeting" is to achieve a specific effect but to avoid costs and manage risks. Even in Baghdad, the Iraqi army was considered low hanging fruit, as ""there is no cover in the desert. Their army has never operated under attack, and we have sophisticated munitions,"" in the words of the General (Bush & Scowcroft 1998: 328). Explaining how remote space emerges as "target-rich" space when this philosophy originally applied to urban space, requires an investigation of the meanings behind and development of "targeting" and target-based approaches in

military strategy.

In military discourse, "targeting" can be defined as "the deliberate application of capabilities against targets to generate effects in order to achieve specific objectives," (Ducheine et al. 2016: 2). Often also called "effects-based targeting," targeting should be understood not as an isolated tactical act but more as a deliberative, iterative, decision-making process whereby target *selection* is equally as important as the strike, (Osinga & Roorda 2016). "Just because targets can be hit with great precision," writes Luttwak (2003: xvi), "it does not mean that anything can be achieved thereby, unless the targets are selected with equal precision." As noted by Graham (2006), the doctrine of effects-based targeting originally involved complex theories about the networks that sustain a state and society, and how precise interventions can disrupt such networks at the lowest cost. A "target-rich environment" is one which many such high-impact, low-cost interventions can be identified.

A "target-rich environment" is often delineated as a viable "kill box," a term which was first introduced in Targeting*: Joint Targeting Process and Procedures for Targeting Time-Critical Targets* (1997) by the Air, Land, Sea Application Center (ALSA). A kill box is defined as a "three-dimensional area reference that enables timely, effective coordination and control and facilitates rapid attacks," (ALSA 2005: i). It is an area of space on a battlefield where the military is technically free to open fire, so long as all "targeting engagements within a kill box … adhere to the establishing

commander's designated target priorities [and] effects," (ALSA 2005: I-3). This limitation derives from the philosophy of "targeting" as a strategy of target *selection* that was developed in conjunction with the concept of the kill box in Operation Desert Storm (Macgregor 2004).

The formal delineation of a kill box serves to simplify the process of joint targeting (the process of target selection) which is a cycle made up of six phases according to the JP 3-60 (US Military 2013): 1) Defining objectives; 2) Target development; 3) Capabilities analysis; 4) Force planning and assignment; 5) Mission Execution and 6) Combat Assessment, (JP 3-60 2013). While geographic considerations are present at each phase of the cycle, opening kill box is especially useful for facilitating the processes nested within phases two and three. Phase two, *target development*, or the "process by which targets are detected, cued, tracked, engaged, and assessed post-attack" and is also colloquially referred to as the "*kill chain*" in military lexicon (Bowers & Wood 2021: 55; US Military 2013: II-21), has five steps: target analysis, vetting, validation, nomination, and prioritization. During target validation, targets are coordinated and de-conflicted with other operations and agencies: it is "a complex process, especially in a coalition in which national caveats, rules of engagement, a low tolerance for collateral damage, political constraints, and various legal issues [which] must be taken into consideration," (Ekelhof 2018: 72). Opening kill boxes, whose primary purpose is to coordinate and de-conflict operations by maintaining a clearly designated fire zone (ALSA 2005), thus largely facilitates target validation. The two

steps of phase three, *capabilities analysis,* which are weaponeering and collateral damage estimation (CDE) (Ekelhof 2018)*,* help the force estimate how costly the operation will be in a particular kill box, an assessment made by surveying the ready positioned weaponry as well as the estimated collateral damage. These estimations, the neatly delineated kill boxes, and targeted kill chains are all the right ingredients for the practice of high efficiency warfare. Indeed, structuring warfare through the delineation of kill boxes and selective targeting strategies signaled transition away from lengthy and costly "war *fighting*" to decisive "war *winning* strategies," (Olsen 2003: 86). By declaring Baghdad target-rich, the General was suggesting that there was a viable kill box, one that had a selection of targets that when inserted as objectives as part of a kill chain, would produce the specific strategic objective of paralyzing the enemy state through a minimum application of force.

High efficiency warfare is supported by, among other things, robust intelligence systems. In fact, "although intelligence is often considered targeting *support,* it arguably can be said that intelligence personnel perform approximately 85 to 90 percent of targeting," (Ekelhof 2018). In the words of the Director for Defense Intelligence, about fifteen years ago we "moved from 'Industrial Age' to 'Information Age' targeting," (Osinga 2007: 245), as precision guided weaponry co-evolved with multi-source intelligence capabilities. Deciding which nodes in a system in a kill box perform multiple society-sustaining functions, such as certain parts of civilian infrastructure, depends on proper data collection. Effects-based operations "are much more

information-intensive than attrition-based military operations," because effects-based targeting emphasizes outcomes seeks to "minimize costs of conflict for the United States through the superior use of information," (Sanders-Newton & Frank 2002: 3).

While kill chains and kill boxes are clearly concepts born of the effort towards increased efficiency in warfare, in its final iteration, high efficiency warfare is ultimately moving beyond the "narrow focus on the 'kill chain'" to a recasting of strategy in terms of the broader "value chain," according to military scholars Bowers & Wood (2021: 55). The scholars draw off of the concept of the value chain as first developed in Michael Porter's (1985) *Competitive Advantage*, wherein Porter observed that a *series* of activities are required to create value for businesses. Value chain analysis enables managers to focus on the activities that generate costs and create value: each activity that makes up the business model should create value and should not be offset by costs or else be disregarded. This requires managers to have a clear idea of what objectives they are trying to meet, who their consumers are, and what collection of activities goes into those end goals. Recasting business activity in terms of the value chain optimizes systems and illuminates the basic units of achieving competitive advantage.
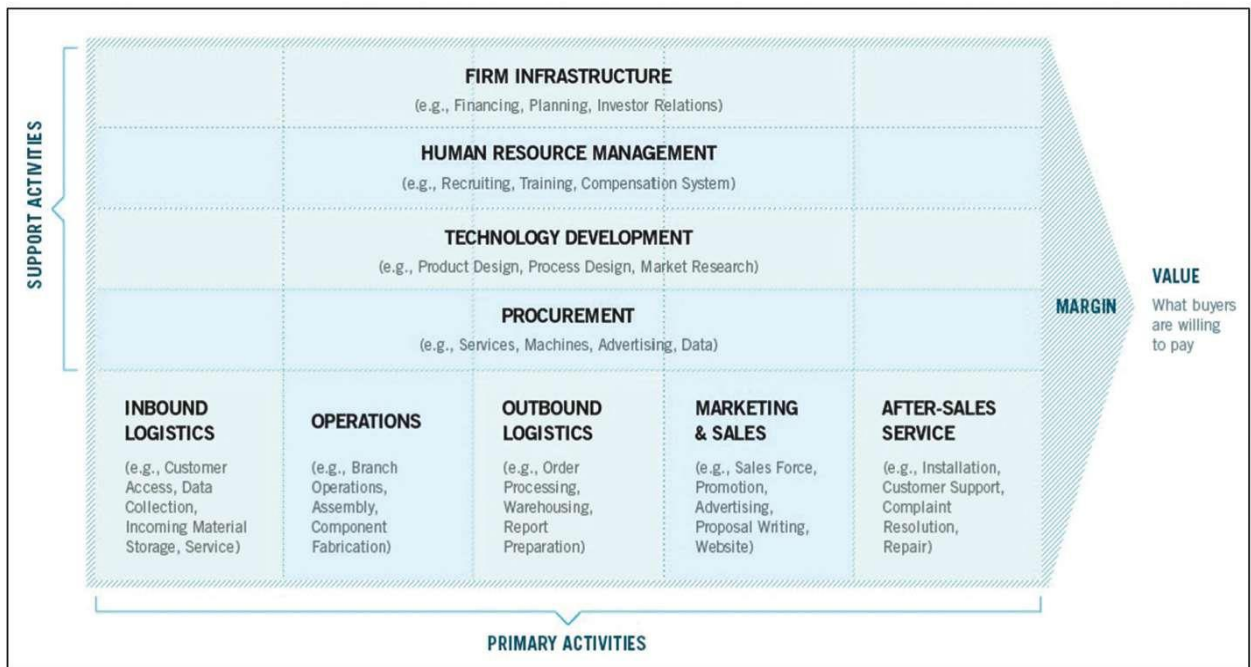
Figure 2.2, Porter's Value Chain. (As shown in: "Explore the Value Chain: Sustaining our competitive advantage in the Western Pacific" by William J. Bowers & Thomas D. Wood (2021))

While conceptualizing targeting strategy in terms of the kill chain "can overlook fundamental elements such as fuel, national industrial capacities, civilian expertise, repair and servicing facilities, basing and overflight permissions, space-based dependencies, contributions of allies and partners," the *value* chain integrates broader considerations that are relevant for cost-effective targeting, such as "supply-chain viabilities, national industrial base capacities, assured communications, ship and aircraft repair feasibilities, critical munition deliveries, friendly nation reactions, medical capacities, access to prepositioned stocks, and many other essentials," (Bowers & Wood 2021: 55). That is, the value chain enhances both target development as well as capabilities analysis.

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The move toward conceptualizing potential targets in terms of the value chain is ultimately what redraws more potential kill boxes in remote spaces, due to the broader set of variables that factor into an estimation of value. It is worth unpacking how the application of value based thinking to targeting results in the designation of kill boxes more and more in remote spaces — why today, "we see little value in 'area killing' or the targeting of civilian" areas, (Coker 2016: 16), and high value in attacking by drone people who are "almost always far removed geographically and temporally from active engagement in military activity," (Cook 2016: 157). That is, even when thought the target is most certainly not an immediate or even imminent threat, its true value as a target is calculated "based on a past pattern of practice and predictions about their future activities," (Cook 2016: 157).

Two main variables stand out as the main culprits, the second of which is more plausible. The first is that this style of approach either correlates with, contributes to, or emanates from growing imperatives to "humanize war." The second is that the application of value chain thinking to target practice foregrounds strategic partnerships and geopolitical affinities, thus making the targeting of urban centers in the context of counterterrorism a costly practice. The first thesis goes that striking the peripheries with precision weapons helps the military, which is now "increasingly interested in reducing the material and human destructiveness of the battlefield [and] limiting damage to the environment and human habitat," (Coker 2016: 17). Targeting is rooted in "old-

fashioned Western humanism," writes Coker (2016: 16). According to Coker's (2016) argument, while governments "used to measure the cost of war in terms of money, lost production, or the number of soldiers killed … today, by contrast, present-day humanism is reflected in the wish of civil society to reduce the incivility of warfare, both for the soldiers who serve in society's name and the enemies with which our societies find themselves at war," (Coker 2016: 16).

This thesis is unlikely since humanitarian preoccupations are hardly present in military estimations of value: in fact, the military describes targets as either "high-value" or "high-payoff," when it is a "target whose loss to the enemy will significantly contribute to the success of the friendly course of action," (US Military 2013: GL-8). Even if scholars insist that war is becoming humanized, and thus that value-chain thinking highlights the value of human lives saved in war, the military defines "value" as a measure of the "target's importance to the adversary" which "may reflect relative military, economic, political, psychological, informational, environmental, cultural, or geographic importance," (US Military 2013: II-9). Thus, effects-based targeting can actually *undermine* the laws of conflict which aim to protect civilians. Baker (2002) argues that the emphasis on effects might make certain areas appear as eligible targets in a larger strategy even if striking them would violate international law or human rights norms, thus creating a conflict between "effects-based targeting … and the law of armed conflict," (Baker 2002: 22). Aside from being conceptually inconsistent with the military's definition of value, targeting historically did not necessarily amount to more

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humanitarian outcomes: Graham (2006) also notes the disconnect between effects-based targeting and so-called humanitarian commitments — supplanting scorched-earth level destruction strategies for the discrete targeting of electricity and communications systems to paralyze the enemy state's systems instead makes civilians who are dependent on these systems especially vulnerable. This conception of value as strategic value strips away any illusions that targeting is more discrete and thus humanitarian, and reveals instead how targets are selected in terms of their future ROI return on investment, which is to say, their "pay-off" value.

If humanitarian estimations are at all present in calculations of value-based or effects-based targeting, these are of two kinds. The first has to do not with the cost of enemy state lives lost, but with the *political* consequences incurred by failing to show regard for human life. In his defense of his drone program President Obama (2013) said

> Conventional airpower or missiles are far less precise than drones, and are likely to cause more civilian casualties and more local outrage. And invasions of these territories lead us to be viewed as occupying armies, unleash a torrent of unintended consequences, are difficult to contain, result in large numbers of civilian casualties and ultimately empower those who thrive on violent conflict, (Obama 2013).

Second, any life preserved and political graces saved are often from those of the offending state itself. That is, if effects-based, value chain driven targeting is discrete and saves lives, and therefore a more humanitarian and politically correct form of war, the lives saved are often not those of civilians of the enemy state but of the offensive military. "[Their] real advantage," says General David Deptula, "is that they allow you

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to project power without projecting vulnerability," (Jaffe 2010). This is true for traditional air power targeting strategies such as those in Desert Storm as well as counterterrorism drones. American casualties are infinitely less likely in the case of drone enabled targeting because operators are so far from the action, thus lessening the political costs of war at home. Still, the thesis that "value" is a measure of preserved human lives, even those of an enemy state, is a compelling one for explaining why kill boxes and target spaces have since been abstracted from urban centers where they first developed, and now applied to less populated remote space.

It isn't until we situate the military value chain within the broader context of shifting geopolitical affinities and the emergence of a coherent counterterrorism strategy among states that the humanitarian thesis is challenged. This is the second, more likely reason that value-based targeting results in redrawn kill boxes in remote spaces. According to former director of national intelligence Dennis Blair concurrently argues that drone warfare "plays well domestically, and it is unpopular only in other countries," (Greenwald & Scahil 2015). To be precise, drone warfare in the counterterrorism context appears to be unpopular among the *populations* of other countries — not necessarily their governments. The high premium placed on international cooperation to combat terrorism disrupts the idea that the "value" realized by targeting remote space can only be understood as the preservation of civilian life. In a situation where most counterterrorism efforts "will involve partnerships with other countries," (Obama 2013), urban spaces are not as "target-rich" as they used to be when

the state itself was the enemy.

In fact, in Attorney General Eric Holder's (2012) defense of the legality of counterterrorism drones, "the use of force would be consistent with these international legal principles if conducted, for example, with the consent of the nation involved." Holder here hints to the fact that countries sometimes outwardly, sometimes quietly consent to the strikes in parts of their territory. This is often the case in countries where the airspace has been considered "uncontested" such as the active war zones in Afghanistan and Iraq, but also, as argued by Woods (2015) journalists regularly report the instances where the Pakistani government has condemned US drone strikes to save face in front of the Pakistani population, even after having privately approved the attacks in advance. As noted in a 2014 report by the Human Rights Council's Special Rapporteur on the promotion and protection of human rights and fundamental freedoms while countering terrorism:

> The Government of Yemen has informed the Special Rapporteur that the United States routinely seeks prior consent, on a case-by-case basis, for lethal remotely piloted aircraft operations on its territory through recognized channels, and that where consent is withheld, a strike will not go ahead. However, according to a recent report by Human Rights Watch, President Hadi told that organization during a meeting on 28 January 2014 that specific drone strikes were not pre-approved, but instead such strikes were "generally permitted" pursuant to an agreement concluded between the United States and former President Abdullah Saleh, which remains binding, (HRC 2014: 7).

The contemporary geopolitical cooperation among striking states and host states against terrorism is what makes establishing kill boxes in urban spaces, (which were environments that initially inspired effects-based targeting) even if terrorists operate

there, a politically costly strategy in terms of the value chain. In the context of counterterrorism, host states consent to strikes, but not in their urban centers, and thus remote and rural spaces are thought to incur less political (and "humanitarian") costs if targeted. These spaces are now "target-rich" because hitting them means low-costs incurred: in preserving the critical infrastructure of host states, and in allowing the US to abide by international legal principles through the consent of those states to strike, they offer the highest "bang" for political "buck." Human lives lost did not register as a high "buck" paid as civilian deaths went unnoticed by the world when they occurred "in remote areas where cameras were not filming, mobile lines were often cut and the internet was nonexistent," (Khan 2021). The "bang," on the other hand, was magnitudes higher: even though "in more than half of the cases deemed credible by the military, one or two civilians were killed entering the target area after a weapon was fired," (Khan 2021), because all "military-age males in a strike zone" were, by their geographic location, considered de-facto combatants by the Obama administration (Becker & Shane 2012), drone strikes in remote places are the epitome of realized value in terms of value chain warfare.

To be sure, the retroactive definition of all civilian casualties as combatants was less likely to pass when kill boxes were drawn in urban areas, but now that they are in remote target space, it is easy to claim that all "people in an area of known terrorist activity … are probably up to no good," (Becker & Shane 2012). In their discretion and selected targeting of areas remote and rural, drone strikes targeting remote spaces are

technically the most efficient, least politically costly, and most "humanized" war. When operating in remote areas, modern weapons are even considered more discriminate than they actually are: in fact, when weapons are deployed "to a remote area generally devoid of civilians, such as underwater or a desert environment … [a] weapon system could possibly comply with the rule [of distinction] even it possessed only a low level ability to distinguish," (Thurnher 2016: 188).

In sum, "effects-based targeting," with all its emphasis on achieving the highest strategic results while maintaining minimum levels of both force and political costs, is abstracted from its original context of the networked city, and applied to remote areas as counterterrorism concerns create geopolitical affinities between originally adversarial states. It is not due to humanitarian concerns, but instead a collusion of the striking state and the host state, that remote spaces emerge as high value "target spaces" for drone attacks. They incur lower political costs as host states are often on board, a condition which also makes urban areas highly costly targets. In both cases, target space is space that is subject to a cost-benefit analysis: it is constructed as low hanging fruit which, if targeted, would produce the highest effect in terms of the strategic objective at the lowest cost.

ii. Humanitarian Targeting

There exists a fair amount of overlap in the history and philosophy of targeting in military and humanitarian spheres. Although scholars often locate humanitarian

delivery drones in military lineages as predecessors of military drones, hence explaining why they seem to inherit some military operative logics such as targeting (Sandvick & Lohne 2014), targeted approaches to healthcare actually predate the incorporation of drones into healthcare. Essex (2013) argues that targeted approaches infiltrate humanitarian aid and healthcare through the geopolitical-economic activities of institutions like USAID, the international development branch of the US government, whereby US development foreign policy extends economic and humanitarian aid to specific regions in the world based on geopolitical calculations aimed at reducing strategic threat posed by those areas. Thus effects-based military "targeting" is transposed from militarism onto humanitarianism when humanitarian activity is recast as a way to satisfy security objectives. In both Sandvick & Lohne's (2014) theorization as well as Essex' (2013), targeting as an ordering philosophy in healthcare governance has a military lineage, whether the lineage is carried by the technology of the drone itself or by the institutions that combine military and humanitarian objectives like USAID.

Such observations contribute to a longer tradition that notes the cross-pollination of military and medicine. The exchange between the two realms is well studied, as metaphors of war abound in popular discourses of disease and medicine as viruses represent "threats" that we are "fighting," and doctors, nurses, and essential workers are presented as holding down "the front lines," as we "battle against malaria" and achieve "victories with vaccines," (Harrison 1996). Just as medicine and

humanitarianism is often militarized, so too is military activity all too often cast in medical terms: for instance, the "surgical precision" of the military drone or the military's concept of the "kill-web" which is explicitly modeled by and uses metaphors based on the human immune system (O'Donoughue et al. 2021). The material histories of military and medicine are also shared — in fact, the development of medical knowledge has long functioned as an important justification for colonial military expedition as pioneers of "tropical medicine" justified their missions in the name of biological security interests (Seth 2018). Both Essex' (2013) theory on how USAID works from, reproduces, and is limited by geo-strategic assumptions and framings, as well as Sandvick & Lohne's (2014) conceptualization of the residual military logics that govern the use of humanitarian drones can therefore be located in this broader tradition that explores the linkages between Western military and medicine.

Without brushing aside any of these perspectives, I suggest also that the same trends that mark the evolution of targeting in the military sphere (discussed above) are also present in the evolution of targeted approaches to health and humanitarianism. That is, targeting discourse developed in both spheres with the increasing primacy of neoliberal estimations of value and cost effectiveness, as well as the increasing primacy of information and data-based assessments. In both spheres, neoliberal estimations inform target-based approaches, especially the geographic "where" of targeting: in the international security sphere, high-value geopolitical partnerships between states result in more peripheral target spaces (as opposed to cities where targeting approaches

developed); in the humanitarian sphere, the cost associated with integration through deep development as opposed to incisive low cost-interventions are taken into account and in this calculation, the latter is more cost effective and the result is that remoteness is an enduring condition as remote space becomes targeted. Rather than a simple transfer from military to medicine, broader neoliberalization trends have reshaped activity in both spheres. It would make sense that processes of neoliberalization would cause similar developments in both spheres of military and medicine: after all, the easy historical transfers between the two spheres are on account of their structural similarities as killing and caring represent two sides of the same necro-and-biopolitical coin. Just as remote spaces do not become military "target spaces" because terrorists move there, but instead because of rationalities implicit in effects-based targeting approaches that recast strategic objectives in terms of value and payoffs (thus increasing the return on investment incurred by targeting remote spaces), so does a distinct lineage in the history of healthcare inform the creation of target space out of remote space.

"Targeting" in healthcare first emerges as an alternative to the more holistic models of health envisioned by the 1978 Alma Ata which defined health as a "state of complete physical, mental, and social wellbeing, and not merely the absence of disease," whereby primary health care "reflects and evolves from the economic conditions and sociocultural and political characteristics of [a] country," (Alma Ata 1978). The Alma Ata espoused a broad interpretation of health care, and was largely influenced by the

primary health care movement which itself had socialist roots and was linked to ideological conceptions about ownership, equity and human dignity (Newell 2988). In the early 1970s, the Soviet Union and China were both calling for an international conference on national health services to showcase the successes their state-led primary health care systems (Farmer et al. 2013). Many other newly independent regimes began to champion conceptions of primary health care, and the Alma Ata conference was a landmark event which signaled a revolutionary move in this direction internationally.

However, as argued by Newell (1988) a counter-revolution was underway in which the counter-revolutionaries cast aside the importance of the basic importance of questions of power, ownership, equity and dignity had for health care. In contrast to holistic primary health care, "selective primary healthcare" was proposed by Walsh & Warren (1980) who wrote that "in an age of diminishing resources," the scope of comprehensive healthcare "makes it unattainable because of the cost," (Walsh & Warren 1980: 145). These researchers wrote their article in preparation for the Rockefeller Foundation's Bellagio Conference, a conference held a few months after the Alma Ata Conference to discuss the future of world health. It was during this conference that the dreams of the Alma Ata were discarded in favor of a more selective, targeted approach.

"Targeting diseases for control," was, like military targeting, an information-based data-driven process of *selection* which determined which "health problems that should

receive the highest priority for prevention and treatment," (Walsh & Warren 1980: 146). Four factors would determine what to target: a disease's prevalence, its severity, the risk of mortality associated with it, and its feasibility of control (which includes relative efficacy and cost of intervention). This is not unlike phase two (target development) and three (capabilities assessment) of the military's joint targeting cycle, which is unsurprising, given that targeting in both settings is structured according to principles of cost-efficiency which include nominating and prioritizing the most strategically effective interventions and matching them to capabilities to produce the highest value outcome.

On face value, using these metrics to calculate and rank diseases deserving of prioritized intervention might appear neutral, after all, some disease cause more disability and death than others. However, despite the ranking system, the authors admit that they "chose to look at infections," instead of other non-communicable diseases, "because they are the greatest causes of illness in less developed areas and are more amenable to prevention or treatment than most non-communicable diseases, (Walsh & Warren 1980: 147). Such thinking was inspired by epidemiological models that were popular in the 1970s that held that the health threats faced by less developed countries came from infectious diseases while developed countries faced noncommunicable diseases such as heart disease, diabetes, cancer, and hypertension. The logic was that the sub-par sanitation systems, water systems, food production and hygiene standards were especially conducive to widespread infections. However, as argued by Weigal et

al. (2013), this epidemiological model was inaccurate; instead, there is a "*double* burden of disease in low- and middle-income countries: noncommunicable disease on top of communicable disease," (Weigal et al. 2013: 321).

Interventions were not directed as the sub-par sanitation, water, and food systems because, just as in the military sphere, imperatives implicit in the *method* of targeting limited interventions to where costs would be lowest and the return on investment would be highest. Here again, the philosophy of targeting structured the selection process of what would be targeted. Infectious diseases were considered, to borrow military jargon, "high-payoff" targets: targeting them for medical intervention incurred low costs, with outcomes that were easier to monitor and measure, "which attracted donors anxious to evaluate the effects of their aid dollars," (Basilico et al. 2013: 82).

However, there is no direct jump from the targeting of specific diseases in developing nations to the making of "target space" out of remote space. The principal question here is how remote spaces become target space for drone companies, not exactly how certain diseases represent high return-on-investment diseases. A more likely lineage is in the formats of healthcare delivery envisioned by Walsh and Warren (1980), who argued that the medical facilities that would provide the selective healthcare interventions need not even be fixed in space in the localities they serviced, but services "could be provided by fixed or mobile units visiting once every 4-6 months," (Walsh and Warren 1980: 152). The already limited, selective healthcare

interventions could thus be even more elusive to remote "areas where resources are too limited to provide fixed health units," (Walsh and Warren 1980: 152). Already the antecedents of targeted healthcare through biomedical delivery drones start to become clear. Targeted interventions via drones carry on the legacy of those traveling mobile units — health facilities never tied to the ground or spatially fixed but delivered on a needed basis, thus discouraging the development of meaningful primary healthcare models and recasting health as a supply chain issue.

Another likely lineage for the emergence of target space is the shift in healthcare philosophy toward the "care delivery value chain" (CDVC). Detailed in recent work by Jim Yong Kim, Paul Farmer, and Michael Porter (the same Michael Porter who inspired the military value chain) the CDVC a renewed strategic approach to healthcare structured by the concept of "value" (Kim et al. 2013). The CDVC "conceives of the delivery of care (and the creation of patient value) as an overall system, not a collection of discrete or free-standing vertical interventions," (Kim et al. 2013: 1062). Narayanamurthy et al. (2017: 482), also drawing off Porter, define the healthcare value chain as "an entire service chain from the input of people with symptoms to the output of cured patients with strong post-discharge care." The authors describe the "nodes and supporting units that combine together to form this value chain [as] insurance providers, government, hospitals, physicians, nurses, patients, and [health goods] manufacturers," (Narayanamurthy et al. (2017: 482).

Our vision for future digital engagement models is a network of integrated on-demand services:
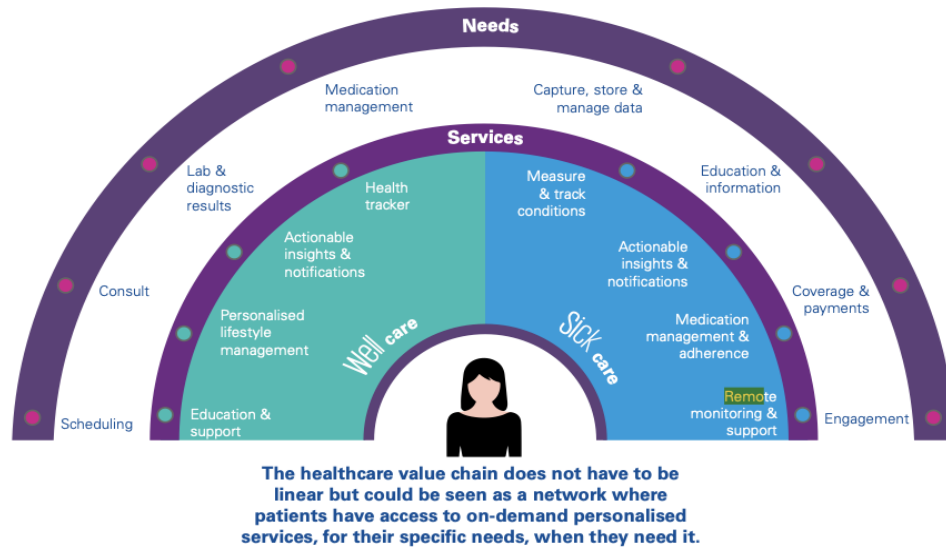
Figure 2.3. "The Healthcare Value Chain." (KPMG International 2018).

While the normal supply chain refers to the system and resources required to move a product from the supplier to the consumer, the value chain builds on the supply chain to also consider the manner in which value is added along the chain, both to the product itself and to the actors involved (Kaplinsky and Morris 2001). So while the CDVC model defines value in terms of the value created for patients "as arising from the full cycle of care for the patient's health problem, along with its results," (Kim et al. 2013: 1061), value is also realized across improvements in the supply chain and the local economy. Specifically, value is created at four main levels: 1) creating care delivery value chains for medical conditions themselves; 2) using a shared delivery infrastructure across medical conditions to simplify and enhance the supply chain; 3) using knowledge from the local context to improve the CDVC; and 4) harnessing the

external effects of improved healthcare delivery to enhance the economy.

In the military, value chain thinking illuminates "supply-chain viabilities, national industrial base capacities… critical munition deliveries, friendly nation reactions … access to prepositioned stocks, and many other essentials," (Bowers & Wood 2021: 55). Target-based approaches in this framework must take stock of how counterterrorism is unfeasible without "partnerships with other countries" (Obama 2013), thus explaining the move away from urban settings as potential target spaces and toward remote space, even if terrorists operate in the city (as shown in Figure 2.1). Does the application of value chain thinking to the health sphere also have an effect on which spaces emerge as target space?

Possibly, though indirectly. The "diagonal" approach of the value chain which attempts to move beyond the horizontal-vertical debate in health seems to indirectly lead to the recasting of remote space as target space. In the horizontal approach, remote space would be integrated since it is a holistic approach that starts from "the economic conditions and sociocultural and political characteristics of [a] country," (WHO 1978). The vertical approach was disease specific, selective healthcare. The diagonal approach is still disease specific, but opens up multiple avenues along the care cycle for actors to submit their value creation potential: the application of value chain thinking to health recasts the problem as an opportunity for companies to demonstrate their value proposition by providing niche solutions that address specific problems and unmet

needs. In the case of a weak supply chain, for instance, Zipline's "drones add value where insecure roads make shipping unreliable," (ITU 2022). The problem is that companies that insert themselves into the healthcare delivery value chain are also concerned with realizing value along their own value chain — which is often not synonymous with the care delivery value chain. This creates a situation of competing value chains — for instance, the CDVC model envisions "wider economic benefits" that enhancing nodes on the value chain will cause, such as "improving infrastructure — i.e., cellular phone towers, internet access, electrification, clean water access, and local transportation systems," (Kim et al. 2013: 1067). Drones, on the other hand, can be classified with other healthcare innovations that realize their value mainly obviating the need for robust local transport systems and maintaining the spatial fixity of patients in remote areas, such as tele-health and telemedicine. While drones would indeed require investments in cell phone towers and internet access, such investments do not necessarily facilitate social mobility. What this means is that remote space is no longer allowed to be considered a problem — in fact, the integration of remote space through the development of infrastructure that could potentially have broad ranging positive effects, would pose a problem for the drone value chain.

Another level of value creation in the CDVC model is at the level of local context, whereby "knowledge base[s] can be built by practitioners," and that "universities, teaching hospitals and other health-care institutions can engage this agenda in new ways, and develop frameworks, knowledge, and practices that will benefit patients and

practitioners as well as the specialty as a whole," (Kim et al. 2013: 1068). The capture of the delivery infrastructure by drone companies can disrupt this, since "value proposition of UAV (drone) applications are often based on insights derived from analytics of payload data," (UNDP 2022). Drones "cannot function without digital infrastructure…including the availability and accessibility of communication networks and navigation systems," (UNDP 2022). Rather than operationalize local knowledge and increase local stakeholder participation and thus create value in that sphere, drones rely on big data collected from populations. Data is processed and transmitted into a series of "actionable insights," a process that "depends on the availability of data and digital architectures," (UNDP 2022).

This can and already has caused "key shifts across the care delivery value chain … in Africa, Asia, and the Middle East market," (Trotman 2020). It is imaginable that the value chain model to healthcare would have been able to support more meaningful economic development and built "bridges" to remote space, however, drone companies got there before road-building companies did, and were able to demonstrate higher levels of value, and thus contributed to the endurance of remote space, through the creation of target-space.

D. Drone "Architectures"

My objective in *Drone Architectures* is to demonstrate how target space is constructed as target space through the complex articulations of the geopolitical and

the geoeconomic as geostrategic discourses that share common drivers in the imperatives and contradictions of neoliberal capitalism, before it is targeted by drone companies. The reason I use the word "architecture," as opposed to drone territories or drone geopolitical economies is because architecture points not only to the hollowing out of space in the creation of peripheral space but also to the reconstruction of space (as implied by the dialectical movement of capitalist destruction and reconstruction) in ways conducive to governance by drone. The term also emphasizes the artificiality of this space, its historical contingency, and the significance of the architects of spaces. When the political decisions and actors involved in the erection of targetable space are emphasized, it demonstrates how fabricated these spaces are — they are not natural problem spaces that drone solutions come to address, but historically specific, created spaces that were made targetable, while other space remains untargetable.

Furthermore, architecture is the basic foundation of society upon which social relations take place. I use the word architecture to not only point out the correlation between political economy and space, but also the kinds of social relations, specifically the forms of governance, that are conditioned and enabled by certain calibrations in political economy and space. Histories of architecture and city planning contain many examples of architectural arrangements that lend themselves to political purposes. For instance, consider the particular arrangement of buildings constructed on university campuses during the 1960s and 70s which were intended to diminish student demonstrations. Or consider the particular system of roads, checkpoints, walls and fences constructed in Apartheid South Africa and Israel for the purpose of ethnic

suppression and erasure of black South Africans and Palestinians (Makdisi 2010). In this dissertation the evidence shows that shifts in the political economy have an effect on spatial configurations, and therefore in forms of politics and governance. Thus, I use the word architecture to capture the trifecta of political economy, space, and governance, and I probe how a shift in one of these prongs effectively remodels the others.

II. Architectures: Research Design & Methods

A. Genealogical method

The methodological component of this section is complex due to the fact that there is no singular methodology for approaching the relationship between transformations in the global political economy, the re-shaping of space, and the generation of a particular form of governance. As such, I mainly approach this topic interpretively, comparatively, and through the theoretical framework of "genealogy" popularized by Foucault and other post-structuralist scholars. As a genealogical study, this project begins with a present phenomenon (the proliferation of drones in both military and humanitarian settings), and problematizes it by bringing to question its historical conditions of possibility.

Foucault (1980) uses his genealogical method to unearth the histories of those things which "we tend to feel [are] without history," such as the prison system or sexuality. Drone space is one such thing — the use of drones as compensatory solutions for governance and the discourse around this practice naturalizes the existence of drone space and fails to problematize its conditions of possibility. Drones are often seen as novel technologies, and probing the question of their conditions of possibility challenges this discourse of novelty by showing the drone to have a longer material history. Unearthing the historical contingency of that which is the subject of the genealogical method, or denaturalizing its existence, means demonstrating that another historical trajectory and another historical outcome might have been possible. This

method requires drawing attention to those moments of struggle, those events in time where one historical trajectory won out over the other. In the context of this particular investigation concerning drone space, it means drawing attention to a historical trajectory where drones are not necessary for the governance of peripheral, remote, dangerous places because those regions do not necessarily exist as peripheral, remote, or dangerous.

In line with such a methodology, for each of my case studies, I consider the pre-neoliberal era, which I argue, was tending toward a trajectory a different spatial organization, before moving on to consider how neoliberal reforms rearranged space to be conducive for a governance style more inclined toward targeted interventions via drone. I aim to compare the triangular relationship between political-economy, space, and governance of two models of the political economy-space-governance model of the pre-neoliberal era, and the political economy-space-governance model of the post-neoliberal era. I suggest the following counterfactual: if the reigning orthodoxy of spatially-holistic, popular, grassroots level development had continued, despite its many issues and failures, drones would not today stand in for issues of governmental reach due to variegated space, either for security or healthcare, in both Afghanistan and Ghana.

B. Site selection and data

Two sites were chosen to investigate the production of target space, one with

military target spaces and the other with humanitarian target spaces: Afghanistan and Ghana. I chose these examples on account of their being two extremes where the data would be plentiful. Afghanistan has been the subject of drone bombardment for years, and based on a data-base on drone strikes collected by the Bureau of Investigative Journalism (2018) on CIA, US military, and host government drone strikes in Afghanistan, Pakistan, Somalia, and Yemen, Afghanistan incurred the highest number of recorded drone strike events coming in at 13,702, with Pakistan coming in second at 431, Yemen third at 336, and Somalia fourth at 202 strikes. Ghana represents another extreme example in that it has recently entered into a US $2 million four-year contract with Ghana in 2019 serving 12 million people, which Zipline CEO said would be "the largest drone delivery network on the planet," (Bright, 2019).

For each country, I have collected policy documents, case reports, political manifestos produced by the countries and their leaders themselves but also by institutions that produced them on behalf of the country — such as reports produced by the World Bank, World Health Organization, various development institutes, and private institutions that were hired by the countries to conduct reports on political-economic matters. I also consulted a range of secondary research.

C. Structure

Each case study proceeds in three sections: a) an exploration of its pre-neoliberal political economy, b) the moment of "roll-back" interventions, and c) an exploration of

its current "roll-out" and "roll-over" moments. In both my case studies, I begin by considering the alternative possibilities for future development trajectories that were latent in the pre-neoliberal era of Cold War, Keynesian development and the territorially bounded geopolitical state. For this I explore the large-scale infrastructural and public spending projects that were inspired by a political-economic orthodoxy of "modernization" which was thought of as instrumental in the attempt to consolidate political control over a country's territory. Because I am concerned with the use of drones in Ghana for humanitarian and biomedical purposes, the spatial history of Ghana conducted here is more focused on the spatial distribution and organization of health instruments and public health access, as opposed to general governance and security capacity such as in Afghanistan.

Following this glimpse of the mid 20th century dynamic of the triangular relationship between political economy, space, and governance of these two countries, this study investigates the winning trajectory: neoliberalism, and ultimately, the antecedents of the creation of drone space. I trace the production of drone space through Peck and Theodore's (2019) helpful schema of "roll-back," "roll-out," and recently, "roll-over neoliberalism," which offers a generative theoretical framework that captures the relationship between the different mutations of neoliberalism overtime and its correlating regulatory and political expressions. Roll-back neoliberalism is a summary term for all of the policies promoting the privatization of nearly all government functions beginning around the 1970s and 80s. In both of my case studies,

roll-back neoliberal reforms saw increased privatizations and public disinvestments in holistic models of development and security measures in states, and thus took on a distinctly geographic effect as socio-economic space became increasingly variegated.

Roll-out neoliberalism is neoliberalism's institution-building moment, whereby a set of policies and practices address the outright failures and crises created by roll-back neoliberalism, but do so in ways organized by and inherently neoliberal market rationality. In both countries, the integration of drones represents one example of roll-out neoliberal reforms that sought to address the fragmented security and health architectures. Even as roll-out regulations sought to regulate the disaster of fragmented health and security systems that were caused by roll-back era privatizations, in each of my case studies, what ended up happening was the institutionalization of market-based solutions.

Finally, I conceptualize the rise of governance by drone within the final phase articulated by Peck and Theodore (2019), roll-*over* neoliberalism, which is the theorists' attempt to articulate a relationship between the ever-evolving processes of neoliberalization and the contemporary "reactionary forces that may be driving authoritarian (re)turns across the mutating cultural economy of neoliberalism," (Peck and Theodore 2019: 248). These cost-effective, targeted, compensatory neoliberal solutions to crises caused by neoliberalism are now giving way to a third phase identified by Peck and Theodore (2019; 259) as roll-over neoliberalism, which is a

phase marked by the (re)turn toward political authoritarianism to aggressively perpetuate neoliberal objectives:

> If the intervening roll-out phase … pursued through the euphemistic language of partnership, good governance, and helping markets work, was partly about making and reproducing new subjectivities, rationalities, and governmentalities … then the reactionary forces of the present conjuncture have been primarily arrayed against *this* inheritance… as red-line or hard-shell defenses are erected around a recalibrated set of neoliberal priorities and privileges, once again pushing the burden of risk and restructuring onto marginalized others.

This study argues that while the periods of roll-back and roll-out neoliberalism were defined by geoeconomic discourses of open economies and integration for the purpose of international security and for the purpose of responding, the revival of older geopolitical ambitions to augment the central state's territorial reach and power that is enabled through the use of corporate entities as auxiliaries to state rule (companies that provide services and assemblages that enact drone governance), all might be understood as a moment of roll-over neoliberalism.

III. Architectures: Discussion

A. Case Study: Afghanistan

For many living in areas where military drones are used for security governance, drone operations feel like a "slap in the dark," according to one civilian (Greenwald 2013). This is a common feeling in response to living in those areas where, according to former president of Pakistan Pervez Musharraf, things seem to "fall out of the sky all the time," (Mazzetti 2013). For large portions of rural populations in countries such as Yemen, Iraq, and Afghanistan, living under a sky that has been a source of trauma is an everyday reality. Despite the naturalization of this occurrence, this reality has not always been the case: these spaces were not always destined to be targets. At what point did space begin to become refashioned to accommodate for governance by drone today?

The project of denaturalizing drones is one of denaturalizing drone *space,* and is thus a project which asks if the spatial configuration of a space was ever in such a way that might anticipate a different form of security governance, and if so, what shifted its trajectory? For this case study on drone space in Afghanistan, or on the creation of peripheral space that is governed by drone, I first consider the spatial configuration of Afghanistan's pre-neoliberal era, which I illustrate with reference to the case of the multiple development projects that were produced for the Helmand dam. I show how while the state sought to augment its reach over its territory through such large-scale modernist development projects which would geographically consolidate the country,

increased development translated to greater popular political awareness and greater political contention in what amounts to the movements toward the democratization of territorial space. My argument is that there would have been little space for security governance via drone in the future trajectory suggested by this style of governance and the political-economic orthodoxy that informed it. Since drones are used as part of a strategy that grapples with remoteness, what I am arguing essentially is that the eradication of remoteness, a project of literal and metaphorical bridge-building, was a primary concern of this model of development and governance.

Next, I move on to consider how neoliberal reforms in their roll-back, roll-out, and roll-over phases rearranged space to be conducive for a governance style more inclined toward targeted interventions via drone. I contend that geoeconomic discourses of the neoliberal economy's capacity to overcome geopolitical problems permeated through these neoliberal reforms. Afghanistan's neoliberal roll-back moment saw increased foreign direct investment in urban centers such as Kabul, despite the government's hopefulness that international investment would naturally flow throughout the country. These investments typically required low capital commitments and could be withdrawn easily, they often catered exclusively to the upper class, and if they did feature larger capital commitments then they typically required the protection of the security apparatus made up of mostly private defense firms, thus concentrating the provision of security within urban centers and among the upper classes.

Next was a phase of neoliberal roll-out, or the set of (still market-based) policies and institutions that address the outright failures and crises created by roll-back neoliberalism, which in Afghanistan were the capture of the radical state-building project by elites entrusted by the international community to govern the country, whereby the distribution of state revenue that came from donors was used instead to secure loyal patronage networks (Strand et al. 2017), and, importantly for this thesis, intensified socio-economic spatial divisions, increasing inequality between urban and rural space, and asymmetrical distribution of security architecture across the geography. The neoliberal roll-out geared toward addressing these issues was the establishment of compensatory governance initiatives such as Security Sector Reforms, which only helped perpetuate donor interest as opposed to population security, the re-regulation of the private security sector which actually ended up in its further institutionalization into the security architecture, and compensatory technologies such as biometric systems and targeting drones to combat domestic insecurity in peripheries. In sum, the patchwork nature of interventions further exacerbated asymmetry in the security sector.

The cost-effective, targeted, compensatory roll-out neoliberal solutions finally give way to a third phase identified by Peck and Theodore (2019; 259) as roll-*over* neoliberalism, which is a phase marked by the (re)turn toward political authoritarianism to aggressively perpetuate neoliberal objectives.

I argue that while roll-back neoliberal processes fragmented the security architecture through the privatization of security and other interventions, both roll-out and roll-over neoliberal regimes signal a revival of older forms of seeking to consolidate geopolitical control over a country that were popular in the pre-neoliberal era. Only this time, national development goals are being neglected in favor of private sector development to achieve similar goals of augmented state power. In Afghanistan, the result is a security regime that is almost entirely dependent on drone use to augment the state's presence — over 13,702 recorded drone strikes launched by the US military, the CIA, and the Afghan government, have been performing security governance in select underdeveloped regions in Afghanistan where warlords run para-security networks. Finally, the peak moment of roll-over neoliberalism in Afghanistan coincides with the Taliban take-over after 2021. The Taliban uses the drones technologies and biometric data left over by the previous government and the US, and has now integrated it into its own security apparatus.

This comparison between pre-and post-neoliberal development is meant to demonstrate the triangular relationship between political-economy, space, and governance by comparing two models: the political economy-space-governance model of the pre-neoliberal era, and the political economy-space-governance model of the post-neoliberal era. I suggest the following counterfactual: if the reigning orthodoxy of spatially-holistic, popular, grassroots-level development had continued, despite its many issues and failures, drones would not today stand in for issues of governmental

reach and security consolidation due to variegated space in Afghanistan, nor would the Taliban perform its domestic security geopolitics via the use of such technologies.

i. Pre-neoliberal alternative futures in Afghanistan

The decade of 1970 was an important one in global politics — in every corner of the globe, newly formed states were defining their identities and testing their powers and limits, new global rivalries were emerging, the Bretton Woods system and Keynesianism were showing signs of collapse, a new global economic system was burgeoning and the "geopolitical" state was giving way to the modern "geoeconomic" state and a vision of international security that depended on economic integration. The tumultuous decade signaled a time of great uncertainty for what the future held but also, great possibility. Understanding the potential futures competing for survival in this era requires unearthing the historical lineage of those futures and the defining moments and sites of struggle.

To be sure, the defining struggles and inherent possibilities in question of this era should not be thought of exclusively in terms of the Cold War rivalry. In fact, the reigning orthodoxy for *both* Western and Soviet models of development were "modernist" in nature. The impressive industrialization of the Soviet Union in the 1950s, accomplished through massive infrastructure projects and investments in fixed capital such as machinery and roads, animated the same ambitions in many other newly independent countries (Mallaby 2006). Large-scale infrastructure projects to stimulate

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development and bring on modernity were not only Soviet orthodoxy but Western as well. As classical modernization theorists like Walt Rostow (1960) wrote in his *Stages of Economic Growth: a non-Communist Manifesto*, modernization was an evolutionary process that involved capital accumulation and investments into developing countries' infrastructure, machinery, and roads, enabling societies to mature to the "age of mass production," and more centralized, efficient governance. The triangular relationship envisioned by modernist political-economic orthodoxy between political economy, spatial re-engineering, and government is clear: modernist development which entailed fundamental re-spatializations through investments into state infrastructure could augment the geopolitical state's power and enhance its governmental efficiency.

Pre-neoliberal development patterns in Afghanistan were distinctly modernist in that they featured a high emphasis on regional, holistic development through infrastructure. It was not until new political-economic trends came along that a shift away from this model began to occur and the spatial antecedents of drone governance became apparent. Understanding the potential futures competing for survival in Afghanistan's spatial history requires first unearthing the historical lineage of possible alternative futures, and how what is won out over what might have been. Despite Afghanistan's deep ethno-religious complexity and other centrifugal forces that threatened projects of holistic development and the territorial augmentation of state reach, the period of 1933-73 represented a period of possibility for realizing these.

To be sure, regional integration in Afghanistan was historically difficult. As major towns in Afghanistan began to emerge as sites of political power and economic movement during the early 20th century, tribal groups that ruled the provinces and the countryside in between remote terrain insisted on autonomy from the established Afghan monarchy "to ensure that their hold over the limited natural resources (like land and pastures) remained secure from outsiders," (Roy 2020: 7). Only a few roads and communications structures existed throughout the country and were concentrated in major cities.

For Zahir Shah who assumed the throne in 1933, the political survival of Afghanistan was contingent upon expanding and deepening the authority of the state. Despite tensions arising from the semi-autonomous countryside, plans to consolidate the territory through widespread modernist economic development were in effect. Plugging all parts of Afghanistan into Zahir Shah's vision of economic development was challenging in a country with very few roads and telecommunications phone lines. Shah thus sought foreign assistance: advisers from Japan, Italy, and Germany laid plans for a modern communication network, roads textile mills, power plants and factories, all of which would be nationalized industries owned by the Afghan monarchy (Collator 2002). In 1937, a radio tower was erected in Kabul, which forged communication links with remote areas (Cullather 2002). Parts of the largely informal economy began to become formalized by the imposition of state tax codes, and Afghanistan was beginning to see the formation of the distinctively modern state apparatus and political economy

extend through its geography.

By the 1950s, the Soviet Union and the United States were added to this list of international investors. Both powers were interested in "economic planning, oil, gas, and other geological exploration…highway construction; power development; land reclamation; technical education; housing and food grain storage" in Afghanistan (Ramyar 2015: 51). Although their involvement in Afghanistan reflected broader geopolitical Cold War rivalries between them, the reigning orthodoxy for *both* Western and Soviet development models was "modernist" in nature, thus adding fuel to the already existing plans industrialize the country. The impressive industrialization of the Soviet Union in the 1950s, accomplished through massive infrastructure projects and investments in fixed capital such as machinery and roads, animated the same ambitions in many other newly independent countries (Mallaby 2006). Similarly for the West, modernization was seen as an evolutionary process that involved capital accumulation and investments into developing countries' infrastructure, machinery, and roads, enabling societies to mature to the "age of mass production," and more centralized, efficient governance (Rostow 1960). The fundamental idea was that modernist development, which entailed fundamental re-spatializations through investments in state infrastructure, could augment the geopolitical state's power.

Upon coming to power in 1953, Zahir Shah's Prime Minister Mohammad Daud also had geopolitical aims in pursuing foreign aid for development. Daud believed that

without rapid growth, "Afghanistan would dissolve into factionalism and be divided among its neighbors," (Cullather 2002: 528). As a part of establishing a strong geopolitical state and overcoming Afghanistan's centrifugal forces, Daud's government embarked on the Helmand Valley dam projects. These were the largest project of land reclamation, water development, and national-scale electric power generation owed to American assistance (Ramyar 2015). Lavishly funded by US foreign aid, multilateral loans, and the Afghan government, this development scheme sought to integrate numerous sectors under the singular power of the government. As was the case with most countries that embarked on large-scale development projects during this era, "the Helmand project symbolized the transformation of the nation, representing the legitimacy of the monarchy, [and] the expansion of state power," (Cullather 2002: 515).

The Helmand projects would deepen the state's power into the regions in various ways. First, the Helmand Valley projects would help the government re-engineer social relations in ways conducive to state power. Developing the Helmand would assure the "allegiance of the largest and most important tribal group" of the southern Pashtuns who wanted investment in the area (Fry 1974). The hope was that modernizing the Helmand would result in stronger state control in the region, and greater access to and control of the country's most important demographic — thus, the "Afghan government's social and economic policies combined gradual modernization with overt favoritism toward Pashtuns," (Bradford 2019: 187).

Next, dam building and land reclamation in the Helmand developed alongside a broadening regulatory framework. The Helmand and Arghandab Valley Authority (HAVA) (which was modeled and inspired by the Truman administration's Tennessee Valley Authority), sought to codify space in the Helmand region by mandating that both newcomers, as well as tribes that already occupy the land now, apply to HAVA for housing and water distribution. By the late 1950s, HAVA had begun constructing whole communities for residents that were resettled from various districts in the Helmand province (Cullather 2002). After security screenings, resettled families would receive a "pair of oxen, a grant of two thousand Afghanis, and enough seed for the first year," (Cullather 2002: 529). The regulation, reclamation, and redistribution of land alongside the resettlement of small groups and ethnic minorities fundamentally reshaped some of the country's previous tribal divisions. While it created new tensions in society between new settlers and previous inhabitants, in the eyes of the state it was a necessary step to bring some nomadic clans, who were especially resistant to state projects, under state control (Bradford 2019).

The country's security apparatus was extended further into reclaimed areas to shape social relations there as the government's vision ran up against the activities of US officials. For instance, US officials attempted to frame the project as a community-building effort by enlisting agricultural expertise from farmers from feuding tribal groups and establishing cooperative organizations between them. The US also saw

religious leaders who were interested in community development as a useful force of encouragement and even produced media that tied economic development in the Helmand to Afghanistan's religious heritage (Cullather 2002). However, Daud was not receptive to the idea of cross-cutting cooperative groups among certain tribal heads and was especially averse to any expanding religious influence. The government thus enlisted security forces to dispel such newly formed alliances.

Finally, the Helmand project augmented the security architecture as it required the state do something about opium cultivation in the area. As argued by Bradford (2019), economic development in the Helmand was in many ways closely related to US security concerns about the threat of drug addiction in the domestic US. Careful not to offend local farmers, Daud avoided implementing a wide-scale ban on opium production until the regime "had time to consolidate its power in the area" — however, the government did expand law enforcement into certain regions to go after high-level traffickers (American Embassy Kabul 1973). Daud established newly formed anti-drug smuggling units that had national jurisdiction unlike previous such units which were under the jurisdiction of local police (Bradford 2019). The establishment of these units was a major step in transforming the role of the state in regulating its territory.

Evidently, the Helmand Valley projects demonstrated a clear attempt not only to extend development past Kabul, but as controlling the regions was a central concern, to augment the government's security presence and power alongside such spatial

expansion. These developments represented a moment in time wherein the possibility of an alternative spatial organization and correlating security architecture was latent. It was a brief moment when the distance between the center and the peripheries of Afghanistan appeared to be bridgeable. A regionally integrated political-economic model and state security apparatus was not only envisioned but pursued.

For several reasons, this ambition would unfortunately never be fully realized. The model itself was ultimately flawed on numerous fronts, not least the subordination of complex social dynamics to cure-all solutions based in development and the problematic cultural-evolutionary assumptions associated with modernization theory. The trajectory of this model can only be theorized about, as the country's tumultuous experience with Soviet occupation, civil war, and the growth of religious extremism, all of which had disastrous effects on the country's infrastructure, complicate the ability to say with certainty the fate of this model. In 2001, one of the major dam powerhouses became a bombing target of the US Air Force, as a symbolic culmination of the effect that geopolitical breakdown had on earlier dreams of robust development and governmental stability.

Furthermore, those visions of modernity-inspired integrated development were never resumed as the post-2001 reconstruction of Afghanistan coincided with the new global political-economic orthodoxy, that is, neoliberalism. Indeed, the geoeconomic discourses associated with neoliberalism of international peace and stability achieved

through small governments, privatization, open borders, and economic interdependency were constructed as the pinnacle solution for the geopolitical problems that had marred Afghanistan's recent past. Geoeconomic solutions would overcome geopolitical problems, but also signaled the foreclosure of that previous model of government-led, spatially holistic development.

ii. Roll-back neoliberalism in Afghanistan

Against this history of geopolitical instability, neoliberal economic policies pushed by global governance institutions in the post-2001 era were pitched at the register of geoeconomic peace. That is, the strategy to overcome the geopolitics and militarism that had riddled Afghanistan for decades situated squarely within the framing of economic reform by former senior officials at the International Monetary Fund. As Sparke (2013) reminds, geopolitics and geoeconomics are intertwined geo-discourses that tend to frame particular territorial problems and ideals in dialectical ways. Sparke gives the example of the way a "'disputed border' might be seen as causing geopolitical instability; while a 'free trade region' or 'green zone' might be idealized as bringing geoeconomic peace and prosperity," (Sparke 2013: 289). This juxtaposition of geopolitical problems with geoeconomic solutions is evident in former IMF official Graciana del Castillo's (2003) articulation of the problem-solution in Afghanistan:

> Since the rout of the Taliban, after two and a half decades of nearly continuous conflict, Afghanistan has embarked on a complex triple transition: from war to peace; from a repressive, militaristic theocracy to a society based on democratic principles…and from a state-controlled, war-

torn economy to private sector-led economic development…[T]he heart of this transition is the daunting challenge of economic reconstruction, (del Castillo 2003).

As a direct critique to a "state-controlled" economy which coincided with the geopolitical problems of war and militaristic theocracy, "economic reconstruction" commenced in the form of "roll-back" neoliberalization. Recall that "roll-back" neoliberalism is a summary term for the policies promoting the privatization of nearly all government functions. It meant decreased public investments in holistic models of development and a driver-seat role for private industry and foreign direct investment. Beginning in the 1970s and 80s in developed countries, neoliberal roll-back was not uniformly experienced across the globe, but came in waves. The push to restructure the economies of many countries in the Global South was aggressively pushed by large players in international relations and institutions of global governance in order to overcome the geopolitics of the previous era and to ensure international security through heightened economic interdependence. In terms of solving the geopolitical problem of domestic insecurity, however, these reforms were bound to make things worse because neoliberal reform would fundamentally change the spatial dimensions of state reach, with deleterious consequences on the country's security architecture. In other words, neoliberal roll-back restructuring of the economy would reshape space in ways that undermine the state's effort to enact holistic security by concentrating development as well as the security apparatus in major hubs while neglecting peripheries. The spatial format latent in earlier models of integrated development and substantial geopolitical territorial consolidation would never be fully revived due to

particular spatial externalities of the neoliberalization process which are here explored.

As abundantly clear in Afghanistan's 2002 National Development Framework (NDF), which was greatly praised by del Castillo, economic *reconstruction* amounted to economic *restructuring*. In customary neoliberal fashion, downsizing the role of the state would make room for the private sector to take on more areas of traditional governance and public service. Privatization was the NDF's central strategy. The strategy makes the central point that the delivery of "routine government services will aim to contract out service to the private sector rather than rely on government as the sole deliverer," since "the market and the private sector is a more effective instrument of delivering sustained growth than the state." (NDF 2002: 17). Policies were going to "be based on competitive market-led solutions wherever possible," by outsourcing most government services to private enterprise and as imperatives of neoliberalization would dictate, "minimize government intervention in the market," (NDF 2002: 38). All sectors were to be reconsidered, from education, where "stakeholders will be brought into a National Task Force to examine the curriculum for secondary schools and develop a program suited to the needs of a private sector led economy," (NDF 2002: 20), to health, where "the implications of cost-sharing" were starting to be explored (NDF 2002: 17).

There were two audiences the NDF was speaking (or pandering) to, both of which frequently feature in the document. First, the strategy aimed at getting the attention of

donors as its goal was to "meet the international standards for receiving direct donor support for reconstruction and development projects," (NDF 2002: 9). In an era where the institutions of global monetary governance were tying conditions that reflect neoliberal imperatives to donor aid to less developed nations, from requiring that states privatize government functions and open up their (often hardly mature) economies, the NDF features just the right concoction of neoliberal buzzwords to articulate its policy vision, demonstrating at once the country's need for assistance and signaling its intention to comply completely with the conditions that would be tied to that assistance.

Secondly, the document repeatedly indicates that Afghanistan was trying to attract as much foreign direct investment as possible. Thus, even though the NDF looks to the national "competitive private sector" to act as "both the engine of growth and the instrument of social inclusion" (NDF 2002: 6), it states its intention to turn to the "international private sector to help us design and implement our projects," (NDF 2002: 8). To do this, the strategy was to establish a body to oversee the privatization program which would survey state assets and assess their salability, establish a foreign investor facilitation center, guide foreign investors through the investment approval process, and crucially, "the agency would have no regulatory role what-so-ever," (NDF 2002: 38).

The government did not ignore the consequences that such neoliberal restructurings would have on the spatial configuration of Afghanistan and the reach of the security apparatus. Should the government fail to create the conditions for

reintegration of rural areas, the NDF warned that "there will be an inevitable movement towards urban centers in general and Kabul in particular. Shanty towns, with all their frustrations and disenchantments, will be the consequence," (NDF 2002: 19). To combat geographical and social disintegration, the government had to encourage economic activity far outside the bounds of the capital and into rural areas, a process which depended on the "provision of security … [and] the establishment of a national army and police force," (NDF 2002: 45).

The government offered conflicting ideas about the nature and role of such security provision throughout the country. On the one hand, the NDF acknowledges the necessary link between the "promotion of security conditions [and] … the empowerment of communities," (NDF 2002: 45). These interlinked goals would be pursued through the "planning of a national community empowerment program that will deliver a series of block grants to communities to enable them to make decisions in a participatory manner on their key priorities," (NDF 2002: 45). It would inspire geographically holistic participation through the recruitment of men from each of the 32 provinces to be trained in Kabul (NDF 2002: 47). On the other hand however, security provision throughout Afghanistan had the more pressing purpose of encouraging donors and companies to invest in areas other than just Kabul — for economic progress is "constrained by perceptions of security. For example, many donors now insist on staying in Kabul, and starting projects there … Thus does the perception of insecurity exclude areas urgently in need of development assistance from

receiving attention," (NDF 2002: 11).

These two imperatives, security for regionally-integrated community empowerment and security to encourage foreign direct investment were ultimately conflicting goals. The open-door policy for the international private sector to invest in Afghanistan ultimately worsened the fragmented security architecture throughout the country. Part of the security apparatus was focused in cities which attracted most of the investment. The other part of the security apparatus relied on informal and often criminal provisions of security by warlords throughout rural areas. As foreign investments begin to roll in starting 2002, any ambitions of regional integration envisioned in the document were showing signs of failure. Ultimately, the government failed to inspire investors to take a chance on rural areas because the government and investors had different ends: economic actors act to acquire a return on their investment, and a country's holistic development is not high on their agenda.

There were three tendencies of the investments made in Afghanistan in this era: the first two were that investments often did not require long-term capital commitments that could improve the country in the long run and could be withdrawn easily, and second, investments made catered almost exclusively to the urban upper middle classes (both Afghan and foreign) (Herold 2003). For instance, Ehsan Bayat's New Jersey based Telephone System International (TSI) invested $95 million in a joint venture with the government to establish the Afghan Wireless Communications Company

(AWCC), which was only available in five major cities including Kabul (CNN 2002). A second cell phone network called Rohsan was erected with another $55 million investment which only extended to six major cities again including Kabul (Herold 2003). The cell phone companies' capital investments consisted of a few cell phone towers and personnel. Another $48 million went to the development and renovation of two 5-star hotels in Kabul, one Intercontinental and one Hyatt Regency. The first was newly renovated by a Dubai-based company, and the latter, situated just opposite the US embassy, was constructed by three different Turkish construction firms (Herold 2003). Such investments benefited mostly the upper-class that lived in cities, could afford cell phones, and could stay at hotels, and thus betrayed any hopes for holistic, regionally integrated economic growth.

On the occasion that investments did require longer-term capital and personnel investments, the third tendency of foreign direct investment in Afghanistan was that it often required security provisions typically afforded by the US military and private defense firms contracted by the US and Afghan governments. As was the case across multiple experiments of neoliberalization, from Chile to Iraq to Afghanistan, economic regime change required a facilitative role that could only be assumed by an aggressive military force to protect economic restructuring activities. In 2006, another 85$ million project for a Marriot hotel financed by the US-based Overseas Private Investment Corp (OPIC) was proposed, although this hotel never opened its doors (Clark 2016). In a report by the Special Inspector General for Afghanistan Reconstruction, John Spoke

writes to OPIC's CEO: "the $85 million is gone, the buildings were never completed

… and the US Embassy is now forced to provide security for the site at additional cost

to US taxpayers," (ABC News 2016). What Spoke was referring to was not only the

military requirements, but as the US military was undergoing processes of

neoliberalization as well, the private defense firms that were beginning to equal the

number of military personnel by a ratio of 1:1 (a ratio that went up to 1:3 by the end of

2008) (Serhal 2021).

As more and more investment poured into Kabul and avoided rural areas, such

investment patterns ultimately affected the geographic distribution of socio-economic

space and security provision in Afghanistan. Even though Kabul has long since been

different from the rest of Afghanistan in terms of development, at no time was the

vision of regional integration almost a reality as much as it were in the pre-neoliberal

era, and at no time was it further from being realized in the post-neoliberal era. In a

four-part series of papers by Marc Herold (2006), the author paints a picture of the

"pseudo-development" of urban Kabul. Kabul is an embodiment of a neoliberal

> … island of affluence amidst a sea of poverty, a sufficient density of foreign
> ex-pats, a bloated NGO-community … Neo-colonial administrators,
> opportunists, bribed local power brokers, facilitators, beauticians …
> members of the development establishment … foreign bank branches, lucky
> hotels (Serena Kabul, Hyatt Regency of Kabul), shopping malls (the Roshan
> Plaza, the Kabul City Center mall), import houses … and the ubiquitous
> Coca-Cola, (Herold 2006).

According to Herold's argument, the rest of Afghanistan is maintained "empty

space" — however, it is not devoid of any security apparatus. Private security

contractors existed there too, only in the remote and peripheral space these actors were mainly contracted by the US military to secure military supply chains that maintained the troops, not to establish security for the remote populations living there. While the earlier Soviet occupation of Afghanistan devoted a substantial part of its army to defending its supply chain, the neoliberalized US military by contrast outsourced logistics security, with significant consequences for the geographic distribution of the security architecture in Afghanistan. A 2010 US Congress report titled *Warlord, Inc.: Extortion and Corruption Along the US Supply Chain in Afghanistan* documents the way that the contracting out of security has enabled a "vast protection racket run by a shadowy network of warlords, strongmen, commanders, corrupt Afghan officials, and perhaps others," (Congress 2010). It writes that "although the warlords do provide guards and coordinate security, the contractors have little choice but to use them in what amounts to a vast protection racket," (Congress 2010: 3). It reports that "warlords are much more difficult to deal with now than they were nine years ago …" and with no formal security apparatus existing there, the population in those places needed to choose in a "fight between warlords and Taliban, and they disliked both of them," (Congress 2010: 48).

Thus, under the era of neoliberal roll-back, the aggressive incursion of private actors ranging from foreign investors to the private security complex resulted then in a bizarre dynamic of overdeveloped ex-pat city in Kabul in a sea of peripheral space that was a hotspot of terrorism and para-security structures. Geographic asymmetries of the

socio-economy and the security apparatus which focused on securing the economic activities pushed by neoliberal reform and military intervention presented a problem for establishing security in "post-conflict" Afghanistan. In what follows I investigate the roll-out of policies and institutions of re-regulation aimed at addressing the failures of roll-back neoliberalism on the security sector in Afghanistan. The most prominent of these is undoubtedly the institutionalization of security governance via drone to address spatial variegation.

iii. Roll-out, roll-over, and the new geopolitical in Afghanistan

Although roll-out regulations sought to regulate the disaster that was the fragmented security industry in Afghanistan, they instead resulted in the *institutionalization* and thus consolidation of market-based solutions to the problems of fragmented security architecture. Recall that roll-out neoliberalism is neoliberalism's institution-building moment, whereby a set of policies and practices address the outright failures and crises created by roll-back neoliberalism but do so in ways organized by inherently neoliberal market rationality (Peck & Theodore 2019). There is no distinct moment where roll-back became roll-out; but rather these terms are better understood as "dialectically intertwined moments of ongoing regulatory transformation," (Sparke 2018). Due to their symbolic triumph over the obstacles of geography via their ability to target "over the horizon" and to enact "wide-area surveillance" in service of law enforcement, the drone in this context represents a neoliberal roll-out device that manages the problem of a spatially fragmented security

structures caused by earlier process of neoliberalization.

In what follows, I consider three instances of neoliberal roll-out: first, the roll-out of the Provincial Reconstruction Teams (PRT) which were foreign-sponsored development projects in Afghanistan that aimed at holistic development and territorial consolidation. While PRT projects only helped Afghanistan's rural spaces modestly develop, they resulted in an even more diversified security presence due to the diverging strategic aims held by a diverse set of sponsors. Second, I consider the Afghan Presidential Decree 62 as a moment of regulatory roll-out neoliberalism, which was the first outright ban of private security companies after scandalous reports of their behavior began to emerge. However, decree 62 ended up buckling under international pressure and instead consolidated the legal basis for such defense firms to continue operating in Afghanistan. Third, as the outsourcing of security to different security firms did little to address the fragmented security architecture, the security threats that emerged from the peripheries of this patchy architecture were often increasingly dealt with by advancing military technology. This took the form of a systematic biometric data collection program in Afghanistan as well as the drone program, which was shared between the US and Afghan governments.

After exploring these three instances of neoliberal roll-out, I move on to consider how such roll-out measures gave way to but also overlap with distinct features of the third phase of roll-*over* neoliberalism as articulated by Peck and Theodore (2019). Just

as there is no distinct moment where roll-back became roll-out, there is no clear line between roll-out and roll-over, except that roll-over represents the authoritarian political shifts that protect and embed neoliberal structures in governance. My contention is that both roll-out and roll-over neoliberalism signal the unsteady revival of older models of regionally holistic territorialized governance which seek to consolidate geopolitical control over a country after the failures incurred by geoeconomic roll-back restructurings. Only this time, the national development goals of the earlier geopolitical pre-neoliberal era are neglected as corporate and other international actors are central players of the extension of state rule, thus diversifying the interests served by roll-out regulations and projects.

The gradual deployment of Provincial Reconstruction Teams in Afghanistan was for the intended purpose of improving stability "by increasing the host nation's capacity to govern; enhancing economic viability; and strengthening local government's ability to deliver public services," (US GAO 2008: 1). However, PRTs were more than just projects of capacity building for the Afghan state: while PRTs were conceived of as a way to enhance the government's capacity to govern, they were also crucially seen as vectors for catalyzing neoliberal forms of development. In a 2009 report to the Congressional Research Service on PRTs in Afghanistan, one comment from a PRT official shows how PRTs were still very much framed according to neoliberal sentiments, in that they required a "cultural shift in thinking" to turn the economy into a "thriving success that is ripe for investment by the private sector,"

(Matwiczak 2009: C-30).

Furthermore, while PRT projects only helped Afghanistan's rural spaces modestly develop, they resulted in an even more diversified security presence due to the diverging strategic aims held by sponsors of PRT projects. Some countries, such as Turkey, would avoid military confrontation. In contrast, other Western countries had Taliban defeat in mind; some trained local militias to help with security, some used civilians as part of a strategy to win hearts and minds, while others did not (Strand et al. 2017). Contrary to the aims of the PRTs of enhancing the government's capacity throughout the country, the particular security assemblage that accompanied PRTs in the form of different nations' militaries, private defense firms, and the employ of local forces only served to worsen the already fragmented security architecture.

Eventually, the fragmented security architecture came to pose a serious problem. The government argued that the private security industry had become a parallel security system which undermined the development of Afghan governmental forces, particularly the nascent public security force, the Afghan Public Protection Force (APPF). Therefore, in 2010 the Karzai government issued Presidential Decree 62 which, to the dismay of the international community, banned (almost all) private security companies following scandals and their disregard for laws and local customs. This move was almost inconsequential in terms of eradicating the negative effect of the private security industry in the country for two reasons. First, the Decree allowed

embassies and NGOs (mostly located in Kabul) to retain their internal security firms, provided they were registered with the Interior Ministry and remained within the confines of their organization. Thus, the APPF was not tasked with replacing all private contractors, particularly those high-profile international compounds in Kabul that continued to rely on PSCs (Auner 2013). Second, the PSC ban was made less significant because many PSCs were given a grace period for up to 12 months to either transition their guards to the APPF or transition from PSCs to "Risk Management Companies" (RMCs). Many RMCs from there assumed the role of vetting and training for the APPF, which meant that many former PSCs, now reinvented as RMCs, continued to animate the security environment in Afghanistan even after Decree 62.

The rolling out of regulatory regimes to deal with the problems of rolling back government involvement in governance, thus inadvertently contributed to the institutionalization of privatized security as opposed to its eradication. It also did little to address the geographically fragmented security structure. The result is framed most eloquently by journalist Emran Feroz (2019a):

> There are two Afghanistans … We have cities like Kabul where many people care for "modern lifestyles" and watch soap operas or music competitions on Tolo TV and where a small elite benefits from the presence of foreign troops and the military-industrial complex… At the same time, we have many villages – a lot of them not very far from the capital – where the stark reality of poverty and war have is a part of daily life. For years, these places have been bombed and raided by foreign militaries, militias and the Afghan army itself. And today, many of these places are not controlled by the Kabul government or their allies but by Taliban insurgents, (Feroz 2019a).

It is against the framing backdrop of the fragmentation of Afghanistan into "two Afghanistans" that the reliance on drones to enact security governance should be understood. It is against this framing backdrop that we can explain why only 27 of the 13,072 drone strikes that fell in Afghanistan appear to have targeted Kabul, as evident by an analysis of the strike database recorded by the Bureau of Investigative Journalism. Media coverage magnifies these strikes, but as the world's attention is locked onto Kabul and other urban centers, "everyday life in the rural regions … is neglected or forgotten. Brutal onslaughts, usually in the form of raids, drone strikes, or other military operations, are carried out on a regular basis," (Feroz 2019b).

The rest of Afghanistan outside of Kabul and other large urban centers is maintained "empty space" (Herold 2006) that is kept empty; it thrives on an illegal opium economy, is run by an illicit sub-state private security apparatus and is thus a hotspot for terrorist activity and drone strikes and surveillance. In these parts which make up the second of the "two Afghanistan," where the official governance apparatus is sparse, drone surveillance and bombardment became a distinguishing governance mechanism. As an analysis of the Bureau of Investigative Journalism's database shows, the highest number of strikes were concentrated not in Afghanistan's busy urban areas, but in rural provinces such as the Helmand, Uruzgan, Zabul, Wardak, and others.

Helmand Province is a notable example: it has been considered Afghanistan's "most dangerous province," (Anderson 2015) and incidentally is also remote from the

rest of Afghanistan as it has no rail service, 33% of its roads are not passable during certain seasons, and in some places, there are hardly any roads at all. This same province which was once home to a project which symbolized a beacon of hope and development in Afghanistan eventually became the area where the Afghan National Army (aided by foreign drone operation contractors) would field its first ScanEagle surveillance drone mission in 2016. Major Schumacher of the US Air Force wrote in 2021, just before the Taliban takeover, that even more drones should be integrated into the Afghan security apparatus because in the event of the "lack of air cover, ANDSF have had to remain close to population and main transportation routes which has resulted in most rural and remote areas being left to insurgent control," (Schumacher 2021: 15). It is thus that drones are considered the best solution to govern remote space.

"Besides drones," President Karzai said in 2013 when the US delivered its first fleet to the Afghans, "Afghanistan will be provided with other intelligence gathering equipment which will be used to defend and protect our air and ground sovereignty," (Ahmed 2013). Among these technologies are sensitive biometric databases that include approximately 40 pieces of data per person (Guo & Noori 2021). Where privacy laws were not written until after the US military and private contractors began capturing biometric information, some databases contain information on people's names, their irises and fingerprints, their military specialties, careers, familial connections, and other sensitive information. All of this information is held in the Afghan Automatic Biometric Identification System (AABIS), which itself was

modeled after the Department of Defense biometric system which was used to help identify targets for drone strikes (Guo & Noori 2021). Although it was projected that Afghanistan will quickly begin to maintain and operate these systems on its own, up until the US retreat in 2021, these systems were also operated almost entirely on foreign contractors (Schumacher 2021). While the Taliban have captured these databases, it remains unclear if and how they use them.

While the fall back on drones as a means of governance and territorial consolidation over remote areas amounts to a moment of *roll-out* neoliberalism as governments try to solve the fragmentation caused by neoliberal reform, in ways still structured by the market, security governance via drone and all that comes with it represents a moment of *roll-over* neoliberalism that enables ever more authoritarian forms of governance. Roll-over neoliberalism entails the rise of authoritarian styles of governance which, I argue, are reviving older geopolitical scripts and associated forms of statecraft. While augmenting state power and territorial consolidation through large scale development projects that extended state security throughout the country was the defining feature of older forms of geopolitical domestic statecraft, today, no such development goals are in mind. A para-security structure reliant on technologies like biometrics and drones for persistent surveillance stand in as "the new geopolitical" as the legacy of roll-back and roll-out neoliberalism begins finally to roll over. Rulership was tending toward this new authoritarian, technocratic model even before the world witnessed the capture of these technologies of biopolitical governance by the Taliban

after their transition to power following the 2021 US retreat. The 2022 Taliban is not the pre-2000 Taliban — it is empowered by *this* legacy, the legacy of neoliberal restructurings that anticipate the techno-surveillance turn in geopolitics.

B. Case Study: Ghana

The drones that fly above Ghana do not evoke the same dread as those that fly over Afghanistan. In fact, the delivery of health goods and services to remote populations in Ghana has been reported as yielding tremendous positive impacts within the health sector in Ghana (Demuyakor 2020). While the deployment of humanitarian drones in Ghana and other parts of the formerly colonized world illustrates the hopes associated with the use of digital innovations in the Global South, critical perspectives raise concerns about the compensatory "band-aid" nature of such interventions, questioning how such investments might erode permanent infrastructure, or as tools for the creation of para-infrastructures (Peckham and Sinha 2019). I want to argue here that not only do such compensatory solutions possibly undermine efforts for more holistic regional integration through investments in permanent health systems, but that the "digitization" of governance that is happening in Ghana has the potential to give rise to a range of externalities that may increase authoritarian forms of governance, similar in some ways to roll-over problems in Afghanistan. A consideration of the potentials and consequences of the digitalization of governance must always be situated in the context of the question of self-determination of peoples because of the way these governance techniques create certain dependencies, rely on data configured out of the intimacies of every day life, and because of the way they transform and concentrate power.

The apprehension that such investments in digitized governance may result in

disinvestments in meaningful health and public service systems are not unfounded. The emergence of drones to deliver humanitarian goods and services in Ghana only makes sense against the context of a history of spatially fragmented health care system which itself has its roots in a particular spatial distribution of developed centers and underdeveloped peripheries as a result of neoliberalization. However, Ghana was not always on a trajectory that foreshadowed such a spatial arrangement, one which ends up calling for the use of drones for governance. Since its independence, Ghana was translating similar nationalist ambitions to those of Afghanistan in the pre-neoliberal era that sought to spatially augment governmental capacity, ambitions which were articulated alongside ideas of popular sovereignty. If Afghanistan's major case in point of how the global political-economic orthodoxy reformatted spatial geographies and thus augmented the domestic geopolitical power of the government was the Helmand dam projects, in Ghana the major case in point of the triangular relationship between pre-neoliberal political economy-space-governance was the vision of implementing a national primary health care model that was accessible to all Ghanaians in an effort to spatially integrate centers and peripheries.

The following case study begins by surveying the triangular relationship between political economy-space-governance in the pre-neoliberal era in order to demonstrate by contrast how the new neoliberal political-economic orthodoxy effected spatial realities and governance practices in Ghana. This, I argue, is the drone's "history of the present," (Foucault 1980). To outline the new neoliberal political-economic orthodoxy

and its effects on space and governance in Ghana, I follow its development through the schema of roll-back, roll-out, and roll-over neoliberalism (Peck and Theodore 2019). For its roll-back neoliberal period, just as neoliberal "economic reconstruction" was a means for liberal peace building in war torn countries such as Afghanistan, in many poverty-stricken African countries, "structural adjustment programs" (SAPs) promised relief from the debt crisis and economic growth. These SAPs were pushed by the International Monetary Fund (IMF) and the World Bank as part of an aggressive campaign to liberalize the global economy, and encouraged devaluing currency, privatizing government functions, and opening up borders to foreign investment and trade. The implementation of SAPs in Ghana compressed government expenditure through massive cuts, abolished domestic price controls on health services, and privatizing state-owned enterprises (Konadu-Agyemang 2000). The result was a government with limited governing capacity, disinvestments in public services and infrastructure and increasing socio-economic inequality. This new political-economic orthodoxy had distinct effects on the spatial organization Ghana just as it did in Afghanistan — socio-economic spatial variegation became the norm as urban centers received the highest rates of investments while peripheral areas experienced higher rates of poverty and underdevelopment, and Ghana's road infrastructure continues to be underdeveloped today.

Next, I trace instances of roll-out neoliberalism in Ghana, which was as in other places, neoliberalism's institution-building moment, whereby a set of policies and

practices were put in place to address the outright failures and crises created by roll-back neoliberalism, but in ways organized by and inherently neoliberal market rationality. Ghana has deployed digital technology initiatives for the management of nearly all public sectors under the "Ghana Go Digital Agenda" policy initiatives. These public-private ventures include an "e-justice" system, biometric identity voter registration systems, and digitized health care systems. Biomedical drone delivery systems run by private companies are an integral part of this system of newly digitized governance. In true neoliberal fashion, this project recasts health governance from a development problem of government to an exclusively "last-mile" problem — a supply chain problem — that can be addressed through sub-contracting and private vendors.

The cost-effective, targeted, compensatory roll-out neoliberal solutions are now giving way to a third phase identified by Peck and Theodore (2019; 259) as roll-*over* neoliberalism, which is a phase marked by the (re)turn toward political authoritarianism to aggressively perpetuate neoliberal objectives. While I theorized that in Afghanistan both roll-out and roll-over neoliberal regimes signal a revival of older forms of geopolitical territorialization, it is still unclear if this trend will manifest in Ghana given its positive history with democratic governance and high scores on Freedom Indexes. However, the meticulous data collection activities by private companies such as Zipline, the biometric-identity apparatus, and other policy regimes resulting from Ghana Go Digital Agenda have given some cause for concern. The apprehension some scholars have is that the constellation of techniques that enact such digitized neoliberal

forms of governance transform and concentrate power in unpredictable ways (Couldry & Mejias 2019). These questions and preliminary critiques are taken up in the final section of this case study.

i. Pre-neoliberal alternative futures in Ghana

For Ghana, implementing public health was tied to the modernization and development that had been popular since independence. Before then, colonial governments employed spatial planning for mainly exploitative purposes, focusing infrastructural development on resource rich areas (Fuseini & Kemp 2015). The post-colonial Ghanaian government had ambitions of implementing a broad-based planning grounded in the genuine aspiration to promote a spatially balanced development (Fuseini & Kemp 2015). Post-independence development policies under the Kwame Nkrumah presidency sought to ameliorate the vast disparities by universalizing free education and health care, making roads and other social infrastructure throughout the country, particularly in the more deprived northern regions (Konadu-Agyemang 2000). Although Nkrumah's projects were wide-ranging — he founded numerous state-run companies, launched the construction of a huge dam project to generate hydroelectric power, built schools and universities and supported independence movements in other African colonies — my focus here is not Nkrumah's Ghana but the relationship between political economy, space, and governance. Therefore, my scope covers the pre-neoliberal era both during and after Nkrumah's removal in the 1960s by coup, and is limited mostly to the economic and spatial characteristics of Ghana's health system

(to account for the emergence of specifically biomedical delivery drones as now integral parts of the health system).

Although only three hospitals existed during the colonial era, all in the colonial capital city of Accra to serve colonial authorities, independent Ghana made accessible healthcare a priority. Thirty-five new health centers were established across the country in the early-to-mid 1960s, and twelve more in the late 1960s and early 1970s (Arhinful 2003). Other investments were made in health-care with the establishment of a medical training and a nursing training program at the University Ghana Medical School, as well as a pharmacy training initiative at the University of Science and Technology (Aikins & Koram 2017).

These developments were reflective of the reigning orthodoxy of development-based planning and public investments in infrastructure that was globally popular at the time. According to a report by the World Health Organization (2010), by the mid-1960s, it was clear that dominant medical and public healthcare models were failing to meet the needs of the most disadvantaged populations in newly independent, developing countries. The social, economic, and political dimensions of healthcare began to surface on the agenda. Thus, according to that report (WHO 2010),

> [d]uring the 1960s and early 70s, health workers and community organizers in a number of countries joined forces to pioneer what became known as community-based health programmes (CBHP). Such initiatives emphasized grassroots participation and community empowerment in health decision-making and often situated their efforts within a human rights framework that

related health to broader economic, social, political and environmental demands. The importance of high-end medical technology was downplayed, and reliance on highly trained medical professionals was minimized. Instead, it was thought that locally recruited community health workers could, with limited training, assist their neighbours in confronting the majority of common health problems. Health education and disease prevention were at the heart of these strategies, (WHO 2010: 9).

It is believed that the 1978 Alma Ata, a declaration for global "Health for All" and signed by 134 countries marked the start of the establishment of primary healthcare models in many developing countries. The Alma Ata envisioned the pursuit of global health as an integrated process, declaring that

> Primary health care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where people live and work and constitutes the first element of a continuing health care process, (WHO 1987: 2).

This declaration did not come out of the blue but was a culmination of processes and efforts towards "community-based health programs" throughout the world in the aftermath empire and of colonial health programs that generally only cared for white administrators and their troops (Packard 2016). "In 1997," asserted Director of the PPMED Division of Ghana Health Service Dr. Koku Awoonor, "before the Alma ATA declaration, Ghana has already started talking about Primary Healthcare," (Nigeria

Health Watch 2019). And indeed, a report by the Kaiser Foundation submitted to the Ghanaian Ministry in Health about the condition of rural health services in 1977 Ghana asserts that "despite personnel shortages, the national Health Planning Unit of the Ministry of Health in Ghana has made considerable strides in institutionalizing a planning and budgeting process in the ministry and developing a plan to provide broad coverage, primary health care to the country," (Kaiser Foundation International 1978). The document outlined the Ghanaian strategy which rested on the "premise that healthy living cannot be separated from total social and community development and that effective health measures call for the complete involvement of the people at the community level. It recognizes that the fundamental resources for all health work is the community itself," (Kaiser Foundation International 1978: III-7).

This document also references several relevant projects and initiatives that aimed to contribute to the Ghanaian health strategy at the time. One of these is the cornerstone research conducted by the Institute of Development Studies (IDS) of Sussex University in collaboration with the Institute of Statistical, Sociological, and Economic Research (ISSER) of the University of Ghana. The 1978 study presents an in-depth analysis of the quality of health services in every health facility in each of the two districts, The Jasikan District in the Volta area and the Birim District in the Eastern region, as well as plans to implement to improve Ghana's health service. In their recommendations, the authors reproduced and elaborated upon proposals presented in a working document produced by the Ghanaian Ministry of Health titled *A Primary Health Care Concept*

for Ghana during a November 1977 workshop held in Accra that was attended by personnel from the Ministry of health, divisional heads, and university representatives. The IDS & ISSER report (1978: 483) notes that its recommendations "followed the overall strategy agreed at the workshop … in order to set out in detail some of the implications of the strategy," though they deviate a bit to form an ultimately "alternative strategy which were based on the discussions and proposals arising from this workshop." The strategy laid out by the IDS & ISSER (1978) report, however, like the *Primary Health Care Concept for Ghana* (1977), aims to "broaden the concept of primary health care to take account of necessary activities in other sectors and to contribute to development programmes which have the promotion of health as a primary objective," (IDS & ISSER 1978: 469). Its strategy was notably holistic in nature, recognizing that

> [t]he concept of primary health care involves the recognition of the principle that a number of different interventions need to be carried out together as part of a package; that to implement only a part of the package reduces the effectiveness even of the interventions which are implemented. This is because the factors which cause different diseases are closely inter- related, and because the effectiveness of one intervention or activity is usually dependent on the presence (or absence) of another. (IDS & ISSER 1978: 405).

Its strategy was multi-tiered, expansive, and reflected the ideals of holistic development. It was holistic on several fronts: one, in terms of the various sectors that would need improvement and integration, and two, it was geographically holistic in that it sought to develop a strategy that would be far reaching enough to service all of Ghana, with the contribution of each village and with the support of the national government:

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A system of health care is proposed which provides three levels of care. The first would be at village level, accessible within one-half to one mile of the population served. This would be organised and controlled primarily by the community itself, supported by the national health system. The second level of care is the first referral unit of the health care system, which should be within four to five miles of the population to be served. The third level of care would be at the district level and consist of both a referral facility (the district hospital) and the district primary health sup-port and supervisory team. Multipurpose village health workers are recommended for the first level and two kinds of basic health workers for the second level. (IDS & ISSER 1978: 483).

The minimized importance of high-tech solutions was in comparison to grassroots efforts is certainly a long shot away from the present condition in Ghana, where, in the words of Director General of the Ghana Health Services, drones were expected to run "24 hours a day," and "save tens of millions of Cedis (Ghanaian currency)," for Ghana's medical needs (GhanaWeb 2022). The question is, what explains this dramatic shift from healthcare based in community participation and investment in health infrastructure to an imperative of using high-end, supposedly cost-effective technology? This question is particularly puzzling due to the fact that post-independence Ghana has always had ambitions of broad-based community-based healthcare models.

ii. Roll-back neoliberalism in Ghana

In Ghana as in other parts of the Global South, the late 1970s to mid-1980s saw the adoption of "structural adjustment programs" (SAPS) pushed by the International Monetary Fund (IMF) and the World Bank as part of an aggressive campaign by these

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institutions to liberalize the global economy. The SAPs encouraged decentralizing governance, privatizing government functions, and opening up borders to foreign investment and trade. Thus, between 1987 and 2000, over 300 government enterprises were sold (Obeng-Odoom 2012), and a year later the government continued pursuing "a clear aggressive program of divestiture … which will limit the role of government in the economy [and] reinforce the private sector," (MOFEP 2001: 326). As evident by the ratio of national to international private investment, Ghana experienced similar development patterns to Afghanistan with approximately 83% of investments representing foreign direct investment between 2001 and 2007 (GIPC 2007: 6). The trend of international private sector involvement had similar effects too, in Ghana as it did in Afghanistan: private sector projects were typically most common in areas where the return on investment would be greater, namely, in the Greater Accra region (Obeng-Odoom 2012). As reflected in the quarterly and annual updates published by the Ghana Investment Promotion Centre, the greater Accra region has regularly hosted over 80% of all investment projects (GIPC 2021). The spatial reorganization induced by economic neoliberalization happened on many fronts. International investments were concentrated in areas that would bring the highest bang for their buck, and as a result, as is almost universally the case with regards to the relationship between neoliberalism and urbanization, the city of Accra in Ghana recorded urban growth of over 300% since the 1990s until today (Grant 2009).

The implementation of SAPs in Ghana compressed government expenditure on

health through massive cuts, and abolished domestic price controls on health services (Konadu-Agyemang 2000). This was possibly a bad time to start rolling back on government involvement in social welfare in Ghana since the incidence of poverty reached as high as 88% in some remote regions (Obeng-Odoom 2012), and especially since the prevalence of medical admissions due to diabetes increased almost two-fold from 3.5% in the mid 1970s to 6.4% the mid-1980s (Adubofuor 1993), and the prevalence of hypertension was 13% in the 1970s (Pobee 2006), a number that has only been increasing. In fact, some growing health issues such as malnutrition during those decades were even the direct result of neoliberal roll-back policies — malnutrition increased during the 1980s as a result of the reliance on cocoa production for export as a single cash crop, at the expense of other food production. International dynamics toward single cash crop economies have a colonial history, but the structural adjustment programs exacerbated such economic policies (Singleton 2006).

Growing health problems nationally were subject to even more pressure as the healthcare sector itself became targeted by the structural adjustment programs imposed by the World Bank and the IMF. Government spending in the health sector dropped drastically from 7% and 10% in 1980 and 1982 to 1.16% of the national budget in 1996 (Konadu-Agyemang 2000). Private clinics had sharply risen since the decline of government expenditure on health. One of the key goals of the structural adjustment reforms was to achieve full cost recovery for drugs by imposing user fees in healthcare facilities. The Hospital Fee Law (or Legislative Instrument 1313) was passed to

institutionalize the reforms. Shifting risks and costs onto citizens was characteristic of neoliberal economic restructuring, and its effects were felt all over Ghana. The introduction Cash and Carry Scheme, which enjoins full cost on the user of health services, caused a steep decline in attendance to all health care centers (Washington and Enyumayew 1989).

Cost of service discouraged all people from seeking out healthcare, but the effects are more strongly resonant in rural areas in the Northern regions. Konadu-Agyemang (2000) shows that in all cases, urban residents still seemed to have better opportunities than rural ones — for instance, the ratio of government-employed doctor to people was 1:5,300 in the investment heavy Greater Accra Region, while it was 1:64,000 in the Northern regions (Konadu-Agyemang 2000). Other indexes such as the availability of child delivery services and maternal healthcare access also varied widely, demonstrating how "one's place of residence is therefore an important determinant of access to basic services," (Konadu-Agyemang 2000).

While lack of health facilities may prevent people from using healthcare, other public disinvestments as a result of neoliberal structural adjustments indirectly worsened the public health crises. Access to healthcare facilities requires not only nearby health facilities and affordable options, but also a well-developed road infrastructure and transport system. Following the general commodification of land following the liberalization of the economy (Yaro 2010), traditional land owners have

re-allocated land for the purpose of profit, "bend[ing] the rules … [and] employ[ing] quack surveyors to plan their areas instead of channeling it through the legally mandated planning bodies," making the spatial planning of Ghana more difficult for planners (Fuseini and Kemp 2015). The result is, according to Fuseini and Kemp (2015: 316), that the favoring of economic neoliberalism "hinders successful planning in the sense of sustainable development which envisions an integrated planning involving the economic, social, and spatial planners as well as civil society organizations." Such an integrated model would have been reminiscent of the models articulated in the 1977 *A Primary Health Concept for Ghana* and the related 1978 *Study of Rural Health Services in Ghana.* Instead, neoliberal reforms caused massive socio-economic asymmetries — problems that the pending "roll-out" neoliberal reforms would attempt to solve, without deviating from the primacy of market-based rationalities as core organizing principles of these reforms.

iii. Roll-out, roll-over, and the new geopolitical in Ghana

It is against the context of the outright failures of the neoliberal experiment of selective state withdrawal, deregulation and privatization that we can understand the emergence of drones and other interventions as representing a compensatory set of policies, practices, and programs. These have been called instances of "roll-out" neoliberalism by scholars (Peck and Theodore 2019), whereby the deleterious effects of the privatization of government functions were met with subsequent attempts to curb the unanticipated, often geographic, problems that privatization created. These

solutions were often themselves market driven, defined by the triumph of "public-private" partnerships, thus institutionalizing the neoliberal ethos. There is no distinct tipping point when roll-back became roll-out, and the practices that characterize each phase are not uniform. These measures represent generalized adaptations to different crises, but what makes them "neoliberal" is that they share in common a basic foundational principle and driving impulse toward market-competitive facilitation.

What's more, is that in a moment of what has been called "techno-capitalism" (Suarez-Villa 2012), market-driven solutions are intertwined with the emergence of new technologies and increased digitalization, transforming the limits of governance and redirecting political-economics, values, and logics of power toward new and unpredictable futures. At the moment, Ghana sits on a cross-roads between "digital democracy" and "techno-authoritarianism." While its history and reputation as one of the most stable democracies in Africa might indicate a move towards an even more open digital democracy, the layers of actors and interests, from Western companies to Chinese ones (which are themselves auxiliaries of the Chinese government) that are working to enact this vision in Ghana might indicate a techno-authoritarian turn as a typically strong democracy is captured by private interests (Gyimah-Boadi et al. 2021) that often seek to exert spatialized forms of control. This is what is meant by the "new geopolitics," and the "roll-over" effects of neoliberalism in governance. In sum, the following section considers the turn in Ghana's domestic health policy towards drones and digitization as moments of ongoing neoliberal roll-out, and consider how such

projects may inadvertently contribute to the phase of roll-over neoliberalism.

The idea that the use of biomedical delivery drones in governance represents the "roll-out" stage of neoliberalism to address the underdeveloped infrastructures resulting from years of rolling back on public investments has been taken up in work by Peckham and Sinha (2019), though without explicit use of the phrase. The authors instead explore this notion through the concept of a "global health anarchitecture," by which they see drones as contributing to the transformation of

> State operations, which have been underpinned historically by expectations of an even distribution of services across bounded sovereign spaces, are being reconfigured from without by provisional networks. These informational networks cut across traditional infrastructures and are often directed from spaces outside the state they operate in, although they have become indispensable to the state's ability to govern, (Peckham and Sinha 2019: 1206).

The authors situate the biomedical delivery drone as an emerging technology within a broader assemblage which is causing fundamental changes in the way that health is being re-spatialized. The drone thus represents a compensatory technology rolled-out by governments to address the socio-economic variegation caused by roll-back neoliberalism. Its use by governments does not indicate, however, an exact return to older forms of territorially integrative state services, but a new dynamic whereby drone corporations cut across traditional infrastructures and direct governance from spaces outside of the state, and have become indispensable parts of a state's governance capacity. This perspective reveals how, far from just being innovative solutions to the problems of the day, drones-in-governance stand in for more comprehensive,

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meaningful approaches to healthcare which are not delivered "just-in-time," but permanently there. This would require investments in healthcare infrastructure and integrating remote peripheries to more developed centers — a possibility which drones tend to foreclose.

Instead, the use of drones in health care requires specific disinvestments in health care systems in order to secure the funding needed to pay tech-companies. When Zipline was contracted by the Ghanaian government in 2018 to offer its alternative health goods supply-chain model, it was not only competing with traditional ground transport supply-chain service providers and private-sector trucking companies (which typically thrived in this environment, and could deliver a lot more in a single truckload than could any one drone flight) for donor and investor funding, but for public funds as well. This proved to be a central challenge for drone companies trying to gain traction in the industry as it was often the case that governments did not have funds set aside to sponsor such emerging industries. Drone companies either had to rely on commercial partners or donor agencies or as in Zipline's case, successfully carve out space in the fund allocation model of governments. Zipline's unique success as a drone delivery company in African states is largely attributable to its success in persuading governments to redirect funds typically allocated to the health sector toward drone-based supply chains. As reported by 2021 Insight Report produced by the World Economic Forum,

> The governments of Rwanda and Ghana allocated a permanent budget for
> Zipline's monthly operations through their ministries of health from the

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beginning of those services. Treating it as a healthcare delivery solution, these governments were able to pay for Zipline services *by eliminating other upstream and downstream costs in their health systems.* Zipline has secured similar state-level budgetary approval in its newly announced system in Kaduna state, Nigeria (WEC 2021: 10, emphasis added).

With the budgetary restraints the national health system faces, and in a country with reportedly only 55 ambulances (BBC 2018), the necessity of integrating drone delivery into the healthcare system and the decision to reallocate funds to pay Zipline should be assessed. In the fog of the countless headlines praising the procurement of Zipline and the promise it represents for Ghana's healthcare system, it is easy to miss some of the lesser heard critiques that were launched at the government for this deal. These critiques came mainly from the Ghana Medical Association, as well as from some minority members of the Ghanaian parliament. Following the government's decision to contract Zipline, the Ghana Medical Association released a statement that read:

> Health should not be politicized and the health of Ghanaians is critical. The GMA is not against the use of technology to improve healthcare in the country. However each single intervention proposed in this direction should not be seen as a panacea to solving our healthcare problems but rather as an augmentation to existing efforts. The proposed services to be provided by the drones do not conform to the existing primary healthcare policy in Ghana … The use of drones without the necessary improvement in the human resource capacity will not insure to the benefit of the country in its quest to improve healthcare delivery… (Nyabor 2018).

The Ghana Medical Association as well as Ghanaian procurement expert Kobina Ata-Bedu questioned the need for Zipline to build distribution centers from which to operate its drones. Ata-Bedu asks in a detailed analysis of the government's deal with

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Zipline, "It has been specified that these products will be held in new distribution centers to be built by Zipline. What happened to the existing cold chain systems? Why produce parallel cold chain systems? Each region has a medical store. Do these not have cold rooms?" (Ata-Bedu 2018: 8). In his critique, he also questioned the ability of the distribution centers to serve the country, noting that while the maximum distance the drone covers is 80km, a distance that hardly connects some cities: "That is shorter than Enchi to Jumbos (82.9km), shorter than Sunyani to Kintampo (122.1km). That is shorter than from Tamale to Damango (124.6km). So really, where is going to be the sweet spot in the middle that can reach the towns, talk less of the spatially scattered villages around?" (Ata-Bedu 2018: 8).

Others also saw past the illusion that Zipline's drones would be the ultimate solution to Ghana's healthcare issues. The Minority Spokesperson on Health and Member of Parliament that represents the Wa West district, Joseph Yieleh Chireh argued that the money spent on the project could have been used to provide more meaningful healthcare services:

> The amount of money we are going to spend to deliver these items could have been used to provide access to many people in terms of healthcare facilities. In any case what is the terrain of this country such that you will need drones? It is a misplaced priority … The challenges we have in our health system don't need drones. People are dying not because there are no drones to deliver the medical supplies. They are dying because the supplies aren't available in the first place… (Nyabor 2018b).

Ernest Norgbey, Member of Parliament for Ashaiman district, went as far as to sue the government of Ghana for sole-sourcing Zipline for the delivery of health

goods. He argued that "the Government of Ghana erred in using single sourcing method of procurement in engaging Fly Zipline Ghana Ltd," (Adogla-Bessa 2019). In not doing its proper due diligence and surveying the market by releasing a tender for bid (as was the normal approved process for public procurement in Ghana) before offering Zipline the contract, MP Norgbey argued that the agreement was illegal and that the service agreement should be immediately terminated. The minority opposition went unheeded by the Ghanaian government, and in fact, hopes were so high for Zipline's potential in Ghana in the aftermath of the Covid-19 outbreak that in 2020, the government ignored the critics and granted a $10 million tax waver to the drone startup company (Udoh 2020).

While proponents of drone delivery in the healthcare system regularly frame Zipline's service as a means to deliver life-saving medicine to hard-to-reach areas, they fail to point to the way similar misappropriated investments over the years and the reliance private industries in governance has exacerbated the asymmetries between urban and rural space in the first place. The idea that such compensatory projects are still structured according to neoliberal market values explains why the problem is framed as a supply-chain problem or as a problem of the "last mile." The rushing incursion of private actors to bridge government "gaps" are thus responding to this problem as though it were a "gap" in the market, a platform of profitability. If neoliberal imperatives once justified the forcible neoliberalization of economies, the privatization of public functions, and war to catalyze these processes, they now bank

off the crises created by that system, and offering cost-effective, profit making, targeted solutions.

It should be noted that the integration of drones into Ghana's health infrastructure is part of a larger transformation in the techniques of governance in Ghana called the "Go Digital Agenda." The integration of drones into the healthcare system is not only one element of an increasingly technology-infused governance model, but it both *depends* on and contributes to the increasing digitization of governance and human life. The set of policies and programs that are part of Ghana's "Go Digital Agenda" initiative is emblematic of the techno-capitalist turn: in an effort to bridge the digital divide, the government is launching biometric National Identity Card system, a National Digital Property Address system, "an integrated e-immigration system, e-procurement, e-parliament, e-justice, e-cabinet and smart workplaces among other initiatives," (CT 2021). The "digitization of Ghana," as described by Minister of Communications Ursula Owusu Ekuful is "an ambitious infrastructure development program for the ICT Sector, with a national broadband infrastructure and total connectivity for the unserved and underserved at the heart of the Agenda. No one will be left behind," (CT 2021).

In fact, as per the nature of digitized population management, no one *can* be left behind: many of these systems, including health-by-drone, *depend* on large sets of big data collected from populations in order to function. In an interview, Zipline's CEO Keller Rinaudo stated that the work that the company does it largely "data-driven," and

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that the company has "had to build all of these interconnected systems and they're all generating huge amounts of data," (Graham 2021). Zipline's drones are not only collecting and systematizing data on product demand, but the company also collects data on other health centers, transportation routes, weather, and even patients and their travel time to and from medical facilities (FlyZipline 2022). Zipline's Capabilities Statement states that its "tracking gives government partners a reliable and timely view of product demand at a national scale and with granular geographic precision," (FlyZipline 2022). All of its data is stored in Zipline's own electronic database, providing "real-time data [and] visibility into potential population health challenges and trends," collecting "custom data points on behalf of partners to measure specific performance indicators," (FlyZipline 2022).

In a sense, there is an entire secondary techno-political economy that coevolves with the integration of drones into health governance, and it is from here that I contend the effects of "roll-*over*" neoliberalism and the "new geopolitical" might begin to be seen. Although the company appears to collect data for "benign" purposes such as enhancing its own operability and that of its partners, there is still a strong potential for risk that data can be used by governments and other actors in malicious ways. This seems to be a more pressing concern for commentators on Rwanda's use of humanitarian delivery drones given Rwanda's more authoritarian governance patterns (Specht 2020), however, as the West's "beacon of democracy in Africa," less concerns have been raised on the techno-authoritarian turn that digital-democracy might take.

However, as argued by Gyimah-Boadi et al. (2021) despite Ghana's robust two-party system and its democratically-legitimate contentious electoral process, Ghana's political-economic system is marred by its "winner-take-all" quality — not only is authority deployed to benefit the ruling party leadership and its supporters, but government control over natural monopolies means that high-value state lands, enterprises and other public assets are "routinely awarded to relatives, cronies, partisans of the incumbent president … — all without breaching the letter of Ghanaian law," (Gyimah-Boadi 2021: 74). This amounts to an easy "capture" of democracy in Ghana, making it ripe for control by the "emergence of China and other so-called non-traditional development partners," who often engage in "vigorous courtship of Ghana, [having] little or no interest in matters of democracy and accountable governance in their African client states, [thus] enabling for democracy capture in Ghana as elsewhere in Africa," (Gyimah-Boadi 2021: 77). Thus, Ghana is not immune to the potential "techno-authoritarian" negative externalities of "digital democracy."

The digitally mediated geopolitical activities of Western and, as often reported, Chinese companies extending their influence into Ghana through development and public-service industries is facilitated by the lack of proper protections for populations upon whom digitized governance is enacted. Ghanaian lawyer and founder of the Africa Digital Rights' Hub Taki Akuetteh asks that since "biometric ID doesn't expire … where is that information sitting? How will it be processed? How will it be securitized?" (Speed 2020). Although drones themselves might be highly regulated in

African countries (as shown by Lockhart et al. 2019), the data architecture upon which depend and contribute to is not, making systems vulnerable to "function creep," whereby data collected for one purpose is used for another. Whereas in Europe citizens are protected from function creep by the General Data Protection Regulation (GDPR), which limits what data can be collected and how it can be used, no such regulation has yet to be established across Africa. Zipline thus is able to make available its data to its interested partners as well as interested governments, as noted in its Capabilities Statement (FlyZipline 2022). Increasingly digitized forms of governance then are a potential assault on the freedom of users as digital control is captured by corporate and government entities of sovereign states.

IV. Architectures: Conclusion

What I aimed to show in *Drone Architectures* was the relationship between political economy, geo-spatial organization, and forms of governance. Together, this triangular relationship forms an architecture, along with its foundations, architects, and the possibilities certain architectural structures enable. In exploring the political economy-space-governance model of the pre-neoliberal and the post-neoliberal eras, I aimed to denaturalize targetable space in both Afghanistan and Ghana by showing the potential future that was arguably latent in former architectural designs.

I aimed to bring together theories of geopolitics and geoeconomics with those of roll-back, roll-out, and roll-over neoliberalism to show how different manifestations of neoliberalism correlate with the emergence of geoeconomic discourses and forms of state craft and re-emergence of older geopolitical forms. If geoeconomic roll-back resulted in spatial asymmetries, then the incursion of drones as roll-out devices to address problems of state reach in variegated space have also given way to a moment of roll-*over* revivals of geopolitical concerns of territorial consolidation. This time, however, in contrast to earlier manifestations of the strong, geopolitical Keynesian state, the state extends its reach not through holistic models of development, but through re-territorializing drones that are largely operated by corporate entities. State operations of security and health, which have been underpinned historically by expectations of an even distribution of services across bounded sovereign spaces (in the pre-neoliberal geoeconomic era which marked a disruption of this expectation as

state operations became privatized), are now "reconfigured from without by provisional networks… [that] cut across traditional infrastructures and are often directed from spaces outside the state they operate in, although they have become indispensable to the state's ability to govern," (Peckham and Sinha 2019: 1206).

While *Drone Architectures* probes questions related to how the consistent *under*development of space creates targetable space which is then targeted by airborne para-infrastructures in security and health, the following and final section, *Drone Infrastructures*, surveys the set of *over*developments, or the actual infrastructures themselves that enable drone use. These include all of the drone supportive infrastructures, service assemblages, and technological grids that actually enact drone governance in drone theaters. Together, *Architectures* and *Infrastructures* demonstrate the ongoing dialectic between capitalist economies of destruction and reconstruction.

Part Three. Drone Infrastructures: Technical Layers and Private Players

I. Theory and Literature: Infrastructures in Modernity

A. The Politics of Infrastructure

Empires of the past reshaped geographies in the form of roads, railways, dams, bridges, and buildings to anchor their power to conquered landscapes. Those that practiced indirect rule also reconfigured social relations by recruiting some local peoples and giving them administrative powers and privileges as a means of firmly establishing far reaching geographic power. The enactment of governance via drones operates according to similar principles. The drone exercises power over populations in its operative theaters through infrastructures that are made up of not only physical artifacts but also partnerships, information, and bodies. For the US military to strike a suspected Al-Qaeda affiliate in Yemen, the military tracks the suspect using satellites in outer space and fiber optic cables that travel across the Atlantic floor, the command is voiced from the Ramstein command center in Germany, and the drone flies from a newly built drone base in Umm AlMelh in the south of Saudi Arabia. Legal infrastructures are also at work: to remain compliant with international law, the host state's permission is often sought beforehand. This simplified sequence only scratches the surface of the intricate infrastructure that supports drone operations.

My exploration into drone infrastructures argues that there is little that is more interesting than the idea that infrastructures are more than just things, that things in themselves can have politics or political significance — that there is more to walls, roads, pipes, wires, than just concrete, copper and steel. If *Drone Architectures* outlines the systemic *under*development that creates targetable space (and by extension, untargetable space), then *Drone Infrastructures* details the set of *over*developments — or stuff — that enable and enact governance via drone. I use the term "overdevelopment" as opposed to just "development" to indicate the compensatory, contingent, and frivolous nature of these developments. The infrastructures that enact drones do not necessarily address the causes of underdevelopment but instead build on top of them. Together, *Architectures* and *Infrastructures* demonstrate the ongoing dialectic between capitalist economies of destruction and reconstruction (Paudel and Le Billion 2020).

Infrastructures, like each part of this dissertation, is broken down into four sections: 1) the current chapter which develops the conceptual frameworks through the relevant literature on infrastructure, 2) the research design, where the methodology guiding the empirical research in *Infrastructures* is discussed, 3) the discussion, where I apply the theoretical traditions and conceptual frameworks to the collected data, and 4) the conclusion. This section on conceptual frameworks and literature surveys the tradition of work that explores what Star (1999) called the "study [of] boring things," or the "many aspects of infrastructure [that] are singularly unexciting" (1999: 377). In

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doing so, we begin "to unearth the dramas inherent system design creating, to restore narrative to what appears to be dead lists," Star (1999: 377). The purpose of this section is to highlight the significance of studying infrastructure generally through a dive into theory, thus justifying the purpose of *Drone Infrastructures* as a research project.

Many studies of infrastructure tend to agree with Star's (1999: 380) assertion that infrastructures are "by definition invisible," and that they only "become visible on breakdown," (see also Emerson et al. 2017, Anand 2017, Larkin 2008). The study of infrastructure results in what Bowker (1994) called an "infrastructural inversion" — it foregrounds what is often thought of as only background. In making invisible visible, then, there is political potential. But what is revealed in the unveiling of the building of infrastructure? In this literature review, I consider how the study of infrastructure 1) is a project of denaturalizing the normative visions and power encoded into background processes by decentering fetishized artifacts and 2) how the study of infrastructure as an emblem of modernity deepens our understanding and critique of distinctly modern forms of power. Both themes are present in the unearthing of specifically *drone* infrastructures. In the third and concluding section of this literature review I briefly reflect on these theoretical dimensions of the study of infrastructure in the context of modern governance by drone. This final section demonstrates how "infrastructure" functions in this thesis, the value of studying drone infrastructure, and its relationship to drone governance and ultimately, resistance to drone governance.

My overarching objectives in this Part of the dissertation are threefold: first, I aim to sketch out the contours of drone infrastructure to decenter the drone as the object of

analysis in the study of drone governance because the drone is only as powerful as its enabling infrastructure. Second, I suggest the study of drone infrastructures offers insight to the relationship between infrastructure and modern bio-and-necropolitical governance. Third, I argue that the study and knowledge of infrastructure lends itself to a politics of empowerment in the face of contemporary forms of governance.

B. The Significance of Studying Infrastructure

i. The study of infrastructure decenters fetishized objects and denaturalizes normative visions

Put simply, "infrastructures are matter that enable the movement of other matter. Their peculiar ontology lies in the facts that they are things and also the relation between things," (Larkin 2013: 329). As things in themselves, different forms of power are often encoded into infrastructures. This idea that is taken up in classic work by Lewis Mumford (1964: 2), who writes that

> from late neolithic times in the Near East, right down to our own day, two technologies have recurrently existed side by side: one authoritarian, the other democratic, the first system-centered, immensely powerful, but inherently unstable, the other man-centered, relatively weak, but resourceful and durable, (Mumford 1964: 2).

This classic statement on the political significance of human-made things argues that rather than being used differently in different social contexts, technologies like infrastructures themselves determine social development. This thesis abounds in deterministic accounts of the relationship between society and technological progress, and stands in the center of Mumford's studies of the city and architecture, reflecting

much nineteenth century critiques of modern industrialism. The theme of artifacts themselves as political is taken up in more contemporary environmentalist arguments about the importance of clean energy. For instance, a nuclear-powered world, according to Denis Hayes (1977), would necessarily exhibit more authoritarian politics than a solid powered world. Lemke (2015) also stresses the notion of the materiality of politics and political power, and argues for renewed attention to "the link between the matter of government and the government of matter," (Lemke 2015: 14). But how exactly is power encoded into matter?

Ruhleder and Star (1996) identify nine qualities of infrastructure that help explain its political substance. Significantly for this question are that 1) infrastructure is often "linked with conventions of practice," or that it both shapes and is shaped by the conventions of a community of practice, and relatedly, 2) infrastructure is the embodiment of certain standards. Like the scientific method, infrastructure becomes the sort of standardized and regulated structure that enables further standardized and regulated things to emerge. Therefore, inherent within infrastructure is a certain normative vision of how things should be structured and how they should work. An example is found in Latour's (1996) *Aramis, or the Love of Technology*, which tells a story of the inception and failure of Aramis, the guided-transportation system in Paris. Aramis' construction was shaped by a particular set of underlying standards: a certain vision of the modern nuclear family was encoded into its construction, making it so that it was built only for a particular sized car. The underlying set of standards Aramis'

construction was shaped by a master narrative that ultimately resulted in its demise. In cases like these, the study of infrastructure can denaturalize or disrupt master narratives or underlying discourses that are encoded into certain social structures. It shows that infrastructures are not neutral — they have politics.

The political significance of things such as infrastructures is best captured in Winner's (1980) classic article, "Do Artifacts Have Politics?" Winner takes a slightly different perspective from Mumford (1964), arguing that although artifacts such as infrastructure might not be political in and of itself, as the "relation between things" (Larkin 2013: 329), "the design or arrangement of a device or system could provide a convenient means of establishing power and authority in a given setting," (Winner 1980: 134). In this case, infrastructure itself is not political but instead infrastructures are *means* by which actors pursue political ends. Therefore, the decisions that go into making infrastructures have wide-reaching political consequences. He writes that infrastructure influences how people are going to "work, communicate, travel, consume, and so forth over a very long time. In the process by which structuring decisions are made, different people are differently situated and possess unequal degrees of power as well as unequal levels of awareness," (Winner 1980: 127).

Time is an important element to consider when discussing the politics of infrastructures. On the one hand, infrastructure is around for "a very long time;" it endures and thus whatever social or political significance it has also endures. On the

other hand, the right timing is of prime importance when it comes to making decisions about infrastructure, because the

> greatest latitude of choice exists in the very first time a particular instrument, system, or technique is introduced. Because choices tend to become strongly fixed in material equipment, economic investment, and social habit, the original flexibility vanishes for all practical purposes once the initial commitments are made … For that reason, the same careful attention one would give to the rules, roles, and relationships of politics must also be given to things as the building of highways, the creation of television networks, and the tailoring of seemingly insignificant features on new machines. The issues that divide or unite people in society are settled not only in the institutions and practices of politics proper, but also, and less obviously, in tangible arrangements of steel and concrete, wires and transistors, nuts and bolts (Winner 1980: 127-8).

Case in point of Winner's insistence on the importance of early decisions in the establishment of infrastructure is Hughes' (1993) study on the late 19th to early 20th century development of electricity infrastructures in Western society, which shows the technological path-dependencies that follow established infrastructures. These path-dependencies often constrained how systems evolved over time. Where electrification was led by the public sector as in many European countries or privately funded as in the United States and parts of the United Kingdom, the early decisions that went into establishing these infrastructures shaped the evolution of these systems for years to come.

So far, infrastructures are considered political because they embody a certain normative order, or because they are how actors can pursue political ends, or because they last for a long time, thus compounding whatever political effects they have. The

study of infrastructure is thus a political act as it unearths the normative visions encoded into it or the ways infrastructure is instrumentalized in the pursuit of power.

The study of infrastructure can also unearth the hidden work — and workers — that contribute to the erection of the world of working artifacts and technologies around us. This is arguably the most significant de-centering and politically significant work the study of infrastructure offers, if not for the fact that it not only decenters fetishized objects but human beings as well, by integrating them both into larger systems. In doing so, the study of infrastructure contributes to "new materialist" schools of thought. New materialism is an umbrella term for scholarship that often stresses the idea that matter itself is to be "conceived as active, forceful, and plural rather than passive, inactive and unitary," (Lemke 2015: 2) and that theory should overcome anthropocentrism and humanism by appreciating the material relation between the human and the non-human (see Barad 2007, Lemke 2015).

One contemporary example of the visibilization of background infrastructure and its human and non-human elements is the viral story of "iPhone Girl," the young woman dressed in a striped factory uniform working in a Shenzhen factory who went viral after photos of her standing in the production line smiling were found on an iPhone opened in Britain (Huifeng 2008: 4). The story took the internet by storm as a peak into the background of our working world. Studies of infrastructure have similar effects of foregrounding the background and decentering the visible or fetishized matter it

enables (in this case, the iPhone). By decentering the visible matter enabled by infrastructure, a critical project is fulfilled — studying the social-material relations of the railroad and its designers as opposed to the locomotive, or of the assembly line and workers as opposed to the iPhone inevitably offers up different analytical questions.

In the name of "surfacing invisible work" Graham and Thrift (2007) also show how cultures that take infrastructures for granted "sustain widespread assumptions that urban 'infrastructure' is somehow a material and utterly fixed assemblage of hard technologies embedded stably in place," (Graham & Thrift 2007: 10) when in truth infrastructures are often susceptible to damage and require consistent repair and maintenance by a hidden class of workers who, by their work, give the illusion of the completeness and immanence of infrastructure. If part of an infrastructure's design is the illusion of immanence, completeness and stability it offers to a society, then the labor that goes into maintaining this illusion is necessarily a part of this infrastructure as well.

ii. The study of infrastructure is the study of power in modernity

The study of infrastructure not only denaturalizes normative visions and decenters visible artifacts that are moved by infrastructure, but also, due to the "unbearable modernity of infrastructure," (Larkin 2013: 332) the study of infrastructure is at once a project which deepens our understanding of distinctly modern power. In the examples above, whether it is normative visions of how the world should be or whether it is about

concealing the work and workers that go into erecting the world of visible artifacts around us, the invisibility of infrastructure is mobilized to naturalize certain power relations or maintain illusions of stability. However, from the perspective of a critique of modernity and modern power, perhaps it is only a partial truth that "invisibility" is an inherent condition of infrastructure. There is another range of thought that looks at how infrastructure's heightened *visibility,* as opposed to its invisibility, is mobilized as a medium of modern political power. This section explores the relationship between infrastructure and modernity, a question which is doubly important in the context of drone infrastructures due to the way they enable modern forms of bio-and-necropolitical governance. As emblems of modernity, many infrastructural projects are copies, funded so that nations can take part in the project of modernity by repeating infrastructural projects from elsewhere to "participate in a common visual and conceptual paradigm of what it means to be modern," (Larkin 2013: 333). This section concludes by moving beyond accounts of modern infrastructure and considering post-modern, software-infused infrastructure.

Infrastructure in modernity is often an emblem and fantastical display of modern state power. According to Prakash (1999: 160), "technology was not only the instrument but also the substance of state power." As the instrument of state power, as studies of the colonial state often argue, the construction of infrastructure such as "irrigation canals and mechanisms of river control … or the laying out of imperial railways and telegraph systems," is often read as the material expression of the

territorial reach of colonial power and the development of capitalist forms of economy (Mitchell 2014). Modern infrastructures were not only instruments of state power but *representations* of imperial rule and modern state power. Contemporaneously, nation-states often build infrastructures less as a means to meet public needs but to signal the transition to modernity. That is why, as argued by Anand et al. (2018), "there is always greater investment in future-oriented infrastructures than is justified by their expense. Shiny new airports with big capacities are built in many countries although they only serve a tiny elite," (Anand et al. 2018: 19).

Other examples of infrastructure as a representation of modern forms of power can be found in sources such as *Expectations of Modernity,* where Ferguson (1999) writes on how the rise of modern infrastructures in Zambia as symbols of modern industrialization correlated with a change of subjectivities in the form "modernized" workers and urban lifestyles. Infrastructures were symbols of modern industrialization that gave way to "modernized" workers and urban lifestyles, who were then forced to adapt to de-industrialized environments during economic decline. Infrastructures thus represent the waxing and waning of modern forms of organizing and the correlating subjectivities associated with modernity. Or, consider Harvey and Knox' (2012: 24) *Roads*, wherein the authors describe the histories of two roads built in Peru and the "longings they express for modernity and progress," where even in the early stage of their construction the roads symbolized "new economic futures" and an improvement of the "social and economic fortunes of the towns [they] would connect," (2004: 43).

Also contributing to work on the relationship between infrastructure, the representation of state power, and modernity is Sneath's (2009) look at the Soviet-era electrification programs in Mongolia. Where electricity was a central symbol of the state's transition to modernity, Sneath (2009) attributes the political imagination caused by the electrification of the state to the "spectacle of light, the visible transformation of dark surroundings that it affords … [which] was ideally suited as a vehicle for the particular imaginative construct of modernity and progress as it was powerfully produced by the new revolutionary state of Mongolia," (2009: 75). In sum, the relationship between modernity, the representation of state power, and particular infrastructures often hinged on the way these infrastructures functioned as signifiers of the future and the aspirations and subjectivities of a society and its leaders.

The instrumentality of infrastructure for the exercise of power depends not only on its work as a signifier of power or even its material use as a circulator of people and matter as economies mature from extractive colonial economies to globalized neoliberal ones, but crucially, in that modern governance is distinctly, according to Foucault (2008), "biopolitical." Biopolitics refers to the style of government that regulates populations through "biopower," or the application and impact of political power onto human life and the body. It is "to ensure, sustain, and multiply life, to put this life in order," (Foucault 2008). Modern forms of governance that are characterized by the administration of life processes hinge on the development of articulate domestic infrastructures. In this sense, modern political power is encoded into infrastructure as

it functions as the system of channels through which life processes are often administered to populations.

Scholars have since taken up this intersection between the study of modern biopolitical governance and the study of infrastructure. For instance, Collier and Lakoff's (2014) investigation of "vital systems security" as a problem of biopolitical governance in the early 20th century explores the growing concern on mitigating risk to disasters that might befall critical infrastructure once "planners and policy-makers came to recognize that collective life had become dependent upon interlinked systems such as transportation, electricity, and water," (Collier and Lakoff 2014: 3). Another example is Collier's (2011) assessment of the style of biopolitical governance conducted in Soviet Russia through a study of Soviet electricity infrastructure and electricity provision, showing how electricity provision reveals a system of total technocratic planning in comparison to Western systems where electricity supply is driven by user demand. After the collapse of the Soviet Union, the orthodoxy that informed this approach to biopolitical governance required dismantling and society had to be re-conceptualized as organized around individual consumer demands. In this example, the Soviet "flavor" of modern biopolitical governance was pronounced through the structure of infrastructure, and shifted to accommodate for a restructured approach to biopolitical governance.

Furthermore, infrastructures as media of biopolitical governance represent a kind of Foucauldian "power-knowledge" relation, whereby power creates and reproduces its own fields of exercise through knowledge. The case of infrastructural design being understood as a specific means of organizing society and exercising biopolitical power becomes suspended as a kind of knowledge that can be extracted from its original context and applied elsewhere to administer similar forms of governance. This "infrastructural fetishism" according to Dalakoglou (2010), is evident in the import and export of infrastructure models in and around Europe. Dalakoglou looks at the case of Albania, where miles and miles of empty roads were constructed by the Italian Fascist regime in the 1920s as an international development project, even as the socialist regime in Albania disallowed the ownership of private cars until 1991. Dalakoglou's contribution is significant in that it shows quite clearly the fetishization of infrastructure itself as opposed to the recognition of its potential usefulness for society.

In all studies mentioned here on the intersection between biopolitics as a modern form of governance and infrastructure, the study of infrastructure deepens and complicates Foucault's original notion of biopolitics, a project I aim to contribute to in *Drone Infrastructures*. Because drones perform both biopolitical and necropolitical governance in select theaters, their infrastructures should be investigated as mediums through which modern power is administered. However, although the study of drone infrastructures would be the study of power in modernity because drones administer bio-and-necropolitical governance, drone infrastructures are notably different from

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examples of modern infrastructure in that they are not necessarily the ever present, fantastical display of state power that is distinctive of modern infrastructure. The formative narrative of the drone's power is that it is infrastructure-less, that it flies with no constraint of infrastructure.

This is because the drone's infrastructure is (arguably) physically minimal if infrastructure is understood as concrete and steel. Post-modern infrastructures are not only systems of physical hardware, but increasingly, digital infrastructures that are technically invisible. As early as 1996, Bowker identified the infrastructural elements of "information infrastructures" upon which modern digital infrastructures are built. Bowker argued that the International Classification of Diseases (ICD) which is used by states, insurance companies, and hospitals was a perfect example of an infrastructure:

> Indeed the ICD fits perfectly into Star and Ruhleder's definition of infrastructure. It is embedded (in a myriad databases), transparent (it acts as an invisible support to medical work), has very wide spatial reach (all countries in the world operate with a version of the ICD--though not always the same version!), is learned as part of membership in the medical profession, and is linked with conventions (Bowker 1996).

Bowker studied the history of this infrastructure, commenting specifically on the use of certain information infrastructures for modern forms of state governance. The ICD reflected statistical benchmarks which could enable governmental responses (or those of corporate insurance companies) in the realm of public health. Statistical analysis offers the first chance at the "virtualization" of the material world of people, and such databases that are based off of statistics should be thought of as almost

invisible infrastructures that, like physical infrastructures, enable flows of information, power, and techniques of governance.

Kitchin and Dodge (2011) offer the most developed articulation of contemporary "virtualization" of the material world in their work *Code/Space.* Among other things, the authors demonstrate how "code now conditions existence in the West—code is routinely embedded into everyday objects, infrastructures, and systems," (Kitchin and Dodge 2011: 260). These "coded infrastructures" show that infrastructures are now more dynamic than simple material understandings of infrastructure would suggest. In fact, "coded infrastructures create shifting, scaling networks linking together different actants located at distant sites or even on the move … an ATM may be physically located on Main Street, but it is connected in real time to a bank's server located several hundred miles away," (Kitchin and Dodge 2011: 77). While the authors' main argument is to show how software and code re-spatialize geographies in certain ways, they also demonstrate the dynamism of code-infused or code-based infrastructures as well as the prevalence of new, infrastructures that blend the material with the non-material, the virtual.

This is all to say that post-modern infrastructures are not wholly visible nor invisible, but are the dialectical relationship between the visual physical and the invisible virtual, a relationship which is instrumentalized to enact material realities and through which postmodern forms of governance, such as that which is administered via

drone, are administers. Aside from Kitchin and Dodge (2011), physical-virtual relationship is taken up by other scholars such as Amoore (2018), who explores the geography of the "cloud" in cloud computing. The cloud is the collection of digital infrastructures of computer networks, where the visualization of a "figurative cloud stands in for the complexity of the internet," (Amoore 2018: 5). On the one hand, the cloud exists as a collection of codes and digital, computer network infrastructures, while on the other hand, the cloud has a distinctly grounded presence. Thus, the "whereabouts of 'unseen computers' is not unknown at all, but rather the cloud is actualized in data centers, located in places with plentiful land, favorable tax rates, affordable energy, water for cooling, and proximity to the main trunks of the network," (Amoore 2018: 8). These scholars are invested not only in outlining the real existence of nonphysical infrastructures, but the dialectical relationship between physical and nonphysical infrastructures.

C. Infrastructure in this Thesis

The starting point of this investigation is that infrastructures are systems into which political power can be materialized. They enable the movement of matter and in doing so obscure the labor that enables them, they are emblematic of modernity and modern forms of political-economic organization. We are thus reminded of Star's (1999:380) contention that "[o]ne person's infrastructure is another's topic," or of Larkin's (2013: 329) contention that the discussion of infrastructure is always a "categorical act," — simply, that the critical project of studying infrastructure disrupts certain configurations

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of power while mobilizing others. "Given the ever-proliferating networks that can be mobilized to understand infrastructures," Larkin (2013: 329-330) writes, the study of infrastructure is

> a moment of tearing into those heterogeneous networks to define which aspect of which network is to be discussed and which parts will be ignored. It recognizes that infrastructures operate on differing levels simultaneously, generating multiple forms of address, and that any particular set of intellectual questions will have to select which of these levels to examine. Infrastructures are not, in any positivist sense, simply "out there." The act of defining an infrastructure is a categorizing moment. Taken thoughtfully, it comprises a cultural analytic that highlights the epistemological and political commitments involved in selecting what one sees as infrastructural (and thus causal) and what one leaves out.

The following chapter is an empirical investigation into drone infrastructures: what are they, how do they work, and what is the significance of studying them? Making visible the hidden units of infrastructure would be in itself a project with political potential, however, I am also interested in the other themes taken up in this section. Therefore, questions of the nature of modern biopolitical (and necropolitical) governance via infrastructure, as well as the phenomenon of infrastructural fetishism are paramount to the empirical exploration of infrastructure. Furthermore, the following study is attuned to new materialist approaches that understand infrastructure to be more than just systems of artifacts but systems that integrate the human and the non-human both as units of infrastructure. Finally, the study is not only interested in the relationship between the human and non-human, but the physical and the nonphysical or digital as well. All of these dimensions are present in the case of drone infrastructures.

To further this dissertation's principal question (what are the spatial pre-conditions of governance-via-drone?) *Drone Infrastructures* is chiefly concerned with infrastructures as enablers of things (drones) but, as a dedicated study of infrastructure in its own right, *Infrastructures* also pays attention to the way infrastructures are things in themselves. As things in themselves, this study asks: what is the political significance of drone infrastructures? Who is involved in their erection, what political decisions go into their construction, and as things in themselves, how are they copied and exported into new contexts to enact regimes of drone governance elsewhere?

While the proponent of drone use in governance might read the following chapters as an exposition of often hidden drone infrastructures, what will become apparent to those interested in the collective ownership of space and in checking government power are the many pre-conditions that allow drones to fly in the first place, and the many points in which populations can intervene so as to control the ground around them before drones can even take flight. *Drone Infrastructures* ultimately disrupts the major narrative that is formative of the drone's technology of power — that drones are independent from geographic constraint and can fly any time, anywhere — and that highlights critical points that people can intervene in the construction of the space that shapes how they will be governed. This final theme of resistance to infrastructure is taken up in the conclusion of this dissertation.

II. Infrastructures: Research Design and Methods

A. Theory as Method

As Star (1999) and many others argue, infrastructure is part of the background, and important contributions about infrastructure should aim to foreground that background and decenter its visible phenomena. This thesis contributes to that tradition of practice by unearthing the infrastructures that enact governance by drone. The main units of the drone's infrastructure are not self-evident, and I have only arrived at them after a few iterations of research and categorizing, and only by foregrounding theoretical commitments. Initially, it was unclear what to look for. While an endless number of "things" might be identified in helping produce the end result of drone governance, things as simple as the existence of factories that produce the metal sheets and silicon chips that go into drone and base-building, it was necessary to formulate a strategy for narrowing down the units of analysis.

Through the survey of numerous kinds of data — military reports and contracts, reports produced by drone companies, the webpages and press releases of drone companies, I arrived at a set of infrastructural units that enable drone use. The fact that multiple iterations of simultaneous data collection and data analysis were involved in this stage does not mean that this was a grounded theory methods (GTM) approach as popularized by Glaser and Strauss (1967). GTM is an inductive approach to social science aimed at theory generation through an intertwined process of data collection and analysis, as opposed to using data deductively to test a theory (Glaser and Strauss

1967). I did not approach raw data innocently, but always structured my research according to the broader theoretical frameworks of this dissertation. As such, this research remained cognizant of Larkin's (2013) reminder that discussing an infrastructure is always a categorical act. It is a moment of deciding which aspect of a set of networks will be discussed and which will be overlooked.

Starting from the political objective and theoretical commitments and moving backwards from there is what helped my narrow down the relevant units of infrastructure. The following anecdote offers the clearest example of the purpose of this method: During the Cold War, Allied Air Forces Central Europe (AAFCE) at Ramstein, West Germany, rejected the Warsaw Pact fuel system as a target because it "would take to many sorties to kill it," (Felker 1998). In the 1980s, however, Air Force Checkmate studied the fuel system again and recalculated the sorties needed to disrupt it from AAFCE's original several thousand estimate down to 150 sorties. The difference was in the way infrastructure was studied and the context into which it was situated. While AAFCE regarded fuel "as a single target set comprising far more numerous aim points than could be reasonably attacked," Checkmate restudied the fuel system as a *link* between Soviet military doctrine and the commander's operational scheme of maneuver to support a breakthrough on the northern plain of Germany (Felker 1998). In studying infrastructure as a system or process that could be exploited strategically as opposed to the sum of all of its artifacts, Checkmate was thus able to identify critical vulnerable army level fuel supply nodes.

Thus, the choice of which units of infrastructure to study were based on a few theoretical commitments. Therefore, the list of the drone's infrastructure is not exhaustive, but aware that it is reflective of this dissertation's themes. First, the theory that the infrastructure of the drone is a result of global political-economic processes, that economic actors (as opposed to just states) have a hand in the erection of drone space meant that I had to follow the money. I read through contracts between states and companies, treaties between states and other states, and units of infrastructure that may incur large profits for one party and large costs and liabilities for another party. This theoretical predisposition was greatly generative for my investigation into drone bases due to the politics that go into their construction, and how costs and liabilities are unevenly distributed onto the countries that have bases built on their soil by foreign actors like the US military or humanitarian drone delivery companies like Zipline.

Second, the theory that the visibilization of infrastructure lends itself to a politics of empowerment for those who endure drone governance as discussed in the *Theory and Literature* portion of *Infrastructures*, also structured my approach to distilling the units of the drone's infrastructure. This means that I have looked for units of infrastructure are "invisible," such as communications and digital infrastructures, as well of units that can be meaningfully scrutinized and contested by affected populations. As such, units like bases, the proprietary communications infrastructures that militaries buy to use in places where the population deals with low connectivity,

the digital infrastructures that are built using data extracted from populations, and the powerful actors, leaders, and visionaries emerge as important units of drone infrastructure.

Third, in line with the new materialist thought that is central to the theoretical framework of *Infrastructures*, this research focuses not only on the artifacts of the drone's infrastructure but crucially, the human agents that are equally formative of the drone's infrastructure. Drone infrastructures are not naturally occurring, nor are they traditional public infrastructures built by governments to administer goods and services — they are the result of intentional investments by states into the corporate actors that build them. The study of infrastructure in this way thus contributes to new materialist thought that studies the human and the non-human in integration. These human agents are both the populations upon whom drone governance is enacted, as well as the people that sit on the boards of drone companies. This is an interesting focal point if not only for the fact that it is often the same people that traffic in military and humanitarian spheres and enact drone use in both areas.

Finally, in that *Drone Infrastructures* is also about the inseparable development of biopolitical and necropolitical governance in modernity, I highlight parts of the drone's infrastructure that are transferrable across biopolitical and necropolitical realms consistent across military, humanitarian, and increasingly, urban settings. This demonstrates the theory that infrastructure itself is often a medium of distinctly *modern*

political power, and it is the infrastructure that is fetishized, copied or transformed, and embedded into new settings to exercise similar forms of power. It shows not only how drones are being transported across different realms of governance (from military to humanitarian) and different regions but how technical and informational infrastructures are likewise transported.

To summarize the research process, the first step of this research was finding and creating a database of military reports, contracts, treaties, press releases, news articles, drone advertisements, drone company webpages, and leaflets produced by drone companies. Next, the documents were categorized into three groups — documents that discuss the specifications of drone bases, documents that focus on communications and digital infrastructures (non-base related infrastructures), and lastly, any evidence in press releases and drone company webpages that document some of the big names in the military that have since crossed over to the humanitarian drone industry. The LinkedIn accounts of these actors also provided a major source of data. For almost every humanitarian delivery drone company, there were considerable links to the military through these actors. Data was compared to look for similarities in infrastructure, and then presented to show how these industries parallel.

III. Infrastructures: Discussion

A. Medicine and Military: Drones Traverse Boundaries

In his illustration of the relationship between the biopolitical administration of life processes and space, Foucault notes that

> Doctors were, along with the military, the first managers of collective space. But the military were chiefly concerned to think the space of 'campaigns' (and thus of 'passages') and that of fortresses, whereas the doctors were concerned to think the space of habitations and towns, (Foucault 1980: 151).

That is, while the military saw how governable space could be forcibly expanded and made through conquest and then fortified, the medical field was interested in how people in local spaces could be managed so as to deal with disease. These different preoccupations with space become fudged as both military and medicine are increasingly neoliberalized. Because of the expansionist tendencies of neoliberal capitalism, consistently in search of new markets and areas for growth across the globe, the neoliberalization and privatization of public health has transformed how space is understood. While doctors were once concerned to think of space in terms of habitations and towns, the medical view of space now more closely resembles the military view of space – space can be conquered through the "passages" to new markets and fortified to enhance the survivability of those markets. For drone companies that offer health delivery services, their campaigns include integrating themselves into the public health systems of developing countries, persuade governments to permanently

reallocate public health funds to their operation, and their fortresses are the drone-accommodative infrastructures that create permanence for the companies.

The more militaristic "conquest-and-fortifications" approach to space is only partly due to the neoliberalization of public health. On the other hand, it is part of the culmination of the long and intricate historical interdevelopment of the realms of military and medicine. Medicine has long functioned as an important interface between the military and civilian spheres: medical inspections regulated the intake of recruits into the army, pioneers of "tropical medicine" justified their missions in the name of the military or security interests of the crown (Seth 2018). Military campaigns inspired rigorous medical knowledge in the name of the health of armies; the study of races and environments abroad constituted at once the study and practice of international security (Vitalis 2015). Contemporary humanitarianism aimed at the Third World, argues Asad (2020), invokes a longer history of military "civilizing" missions. It is thanks to this centuries-long dance between military and medicine that metaphors of war abound in popular discourses of medicine and disease. It is demonstrative of the ethos of medicine that struggles in the realm of global health are portrayed in plainly militaristic terms, where phrases like "victory with vaccines," and "battle against malaria" reveal the instinctive connection that has been forged between the two realms in modern times. This theme was illustrated by the discursive response of many national governments to the Covid-19 pandemic: the virus is a "threat" that we are "fighting," while doctors, nurses, and essential workers are "on the front lines." On the other side,

the medical metaphors that abound in military discourse, such as the infamous "surgical strike," can also be situated within this historical exchange (See Packard 2020 on the historical exchanges between military and medicine).

It is due to this historical lineage of linkages that the revolving door between the two industries, meaning the exchange of techniques, knowledge, and personnel should come as no surprise. Thus in June of 2019, Zipline, an otherwise strictly *humanitarian* drone delivery company that delivers health goods and services made an all too predictable move: it launched a "logistics field integration test" to demonstrate its ability to "ship, install, test, and operate its system in a full field test integration with [military] forces," (Zipline 2019: 3). In true military flare, the project's name consisted of an acronym nested within an acronym: it was called the Distributed OCONUS (Outside the Contiguous United States) Logistics Field Integration Test, or DOLFIT. Working in collaboration with American and Australian military forces, the DOLFIT was designed to, among other things, demonstrate Zipline's ability to integrate into military operations, incorporate delivery site locations into an active battlespace, and deploy a distribution center in austere environments and into the Command and Control structure of the military. The project aimed to show how Zipline, a drone delivery company whose branding initially was geared toward the promise of delivering health goods to remote regions for governments, could shift its focus in service of military operations. Zipline demonstrated this capacity through a seamless integration into

existing infrastructures along with a speedy an installation of all other necessary infrastructure to make drone deployments.

Prior to this, Zipline had already cleared space for itself by establishing a market in Rwanda and Ghana as a health goods drone delivery service, and fortified its position there by integrating itself into the public health system, persuading these countries to permanently reallocate public health funds to its operation, and establishing infrastructures that give it permanence. As one cognizant of Foucault's observation of the spatial parallel between health and military spheres would tell you, its stint with the military was an unsurprising move. Infrastructures are transferred not only between places in modernity (as discussed in the Theory and Literature section of *Infrastructures*) but between *realms* of governance as well. In this case, Zipline transferred its drone delivery infrastructure from the humanitarian health sphere to the military sphere. While this move was unsurprising, its directionality was slightly atypical: the practice of drone use in governance and its accommodative infrastructures began with the military before it made the move from military to civilian settings, taking with it operative logics, information technologies, and infrastructures (Sandvick and Lohne 2014).

This exploration into drone infrastructure proceeds in three subsections that correlate to different units of infrastructure. The units of drone infrastructure studied have been limited to drone bases, communications and digital infrastructures, and

people. For each subsection, I consider military drone infrastructures first before exploring their humanitarian drone counterpart. Although most units of the humanitarian drone infrastructures tend to mirror or parallel military drone infrastructures, the last section on people demonstrates less their parallel and more their degree of intersection, that is, the revolving door between these two industries, or the fact that many former military men serve on the boards of humanitarian drone companies.

B. Bases

Three propositions emerge out of the exploration of the different base assemblages of the US military and a selection of humanitarian drone companies. First, it appears that contrary to the aspirations of the drone industry, the space and cost related footprint of drone operations is larger than the industry might boast. Because of the limitations of drones and how they operate, drone bases must be widely proliferated — a presence which diminishes the illusion that drones require a light footprint in their area of operation. Next, while drones, drone companies, and drone users need drone bases, the countries in which they are stationed may not need them: on the contrary, the bases are often political and economic liabilities for the countries where they are stationed. This is true for both military bases as well as the facilities from which humanitarian delivery drones are operated — as structures which are owned by one actor but established in space that belongs to another, distributed drone bases raise questions about ownership and liability. Finally, a base is never just a base: the study of drone bases reveals the

way that drone bases are geopolitical and geoeconomic pawns for the actors that use them.

i. Military

"In Africa, I would say a light footprint is consistent with what we need and consistent with the defense guidance," said Army General Carter F. Ham to the House Armed Services Committee in February of 2012 (AFRICOM 2012). Ham recognized concerns among some African countries about an increased US presence on the continent but emphasized that cost alone would preclude the US from establishing more permanent bases there. This image of light footprint represents a stark contrast to the US military base structure's reality: covering over 26.9 million acres, the US Department of Defense owns over 585,000 facilities located on 5,775 sites worldwide (DoD 2018). These installations are scattered across all 50 states in the US, 8 US territories, and 45 countries.

The financial value of all of these facilities was reported by the Department in Defense in 2018 to be worth $1.173 trillion — a figure that only encompasses the publicly recognized bases (DoD Base Structure Report 2018). The number of hidden military facilities is unknown, but the United States "likely has more bases in foreign lands than any other people, nation, or empire in history," (Vine 2015). Bases are positioned all across the US, Europe, the African continent, and all the way up to the Chinese border. Often referred to as "lily pads" by some scholars, these bases make up

a military strategy "meant to encircle and nail down control of [a] vast set of interlocking regions — the thought being that, if the occasion arises, the American frogs can leap agilely from one prepositioned pad to another, knocking off the flies as they go," (Englehardt 2010: 40). This is indicative of the new ethos of the US military's drone-base proliferation strategy: "small" and widely scattered.

Despite plans to draw down this presence, during the Trump administration, US Africa Command (AFRICOM) went on to draw up long term 20-year plans to enhance its drone ISR (intelligence, surveillance, and reconnaissance) and warfare capability. This plan is still supported by the newly appointed Africa policy advisors under Biden's administration (Pangea-Risk 2021). In a report to Congress by General Stephen J. Townsend, US Army Commander of AFRICOM, the General insisted that "funds to support contracted ISR capabilities" which include drone operations, were "cheap insurance and an ounce of prevention for America," (Townsend 2021: 7).

The most visible manifestation of the military or humanitarian delivery drone, besides the drone itself, is its base (or multiple bases). The drone base assemblage is what distinguishes military and humanitarian delivery drones from drones purchased and bought by consumers for recreational uses, which typically have no base. Thus, for these drones to fly, any vision of a "small footprint" in Africa is looking less likely. The proliferation of bases is owed to the diverse roles different drone bases perform. Military drones typically require two kinds of bases which make up a kind of "hub and

spoke" model, and any base can fulfill only one or both functions: 1) a headquarters or control center and 2) a physical launch base, where drones are launched, recovered, and maintained. Headquarters are typically far removed from the action on domestic (US) or friendly territory, while launch bases are scattered globally. This hub and spoke model does not include the massive base infrastructure in the US dedicated to drone operations training. Training bases include Randolph Air Force Base in Texas and Kirtland Air Force Base in New Mexico, not to mention Fort Huachuca in Arizona which is home to "the world's largest UAV training center," (Sunseri 2010).

The two most prolific hubs or control stations that are relevant to the drone wars are the Creech Air Force Base, located just outside of Las Vegas, and the Ramstein Air Base in Germany. "Pilots" at Creech send their commands to the drones they operate via transatlantic fiber optic cables to Ramstein Germany, where the signal is uplinked to a satellite that connects to drones that fly out of deployment bases in Afghanistan, Cameroon, Djibouti, Guam, Jordan, Italy, and many other countries. This connection to Ramstein is crucial: without it, there would be too much lag time between pilot commands and the drone's action, making swift maneuvers and real time video capture impossible. The drone's "surgical precision" thus depends on these installations. Furthermore, launching drone strikes from Ramstein has helped the US evade liability when it comes to international law.

Figure 3.1. Creech – Ramstein Connection. Source: The Intercept. (Scahil 2015).

Abroad, units called the "launch recovery element" are stationed at "spoke" drone bases in different countries. These are trained personnel who control the drones during take-off and landing, they load munitions, and administer routine maintenance for the drones. Actual deployments and maintenance typically do not occur from US-based bases, but because drone maintenance must be conducted where the drone is based rather than where it is controlled, from bases located closer to the action abroad. Drone maintenance is a personnel-intensive activity, and more than half of the personnel in a typical combat line for both the Predator and the Reaper drones are maintainers (Harrison 2021). Thus, while Creech and Ramstein get the most media attention, and even have their own drones on site, these installations are only the tip of the iceberg. Because of the decentralized nature of drone warfare, whereby operators and launchers of drones work from different bases, the US has drone bases stationed in upwards of

110 sites domestically and an estimated sixty semi-permanent drone bases abroad, and an unidentified number of "pop-up" bases.

For both military and humanitarian governance purposes, bases are necessary due to the limitations of even the most capable drones. Even with thousands of drones in flight, they are only able to cover a fraction of the globe for the purpose they are intended. Even the most advanced drones have limited loitering capabilities, need to be recharged and maintained, and are only able to fly limited distances. Time lost over distance travelled is a pressing concern for military drones — during the 2012 Benghazi attacks, the two-hour delay caused by having to bring drones in from a base in northern Italy meant that the drone strikes were too late. The delay was just enough time to allow rebel groups to kill US ambassador Chris Stevens (Kharief 2016). In a hearing by the House Committee on Foreign Affairs following the Benghazi attack, foreign policy expert Daniel L. Byman testified that resilience against future attacks must include hedging partnerships with nearby states, and "trying to find alternative solutions to dependence on Algeria for key security issues, such as bases for US drones," (Byman 2013). Since then, a large number of AFRICOM bases all across the African continent have continuously popped up (Figure 3.2). Many drones are based in airfields in host countries that are quietly expanded and modernized by American engineers.
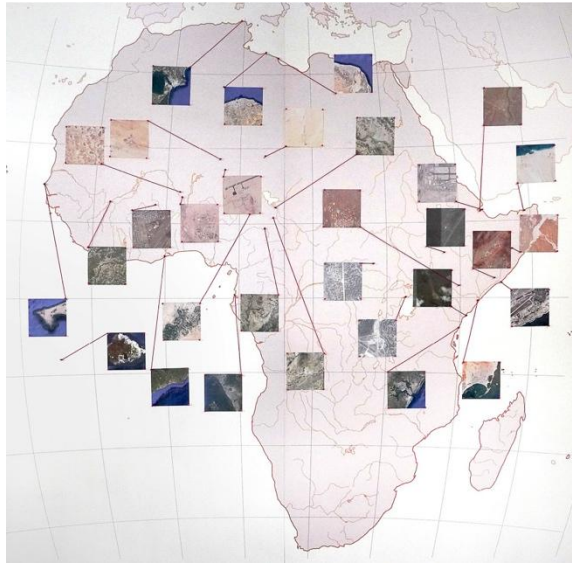
Figure 3.2. Some of Africa's known permanent and semi-permanent military bases on the African Continent as of 2019. (Tricontinental Institute for Social Research and The Socialist Movement of Ghana's Research Group 2021).

Therefore, in 2021, the US military's "light" footprint in Africa was sprawled across the continent, consisting of 27 bases mostly concentrated in East Africa and the Horn, West Africa, and the Sahel regions (Pangea-Risk 2021). Fifteen of these are "enduring locations" while twelve others represent less-permanent "contingency locations." These numbers are likely to increase as AFRICOM is actively pursuing plans to increase its presence on the continent. It is also worth noting that AFRICOM uses space at "host national facilities," and while these are not listed on AFRICOM's maps, they necessarily widen the scope of base like structures.

Besides the sheer number of bases, the base footprint is increased when one considers just what it takes to establish and run some of the larger bases. The drone base construction and servicing industries, that is, the industries that go into drone base-building dwarf the measly $9 billion drone industry itself. It is difficult to estimate the dollar value of that industry because defense contractors do more than just build and service drone bases, but offer a wide variety of other services. However, the size of this industry is nonetheless bound to be a huge number if just *one* drone base contracted to be built and serviced in Agadez, Niger will cost the US Department of Defense more than $280 million by 2024 (Turse 2018). According to reports submitted by the Air Force to Congress, the Air Base 201 in Agadez calls for paving more than 17 acres of desert to create the drone runway, taxiways, and aircraft parking areas (Turse 2018). Furthermore, as shown by photographs and videos released by the military, the base is equipped all the things to make it a home away from home: an in-house cafe, recreational rooms with large screen TV sets, a state-of-the-art gym, and more (Turse 2018). Bases are climate controlled, and companies have been contracted to install major water, electrical, and sewage lines between the base and the main city (Turse 2018). The Pentagon reported that the sustainment cost to keep the base running was estimated at $30 million a year, in addition to the initial overhead costs. In 2015, Air Base 201's classification was changed from a temporary "contingency location" to a "cooperative security location," meaning that the base will endure for at least a decade.

While projects that cost over a certain threshold go through more congressional scrutiny for approval, a 2020 report by the DoD's Inspector General shows that the Air Force bypassed congressional approval for the bill when it split the construction requirement into six different projects (DoD Inspector General 2020). Because it lacked congressional scrutiny, this project has been subject to abysmal oversight as well-funded contractors constructed much of the infrastructure in ways that failed to meet the military's antiterrorism standards, resulting in what has been called the "botched" base project (Rempfer 2020).

If the first tendency of drone bases is that they require a heavier footprint than is commonly reported, the second is that while drones need bases, the countries that bases are in may not need them. While Americans foot the (underreported) bill, it is Niger that will endure the arguably higher costs. Many Nigeriens worry that the base is a "magnet for the terrorists," (Raghavan and Whitlock 2017). After all, terrorists are "looking for Westerners," said one worried tribal elder in Agadez (Raghavan and Whitlock 2017). The fears of the locals were ultimately realized after an ambush by militants against American and Nigerien soldiers in the area left four Americans and five Nigeriens dead (Meek 2018). Even as the base exposes Niger to a host of potential security issues, the US and its contractors are safe from liability. The Defense Status of Forces treaty between the US and Niger notes that the

> Parties waive any and all claims (other than contractual claims) against each other for damage to, loss, or destruction of the other's property or injury or death to personnel of either Party's armed forces or their civilian personnel

arising out of the performance of their official duties in connection with activities under this Agreement, (Niger SOFA 2013: 9).

Other privileges, exemptions and immunities also include the allowance US personnel to enter and exit the Republic of Niger with US identification only, which Niger "shall accept as valid all professional licenses issued by the US … [and] shall accept as valid, without driving test or fee, driving licenses issued" by the US and that US personnel be authorized to wear uniforms and carry arms in the country (Niger SOFA 2013: 4). Furthermore, both DoD as well as regular personnel "shall not be liable to pay any tax or similar charge" and they may have the discretion to "import into, export out of" Niger (Niger SOFA 2013: 5). Vehicles and personnel may "enter, exit, and move freely within the territory … and shall not be subject to the payment of overland transit tolls," (Niger SOFA 2013: 3). The US also has the freedom to "contract for any material, supplies, equipment, and services … without restriction as to choice of contractor," (Niger SOFA 2013: 4). All contracts shall be solicited and administered in accordance with US, and not Nigerien, law. These US chosen contractors are not liable to pay Nigerien taxes either.

The laundry list of privileges and exemptions the treaty secures for the US and its contractors contrasts starkly with the list of liabilities and disadvantages incurred by Niger. While the base is technically property of the Nigerien military, even as it is built, funded, and used by Americans, the base is unlikely to improve the local region much. The construction of this particular drone base was contracted out to multiple US and foreign based companies, and only a fraction of contracts went to Nigerien companies.

Despite the total cost for construction and operating costs, very little will go into improving the local economy. The *Intercept* reported that Nigerien cafeteria employees working for contractors can make wages as low as $1.20 per hour, working 12-hour days and getting a day off every two weeks (Penney 2018). Most food on the base is shipped from abroad. It is also worth mentioning that the base is constructed on land formerly used by Tuareg cattle-herders (Penney 2018).

Furthermore, not only has the US military attempted to bypass congressional scrutiny at home, but it has also participated with the Nigerien government to bypass Nigerien constitutional law. Article 169 under Title X of the constitution which deals with treaties and international agreements stipulates that "The treaties of defense and peace … those which modify the internal laws of the State and those which involve … a financial engagement from the State, may only be ratified following a law authorizing their ratification," (Niger Constitution, X.169). The defense agreement potentially also undermines Article 147 under Title VII which stipulates that "the companies operating in Niger are required to employ, as a priority, Nigerien personnel," (Niger Constitution VII. 147).

The base in Niger is but one example of the lopsided power arrangement between the US and the countries in which it builds its bases, which brings us to the third tendency of these bases. A base is never just a base, but a geopolitical and geoeconomic pawn that projects US power globally. In an agreement between the US and Ghana, it

states that Ghana shall surrender "unimpeded access to and use of Agreed facilities and areas to United States forces, United States contractors," (Ghana SOFA 2018: Art.5). In yet another Status of Forces Agreement between the US and Senegal it stipulates that while all "existing buildings, non-relocatable structures, and assemblies affixed to the land … remain the property of Senegal," (Senegal SOFA 2016: Art.6.1) the US retains the right to "control access to agreed facilities," as well as have exclusive control over the "use of prepositioned material and shall have the right to remove such items from the territory of Senegal," (Senegal SOFA 2016: Art.5.4). In most Status of Forces Agreements, with the exception of Djibouti where the US promises that it will award contracts to Djiboutian contractors "to the maximum extent possible," (Djibouti SOFA 2003: 8.2) the US retains the right to choose its own contractors and contract out in accordance with US laws.

Thus, not only does the US expand its geopolitical power through what Johnson (2004: 23) argues is "not an empire of colonies but an empire of bases," but it also extends its geoeconomic power through the protective stipulations it affords to its contractors. The extension of these bases is on the one hand, a manifestation of the way the military thinks of space in terms of "campaigns … and of fortresses" but also, the way the military has increasingly been thinking of space in the way doctors do, "the space of habitations and towns," (Foucault 1980: 151). As the US and its contractors extend their geopolitical and geoeconomic power into these countries, it forges alignment between US and African states and militaries, facilitating flows of

knowledge, weaponry, and ideologies. In the words of US Ambassador to Niger Eric Whitaker, it's in the best interest of the US to "help a willing partner such as Niger to fight them here, rather for us to be forced to fight them closer to the homeland," (Cerre 2019). The military is performing activities that are "intended to 'shape the battlespace,' prevent and deter future conflict and disrupt or destroy the capabilities of potential adversaries, whoever—and wherever—they may be," (Brooks 2016). To do this, they establish permanent presence with their bases, and they reshape domestic Nigerien security governance.

ii. Humanitarian

The bases of humanitarian delivery drone companies feature some of the same patterns as the bases of military drone operations. Their footprint is heavier than they boast, they incur certain liabilities for the countries they are located in, and their proliferation represents the geoeconomic activities of companies who are trying to shape the environment to ensure the continued need of drones and thus the projection of the company's interests.

First, humanitarian delivery drone companies also boast of the "light footprint" quality of their base structures. Zipline, which calls its bases "nests" in the context of the biomedical delivery industry or "hubs" in its recent experimentation with the military (Zipline Patent 2021), has an apparently minimal base infrastructure which consists of the "launcher, the recovery mechanism, along with a building/facility to

recharge, pack, and prepare the UAs," (FAA 2022: 12). The Zipline system is meant to be rapidly deployable and consists only of "two key components - a base station, or Hub, and drones, or Zips," (Zipline 2014: 2). Each Hub is headed by a distribution center management system which comprises everything needed for drones to fly: a mission manager, a sensor station, a communications station, a logistics system, a skymap database, a terrain map database, and an interface handler (Zipline Patent 2021). Zipline's lean infrastructural base is supposedly owed to the sophisticated programming of the drones, whereby the "vehicles make their own decisions, monitor their own health, successfully complete missions and return," according to Zipline's CEO Keller Rinaudo (2017).

Matternet, another drone delivery company that delivers medical supplies in several countries also boasts of the lean infrastructure of its "Stations," which are two large three-meter-tall pods that sit on either end of their drone delivery chain. Stations are described as an "elegantly designed architectural structure" with a "small footprint and precision landing system," (Matternet 2021: 1). Matternet CEO Andreas Raptopoulos states that the "station is critical for unlocking scalable drone delivery at attractive unit economics … mak[ing] Matternet's drone-as-a-service platform even more valuable to customers in healthcare and beyond," (Matternet 2021: 1). For Matternet, the relatively small footprint receptacle Stations charge and monitor the drone's health in between missions. The entire system is meant to operate autonomously on proprietary software,

whereby a cloud software handles customer requests, generates flight routes, and commands all the operating drones.

Figure 3.3. Matternet Station. Source: Matternet.

While the humanitarian drone base infrastructure might be less invasive than its military counterpart, the base infrastructure is far more complex and expensive than reported in these advertisements and press releases. As much as some companies would like to present their drone delivery system as almost fully automated, a collection of spokes with no hubs, there are behind-the-scenes control centers that help operate or supervise the flights of drones. When asked about how autonomously their operations really run, Keller Rinaudo of Zipline admitted that there always is someone "in the loop in the sense that we have an air traffic controller that is in communication with the vehicles at all times and can issue high level commands to different vehicles in the fleet if necessary," (Rinaudo 2017). This person is not always stationed at the relevant Hub, but might be someone far away from the action. A patent filed by Zipline shows that the unmanned aerial system of Zipline's drones "comprises a distribution center, a

UAV, and global services," (Zipline Patent 2021). The global services component is comprised of a global service operator that oversees multiple distribution centers. While humanitarian drone companies like to boast that they employ the host country's local labor force, oftentimes the most important decisions made do not come from the locally employed work force. This skews the fair distribution of material benefit that Zipline creates for the host company, especially since the humanitarian company boasts a $2.75 billion valuation and a CEO with a net worth estimated around $5 million (earning Rinaudo a spot on Forbes' 30 under 30). Just as most military headquarter bases are located in the US and far from the action, the global service operators are not often based in Africa, but work out of San Francisco as the company's Careers webpage shows.
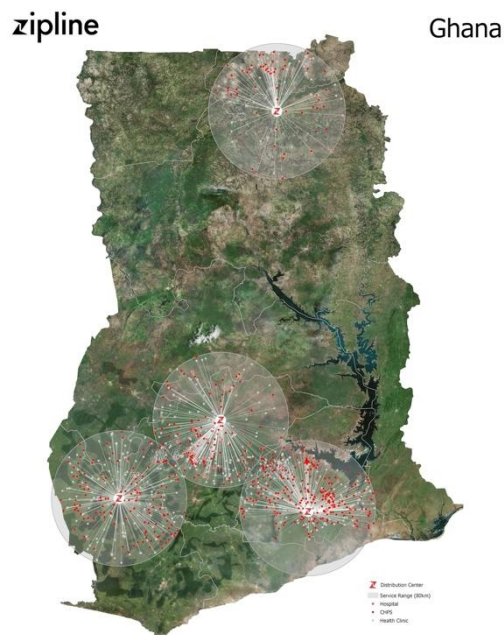
Figure 3.4. Zipline Distribution Centers in Ghana. Source: Zipline.

Furthermore, these drones are often less capable than military drones, thus requiring more bases. When asked about how many hubs would be needed to scale Zipline in the US, which has about 6,000 hospitals, Rinaudo estimated that with "about 20 distribution centers you could cover 70 to 80 percent of the US population," (Rinaudo 2017). This is a questionable estimate since Zipline's drones can only travel about 80km, and the US is about 41 times the size of Ghana, a country which already has four distribution centers that don't even begin to cover the country's whole geographic range (Figure 3.4).

Moreover, because these drones typically distribute goods and services, the entire logistical network that services these distribution centers must be considered as part of their infrastructure. Even as companies like Swoop Aero boast that they "provide the complete infrastructure to deploy drone operations at scale," that this infrastructure has absolutely "no external dependencies," and that the companies themselves "have full control of the … stack," (Peck 2022) the reality is far more complex. Bases are necessarily serviced by partnerships drone companies establish with health organizations, retailers, and other businesses to deliver medical goods. The addition of a few extra control centers might not make the footprint so scandalous, but noting the partnerships, contracts, and logistical networks that allow for these bases to be operative and hold medicines might.

In the case of humanitarian delivery drones, the reality is again that while drones need bases, the countries may not — in fact, those bases often amount to a liability. Just as the US military has to undermine the laws and processes of parliamentary approval of the countries it operates its bases in, humanitarian drone companies are likewise guilty of skirting around local laws. The government of Ghana was sued by parliament members for giving Zipline the extensive contract without releasing a tender for bid, which was the normal approved process for public procurement in Ghana.

Despite the lawsuit, the agreement between Ghana and Zipline stood, and to Zipline's benefit. For instance, the agreement between Zipline and Ghana shows that the government is to either pay all import duties and taxes incurred in Zipline's setup and operations, or to reimburse Zipline for any payments made. It must also look for land for Zipline to set up its distribution centers in Ghana. Ghana must also hand over its national database of medical information to Zipline, free of charge. Zipline is allowed, by the terms of the agreement, to use this data as it sees fit, and to share it to a third party if it wills. In another example of the lopsided power between company and country, as part of the agreement between the government of Ghana and Zipline, Zipline is the *sole* distributor of Covid-19 vaccines across the entire Western North Region. In a country where at present, only 27.3% of the population has been vaccinated against Covid-19, it shows how such agreements are not only lop-sided but possibly harmful to the population.

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Because drone bases in this instance double as distribution centers, critics have raised questions regarding their redundancy. Ghanaian procurement expert Kobina Ata-Bedu questioned the need for Zipline to build distribution centers from which to operate its drones. Ata-Bedu asks in a detailed analysis of the government's deal with Zipline, "It has been specified that these products will be held in new distribution centers to be built by Zipline. What happened to the existing cold chain systems? Why produce parallel cold chain systems? Each region has a medical store. Do these not have cold rooms?" (Ata-Bedu 2018: 8). The question that many critics pose is why the government has allowed Zipline to establish distribution centers to supply hospitals and clinics as opposed to integrate the clinics themselves into the supply chain.

Questions around liability and ownership are further raised by the structure of the agreement between Ghana and Zipline, which is a "Build-Own-Operate-and-Maintain" one — Ghana is essentially renting delivery drones and storage from Zipline for a number of years, at the end of which Zipline can choose to dismantle its distribution centers, pack up its drones, and leave with its software and machines. This is as opposed to a road delivery structure or a commitment to stock up the clinics, which would be owned by Ghana and Ghanaians, and would have other beneficial effects for society beyond just healthcare delivery. According to the World Economic Forum, both the governments of Rwanda and Ghana have allocated a permanent budget for Zipline's

monthly operation which comes out of their ministry of health funds by "eliminating other … costs in their health systems," (WEF 2021: 10).

Zipline has been able to use its "success" in those countries to secure similar state-level budgetary approval in Nigeria by claiming operational profitability in Ghana (WEF 2021). Thus, while the Ghanaian and Rwandan health systems foot the bill, Zipline reaps a much greater reward — it is not only "profitable," but it demonstrates its proof of concept, enabling it to expand even further into more markets and countries. Positive proof of concept can often trump the problems associated with costs; that is, even if drones are more expensive than traditional logistical solutions, the drone companies continue to score contracts. Officials from UNICEF's Office of Innovation and Ventures reported that while "it's still more expensive to use a drone in Malawi than it is to pay somebody to take supplies on a motorbike," in Malawi the regulatory environment is more permissive, opening the door up to the possibility of integrating drones into the humanitarian supply chain structure (Regen 2016).

The ultimate objective for humanitarian drone delivery companies is to "enable a leapfrog," according to Matternet's CEO, "similar to what we saw happening with mobile phones," (Krause 2017). For Raptopoulos and other humanitarian delivery drone companies, the idea is to "develop a technology that is robust and affordable enough for it to be adopted by organizations like Doctors Without Borders and beyond that, local businesses who will be able to build services on top of this technology

platform," (Kraus 2017). The objective is to reach a "true 'set and forget' state," whereby the drone companies see themselves as integral parts of the country's infrastructure, and crucially, where drone companies eventually *foreclose* the development of other logistical infrastructures. The construction of drone bases and drone infrastructures in these countries signals not a competition in logistics but a monopolization of logistics, a scheme to obviate other forms of infrastructure. These companies can penetrate the logistical infrastructures of not only health but almost any industry that relies on a supply chain.

There is no geoeconomic leverage in connecting the "billion people who have no access to all-season roads," (Raptopoulos 2013) through initiatives to construct these roads, which according to Matternet's CEO would take an estimated 50 years and billions of dollars to build. There is, however, a geoeconomic benefit for Matternet in having "one billion people connected to physical goods in the same way mobile telecommunication connected them to information," (Raptopoulos 2013). In this way, humanitarian delivery drone companies are not trying to reshape space in ways meaningfully beneficial for disconnected populations, but to bring products delivered by drone to them, leaving them sequestered in remoteness. It is only by their continued remoteness do these companies continue to serve any real purpose.

C. Communications and Digital Infrastructures

As remotely controlled aerial technologies, drones need not only bases to operate from, but also certain communications and digital infrastructures. According to one retired Navy captain and professor at the Naval War College, "it's only because of communications technology that we are able to have the airplane itself in the theatre of operations and the operator back in the United States, like in Creech Air Force Base. This is possible because of undersea cables and satellite communications," (Chen 2018).

These communications infrastructures include hardware components as well as software components, or infrastructure's "digital twin," as aptly named by humanitarian drone delivery company Swoop Aero. The hardware components that create connectivity and the basis for a digital infrastructure are in the form of fiber optic cables, satellites, communication towers, and crucially, sensors. Sensors that are fitted onto drones are the interface between the physical hardware and the digital software – they enable drones to collect, see, hear, and collect all the data necessary to construct a robust digital twin. The software components are the collections of code, digital mappings of space, cloud platforms, and digital applications that codify, map and analyze space as well as act as the digital medium of communication between drones and operators.

The last crucial piece of the digital infrastructure is not easily categorized as hardware or software. The drone's digital infrastructure and its operative logic is informed by large swaths of data – data collected from *people.* The drone's data economy requires the existence of *people* as crucial nodes and data points. People who use cell phones whose SIM cards give drone operators their coordinates, and people whose data is mined in order to facilitate greater optimization and automation for both military and humanitarian drones, are central units of this part of the drone's infrastructure. Drones leverage existing and collect new data from people; digital infrastructures analyze and operationalize the data which is then used to enhance drone operations and increase the people's governability. In this sense, drone governance imagines biopower and bodies not simply as "bio" or "bare life" but rather also what Grewal (2017) called technologized bodies or cyborgs, units that are central units of the drones infrastructure and enact its operation. This provokes questions about the future meanings of resistance against drone governance – resistance against drone space must take into account that people are crucial nodes of that space.

In all, three dimensions of communications and digital infrastructures are surveyed here: 1) third-party connectivity network hardware, 2) maps, apps, and sensors that link the hardware and software together, 3) and people, whose data is the subject of the linkage between the former two. For each of these dimensions, I look at military assemblages and compare them with those of humanitarian delivery drones. As usual, these two spheres are parallel in many ways.

i. Military

Besides the proliferation of scattered military bases, another sign of the US military's expanding operations in Africa is the $25 million project to bring secure fiber-speed communications to its remote outposts there. So long as drones can "see" one of the satellites which the US military has invested heavily in, they are operable from almost anywhere. In 2018, AFRICOM bought access to SES Government Solutions' O3b Constellation, a network of satellites that provide fast connectivity. The multi-year award went largely under the radar, as have other commands' contracts for O3b satellite service (Houck 2018). Pete Hoene, President and CEO of SES Government Solutions said that SES was "proud to support US AFRICOM not only with an entire O3b MEO beam, but also with a tailored, fully managed end-to-end service" and that this was the "fourth time that a US government customary has purchased an entire O3b MEO beam" from the company (SES 2018).

Ironically, O3b originally stood for "other three billion," or the other three billion people that were on the other side of the digital divide with little access to connectivity infrastructures. Instead of living up to its name, SES sold complete access to 4 of its 16 O3b MEO satellites to the US government. According to its map of network coverage as of 2022, none of its O3b MEO satellites currently service the African continent. This means that where fiber optic cables are scant and populations rely on satellites for connectivity, the US has not necessarily increased connectivity as a residual effect of

its being in Africa but instead seems to have bought proprietary licenses to it. The US is perfectly within its right to do so: as part of many Status of Forces Agreements between the US and the African countries it operates in, the US retains the right to "operate its own telecommunication system," meaning that it does not need to share its access to connectivity technologies (Niger SOFA Art 14; Senegal SOFA Art. 14; Djibouti SOFA Art 14.2; Ghana SOFA Art. 14).

Better satellite connectivity is necessary to handle the significant increase in data and complexity of the software that operations rely on. The software and digital applications that pilots use to operate drones is increasingly complex, especially since a shift in the industry dating back to 2008 when defense company Raytheon launched a battle to open up the Pentagon's UAV interface. While unmanned vehicle purchases were traditionally "end-to-end," meaning that the Air Force would buy the drone, the sensors, the ground station and operating software as a single package, in 2008 defense industry giant Raytheon made an unsolicited bid to sell the Pentagon a new, open-platform version of the standard software and ground control station used to operate drones. Raytheon wanted drones made by different manufacturers to be operable from its basic ground control station and open-architecture software. This would offer an alternative to the existing situation which consisted of drones supplied by different manufacturers, built around proprietary ground systems/base structures, with unique training requirements, unique digital applications, none of which were interoperable between platforms.

Raytheon pitched its common ground control system (CGCS) as an economical solution for controlling drones made by different manufacturers. Mark Bigham, Raytheon's Vice President for Defense and Civil Mission Solutions argued that the "government is being held in handcuffs" current proprietary, closed system in which different manufacturers build proprietary ground systems (Carey 2011). "Now that we're entering this era of extreme economic pressure" said Bigham, the military needs to consider a consolidated, open interface ground system which would "significantly reduce cost and enhance capability," (Carey 2011). The beauty of this model, according to Bob Busey, director of unmanned vehicle control systems at Raytheon, is that it can "integrate third-party packages for things like mission management, mission planning, maps and graphic user interfaces," (Blinde 2019).

The Department of Defense took the proposal seriously as during this time, it had already begun shifting its business model when it came to drones. The DoD's newest procurement policy guide, known as "Better Buying Power" was endorsing a model which called for an open-architecture for their unmanned air control platforms to integrate into, a model that would cut costs by opening up the competitive landscape. Because every unmanned aircraft's control station has similar software needs (weather app, blue-force tracker, target specification, weapons release, and situational awareness), the idea was to standardize the format of these applications and allow application developers to sell their software to the military and be easily integrated into

an open-architecture software infrastructure. Figure 3.5 shows the collection of applications assembled onto one iOS-looking interface, all made by different developers who compete for their app to be featured.
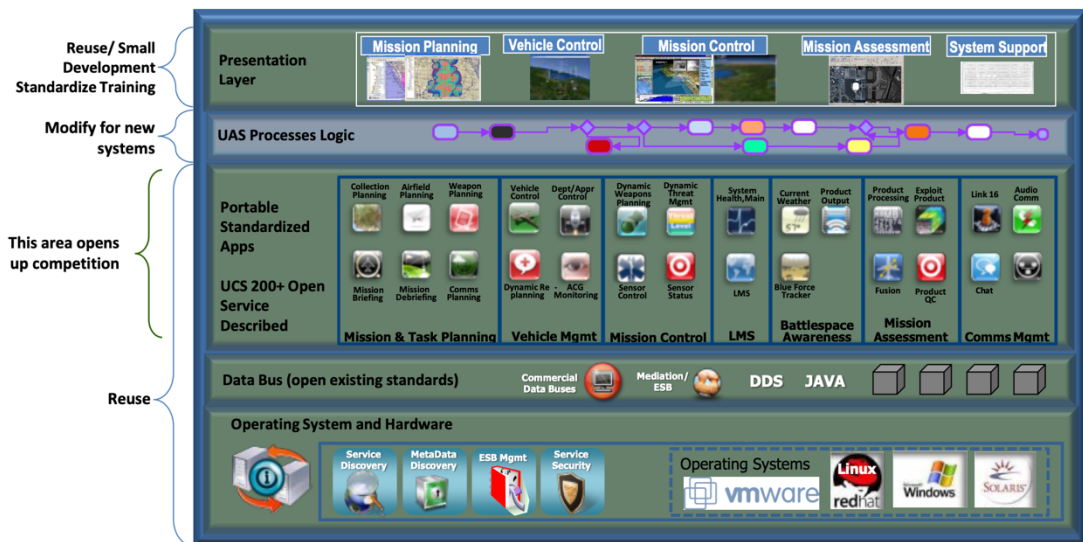
Figure 3.5. Open Architecture Model, (Ernst 2016).

Raytheon's proposal noted that in the event that drone developing giants like General Atomics (producer of the famous Predator and Reaper drones) refused to open their drone's interface, Raytheon would happily reverse engineer the drone so as to make it compatible with this new system (Telstar Logistics 2008). Raytheon justified its intervention not only by framing it as an economic solution for the government, but also by framing it as an intuitive move in an industry that was exhibiting more specialization. Drone companies, Bigham said "will always spend their independent research and development funding on the aircraft," while overlooking the ground control stations and operating software (Telstar Logistics 2008). Although Raytheon

framed this move as a natural consequence of economic specialization in the defense industry, it was a move to capitalize on the military's remodeled "Better Buying Power" procurement strategy and an unabashed attempt at monopolistic consolidation of a large part of the industry. The genius of this move is that it did not seek to compete with drone companies by offering a better drone with better software and control station but to own the software infrastructure and let the drone companies figure out how they were going to integrate into it. By owning the digital and ground control infrastructure, Raytheon could now not only compel other companies to design their drones with Raytheon's platform in mind, but also compel companies with existing proprietary platforms to open them up. In the words of Raytheon's Intelligence & Space Air Traffic Systems Mike Dubois: "Little drones, big drones, crewed and uncrewed, the whole airspace ecosystem needs to be shared," (Raytheon Intelligence and Space 2022). By "sharing" the airspace ecosystem, Dubois means the integration of all drones into Raytheon's software infrastructure.

Many of the apps that are integrated onto the software architecture (which belongs not only to Raytheon today, as other companies have begun competing in this space since 2008) are digital representations of the various sensors that are installed onto drones. Different sensors fitted onto drones help the drones see through video imagery, assist in geo-location, weather sensing, thermal imagery, radar tracking, and more. Sensors of today are designed to be "platform agnostic" so that they are easily transferable from drone to drone and so that they might compete in the drone sensor

market. The competition has resulted in great innovation in terms of what sensors can do.

For instance, sensors are central to the map-making that the military uses to achieve spatial awareness. Before drones, the military relied on digital maps that were produced by third-party organizations that had links to the state and military, starting as early as the 1950s when the military began to see the importance of linking geography and the newly emerging computer technologies (Haklay 2010). While companies such as Garmin and Esri continued to develop computer geography in the following decades, new GIS (geographic information systems) and GPS (geographic positioning systems) were out of most people's reach due to the level of complexity of the knowledge required to operate them (Specht 2020). This meant that the control over these maps has always rested largely with organizations with links to the military or the state. With the advent of drones and advanced sensors, however, the military's mapping capacity is more enhanced than ever before. Today's sensors and accompanying apps can compile the sensor readings into a 3D map that is so detailed that *different species of trees* can be distinguished (Lacdan 2019).

Apparently impressed with the universal ground control station and open-architecture software that allowed for the explosion of the app and sensor industry, the DoD offered Raytheon over $900 million between the years of 2009 and 2016 to develop another important piece of the drone's infrastructure: the "Distributed

Common Ground System" (Chatterjee & Strork 17). While other defense companies contributed to the development of this system, the sheer value of contracts given to Raytheon dwarf all others for the development of the DCGS. The DCGS is the Air Force's primary intelligence, surveillance, reconnaissance, collection, processing and exploitation, and analysis architecture. It is a software infrastructure that is housed on dozens of networked military computers that are scattered across the globe, built and maintained by over 70 different defense contractors, with Raytheon leading the pack. It employs a global communications architecture that connects multiple drones to globally distributed control stations, whereby airmen produce actionable intelligence from data collected by a variety of sensors placed on drones (Kitfield 2015). The DCGS allows operators to access up to 700 different sources of intelligence information including video feeds, thermal imagery, mobile phone tracking data, and more (Dimichele 2016). Chatterjee and Stork (2017: 52) offer an illustrative depiction of the system:

> In practice, this means a phone signal tracked by a U-2 pilot flying 60,000 feet over Syria could be observed in close to real time by a DCGS analyst in Virginia who could ask a drone pilot in Nevada to zoom a camera on a Predator at 10,000 feet so that an imagery analyst in Florida could take a closer look before calling in a jet to drop a bomb. The Pentagon calls this "reachback" because it allows troops in the field to get immediate support from military personnel at bases located in the U.S, (Chatterjee and Stork 2017: 52).

The DGCS is distinct from the mission control base. Without this elaborate surveillance information system, what General David Deptula called the "little piece of fiberglass flying around called an unmanned aerial vehicle," would amount to very little. It is the Distributed Common Ground System, which "turns the data into

information and hopefully knowledge," that makes the drone useful (Kitfield 2015). If the control base cockpit is where pilots operate the drones, the DCGS is where analysts work with the data that is used to operate the drone and that the drone collects.

It was also Raytheon who developed the "extreme-scale analytics" system RIOT, anagram for "Rapid Information Overlay Technology." This is a system which mines social media networks for location data from photos and comments posted by individuals and translates dispersed social media data into "usable information to help meet our nation's rapidly changing security needs," one Raytheon spokesperson said (The Guardian 2018). The software aggregates a large set of data points to predict where an individual is most likely to go next, what they like to do, and who they communicate with or are likely to communicate with in the future.

Finally, maps, apps, and sensors are only one part of the equation. The data that aids in the creation of actionable knowledge comes from *people* — that is, populations that are under surveillance. While it is unlikely that software like Raytheon's RIOT have been used to locate targets for drone strikes because targets typically are not using social media, drones do collect location data from people's regular cell phone usage that is sent to real and imitation cellular provider towers. It is thus that *people* with cell phones are the final piece of the infrastructural puzzle that allows drones to operate.

The National Security Agency (NSA), which provides combat support to the military, often helps identify targets based on metadata analysis and cell-phone tracking technologies. The NSA has helped the military transition from the reliance on human intelligence networks toward greater reliance on signals intelligence, or intelligence gathered from intercepted communications channels. Drone strikes typically target someone based on the activity and location of a mobile phone that a person of interest is using.

To collect data from cell phones used by people, the NSA uses a geolocation system known by the code name GILGAMESH. Under the program, a device known as an IMSI (international mobile subscriber identity) catcher is fitted to a drone. The IMSI catcher works by pretending to be a cell phone tower and inviting all phones nearby to connect to it. With multiple IMSI catchers in action, drone operators can attempt to geolocate a target. In NSA documents retrieved by the Intercept, the NSA boasts that its tracking program has "cued and compressed numerous 'kill chains' (i.e. all of the steps taken to find, track, target, and engage the enemy), resulting in untold numbers of enemy killed and captured in Afghanistan as well as the saving of U.S. and Coalition lives," (Scahill & Greenwald 2014). Within the NSA, a motto quickly caught on: "We Track 'em, You Whack 'Em," (Priest 2013).

The specific technologies, all the parts of the hardware, software, and persons that make up infrastructures are overlapping and continuously shifting; they are part of a

system that not only contains them but extends outwards from them. In this case, these infrastructures are extending outwards into the future realm of possibilities: for the combination of hardware, software, and persons that enables drones to operate creates not only actionable data for the drone targeting program today through algorithmic reasoning, but also the real possibility for drone autonomy. While the possibility of drones performing security governance completely without human intervention is still not yet a near reality, the algorithmic reasoning by which drones enact governance does currently structure drone operations. For instance, there is considerable potential in what's called edge computing: instead of having sensors transmit video feeds and other data back to ground controls and data centers for analysts to process, there have been strides to install AI processors on the sensors themselves and only transmit the slimmed down end product (Freedberg 2019). This is only one process of many which cuts out the human middleman in a move toward greater automation.

While the adoption of artificial intelligence (AI) for military purposes is now moving from the research into the production phase as the US Air Force begins testing its autonomous "Skyborg" system, the promise of total automation may never be realized in so far as drones depend on an infrastructure. As per the "recursive quality of infrastructural relations" (Harvey 2018: 85) or the fact that infrastructures are never unitary but always overlapping and coexisting infrastructural systems, there is no technical solution that could allow a completely automated system. The need for upgrades in the software, the ever growing space for innovation and improvement

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means that the promise of a completely automated system will always remain the out-of-reach ideal, and the infrastructure of the drone will always be composed not only of its material and digital artifacts, but always of people — both the people who are making the software and the people who are making the software work by their virtue of embodying the data that the software extracts and shapes. As such, the infrastructure is never really becoming more technical and independent from humans, but more intermeshed in the social than ever before.

ii. Humanitarian

According to former military pilot and current humanitarian drone delivery company CEO Eric Peck (2020),

> Drone logistics is about more than delivery; it's about establishing a new infrastructure layer for society; an infrastructure layer that leverages skies for the movement of goods and delivery services in a way that hasn't been possible in the past. Swoop Aero's ... goal is to scale that infrastructure layer country by country, so our integrated drone logistics service reaches 1 billion people by 2030, (Peck 2020).

While this infrastructure is meant to be conducive to the company's drone flights, it does not, like other traditional infrastructures, facilitate the flow of other materials and peoples. However, because drones rely on communications infrastructures, one might be able to make the case that a drone company coming to a town near you means improved connectivity infrastructures.

Not necessarily. Humanitarian delivery drone companies like Swoop Aero and Zipline walk in the military's footsteps when it comes to the communications infrastructure. Zipline strategically locates its distribution centers to be in direct connection to a fiber internet source. However, in its recent service to the military, it has been experimenting with satellite connectivity, and "plans to continue to modify its systems to work even more efficiently with VSAT (satellite)," (Zipline 2019: 34). In Zipline's report it notes its interest in working with DoD to use the military spectrum, noting that "it is worth exploring how Zipline could also use organic military satellite communications capability," in order to get a piece of the pie that the local population has been unable to get (Zipline 2019: 34). This transition to satellite technology might greatly enhance Zipline's *humanitarian* delivery purposes since its reliance on fiber optics typically limits its reach into rural areas (which are the ones most in need of delivery) since those areas typically lack fiber optic connections and reply on satellite. However, this will still cost the local population: what sets fiber optics apart from satellite connectivity is the former's ability to host higher transmission rates. All of the capacity that is offered by the entire global commercial communication satellite fleet (approx. 500 satellites) can be transmitted in a single pair of fiber optic cables, thus making the installation of fiber optics much more beneficial to a community. Unfortunately though, humanitarian drone companies do not seem to be contributing to this effort.

Aside from connectivity infrastructures, as part of their digital infrastructure needs, drones require different database sets, such as a database of global sky maps and of terrain maps (Zipline Patent 2021). For drones like these to operate, they rely on third party global terrain map databases for topographical data and map imagery like those provided by Google Earth or other private corporations. This third-party outsourcing is standard for mapping needs. Humanitarians increasingly partner with private corporation that have the data collection and geo-spatial information capacities that they themselves do not have (Fontainha et al. 2016).
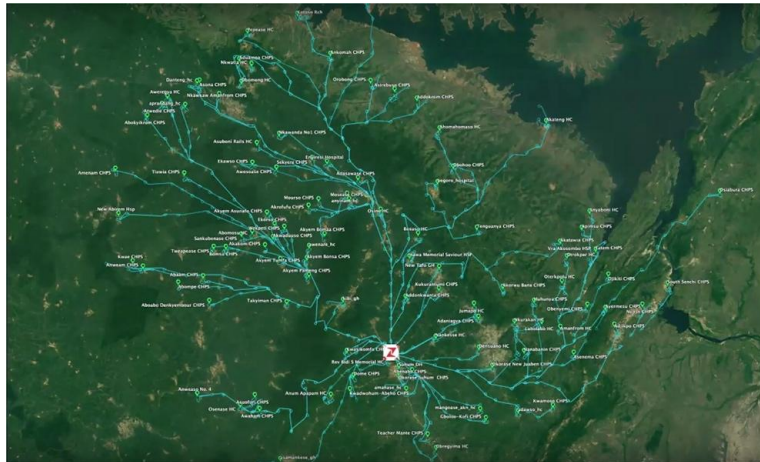
Figure 3.6. Flight Transit Plan for one of Zipline's distribution centers in Ghana. (Source: https://www.youtube.com/watch?v=xB29HG5JNIE, accessed 23 March 2021).

Figure 3.6 shows all of the predetermined routes Zipline's vehicles take in Rwanda. Because Zipline's drones do not use cameras to fly, (which has helped the company overcome any potential problems involving concerns over privacy) the company has to manually map the flight paths, landing spots, and emergency landing spots. Zipline's GIS team travels physically along every flight path to check for potential obstacles like

trees and cell towers and terrain, building a 3D map model (Wyrobek). Recently, Zipline announced its partnership with Intermap Technologies, a company that creates geospatial data solutions, delivering near real-time geospatial data. A new development that we see in humanitarian spheres is the new cadre of remotely distributed, spontaneous volunteers referred to as "digital humanitarians" (Hunt and Specht 2019) that use map-making softwares, geotagged social media postings and other digital data sources to improve humanitarian situational awareness. Drone companies, however, have not capitalized on the digital turn in participatory mapping, even as they engage with local populations to solve local problems.

Instead, drone companies like Zipline continue to rely on open-source maps provided by private corporations, but also, on the digital databases that provides information on population health, movement, and other indicators which enable humanitarian drone operations (UNDP 2022). When governments turn over these health databases, it underscores the reality that people living in the less connected parts of the world increasingly find themselves forced to choose between visibility and invisibility, and the introduction of drone technology, whether it is used to draw maps or to offer humanitarian assistance, is an integral part of this choice. Mapping practices can present "an impossible choice; one in which participants encounter the dilemma of needing to shed or set aside notions of how territory has been historically contested and negotiated in order to secure legal recognition of their rights in a hoped-for-future," (Bryan 2011: 46). People who refuse to contribute to map making may still be mapped

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by large corporations, still do not retain control over their spatial data, and continue to "lack clear exit rights from the effects of heavily deployed technologies" (Fox et al. 2006: 100).

While the humanitarian drone industry continues to rely on top-down mapping resources provided by corporate giants like the military as opposed to the bottom-up participatory mapping schemes popular in humanitarian circles, one major difference between the software models of military and humanitarian delivery drones are how fully the software needs of the drones have been submitted to market competition. The humanitarian delivery drone's software is often proprietary — companies like Zipline not only design the drone, but the flight computer, the boards and microprocessors, the overall avionics systems, the flight controls (the math that allows the vehicle to fly), the guidance and navigation systems, the air traffic control algorithms and even the communications architectures that are necessary (Rinaudo 2017). This model is not accidental, but according to Zipline's owner, this company is closely watching the defense industry and learning from its mistakes. He says that "one thing most people don't realize about Boeing is that Boeing is only a final integrator, and when go and try to build a plane like the 787 it's this complicated rat's nest of subcontractors subcontracting to subcontractors, and that leads to projects being expensive and slow," (Rinaudo 2017). On the other hand, Zipline works fast by keeping its designs in house.

It is unlikely that humanitarian delivery drone companies will fully submit their software and application needs to the market, however, there is some level of open-access architecture involved as technology developments catalyze an "exciting open-source and nonproprietary UAV market," (UNDP 2022). As in the case of military drones, the sensor-making technology companies will specialize and market to drones for a chance to be installed on a drone's underside. How this model will impact the software structure of the drones and the apps the drones use is still not clear, but it is likely that, just as what happened in the military sphere, the humanitarian drone companies might have to open up their software to a more open-architecture model [sensors].

What Zipline and other humanitarian drone companies share in common with military drones is the push toward greater automation, a push that relies on data that is collected from usually unsuspecting populations. The process of humanitarian drone delivery companies removing the opportunity for human error and moving toward greater automation requires data, and data requires *people* upon whom data is based. The push for more automation requires larger amounts of data on people's habits, health, location, movement, and more so as to make decisions based on statistical and algorithmic reasoning. This is the final piece of the drones communication and digital infrastructure. Drones operate based off data and also enable greater data collection themselves. Zipline does not only see itself as distributor of goods and by extension a warehousing and inventory management company, but also a service aimed at "data

and performance management," (Zipline Capabilities Statement 2021: 1). Zipline's self-reported goal is to enable "more data-driven decision-making in public health," (Zipline Capabilities Statement 2021: 2). To conduct its services, Zipline "generates monthly and seasonal reports that decision-makers can use to remodel forecasting and distribution …. Ensuring supply chain teams have actionable insights to drive informed decisions," (Zipline Capabilities Statement 2021: 4). The data collected from populations is usually without consent as "no data is ever self-reported and there is no opportunity for human error," (Zipline Capabilities Statement 2021: 4).

D. People as Infrastructure

The focus on bases and communication and digital infrastructures risks invisibilizing an important component of the drone's infrastructure, that is, the actors, local and global, that establish this infrastructure and are tasked with its operation. These actors make up the innovation networks that exist between government and private industry. To be sure, though people who act as nodes and data points are crucial parts of the digital infrastructure, the people involved in leadership and innovation are another class of people in the broader infrastructure, who perform an altogether different role.

Visit the "Meet the Team" or "About Us" webpage of any popular humanitarian drone company, and find a group of board members and you will notice that a number of them have served in high-ranking positions in the military and government. While

the boards might feature some doctors and public health experts, since these companies are after all humanitarian delivery drone companies, there seems to be an overrepresentation of military and security personnel. This overrepresentation is at least one material reason for the parallels between the two industries military and humanitarian. The question is, why is there an increased tendency for military and government personnel to board biomedical drone delivery companies more often than public health officials, sometimes at a rate of six to one, in the first place? Two elements might explain the ever-revolving door between the military and humanitarian drone realms: first, the technological affinities between the two industries – they both use drones, and second, the problem of obtaining regulatory approvals which is facilitated by the legitimacy military and government board members give humanitarian delivery drone companies from the perspective of governments.

i. Technological affinities

The transfer of personnel from military and government spheres to humanitarian delivery drone companies is extensive. At Draganfly, another drone company that boasts of flying "life saving drones" (Draganfly 2022), almost half of all board and advisory members currently occupy or have in the past occupied high-ranking positions in governmental defense, security, and intelligence sectors. On March 3rd 2020, Draganfly brought on former Assistant Secretary of Homeland Security for Immigration and Customs enforcement (ICE) Julie Myers Wood. Then one week later, former Republican General Counsel for Homeland Security Molly Wilkinson joined

the board. Yet another week later, former White House Chief of Staff Andrew H. Card, who had been a Dragonfly board member since 2018, sits down with Yahoo news to discuss Draganfly being selected to integrate health diagnosis technology to help monitor the Covid19 situation. In 2020, the company went on to employ former Assistant Chief of Staff for the Commander Naval Forces Europe and Africa in addition to Central Command in the Middle East Vincent Lawrence and Former General Counsel of U.S. Department of Homeland Security and Raytheon Senior Executive John Mitnick — the list goes on. Oddly enough, this company whose drones save lives has one public health official on its board to at least six defense and intelligence officials.

At Matternet, a company which initially made a reputation through humanitarian deliveries in regions like Papua New Guinea and Bhutan and has since expanded to specializing in healthcare logistics in Berlin, Switzerland, Tokyo, and Abu Dhabi, there is Commander John Rousseau who is now Vice President of Operations at Matternet. Rousseau began his career in the Navy where he occupied multiple different positions in different departments. Notably, he worked in the Naval Test Wing Pacific (NTWP) as the Wing's Commander, where he racked up over 20,500 operational hours and where he was the "driving force" behind the establishment of the government-led MQ-8C Fire Scout test program (NAVAIR 2015). The MQ-8C is an unmanned helicopter drone developed by Northrop Grumman for the US Navy that has autonomous take-off and landing capability and performs ISR and precision targeting support for the

military. In 2015, Rousseau became the Executive Director of Operations at the Naval Air Systems Command, a government position that would mirror his position at Matternet. In 2022, he left his 25-year long career in the military to join Matternet as their Vice President of Operations (Linkedin 2022).

At SwoopAero, we have co-founder and CEO Eric Peck, a former Air Force Pilot who began his career leading "missions in the Middle East as a qualified C130J Hercules Captain," (SwoopAero 2022). Peck's inspiration for starting SwoopAero came directly from his experience in the military, where he reasoned that if he "took a 70 ton Hercules that [he] used to fly and condense it down into a 12 to 20 kilogram electric plastic … aircraft" he could produce a novel solution that could deliver chemotherapy medicine to anywhere in the country (Peck 2020). Also part of this company as Chief Pilot and Director of Flight Operations was former Air Force Pilot of 15 years Lewis Hill, who has since left Swoop Aero and joined AeroPM, an Australian defense industry consultation company.

The reason why more military and security officials are hired to the humanitarian drone industry than say, doctors or experts in public health and humanitarianism is possibly because of the drones themselves. These industries (humanitarian and security) are forever linked by this technological affinity. It's an easy move because drones performing biopolitical and necropolitical governance do so in similar ways and the industries learn a lot from each other. That is, high ranking defense officials and

former military men are comfortable and successful working with such governance technologies, and thus are more likely to start humanitarian drone companies (like SwoopAero's Eric Peck) or humanitarian drone companies are keen to hire them.

For example, the newly appointed CEO of Volansi, the Silicon Valley drone logistics company that piloted the first delivery of temperature-controlled vaccines in the US that served in eastern North Carolina where access to healthcare in remote areas is limited, is Will Roper. From 2012 to 2018, Will Roper was the founder of the Strategic Capabilities Office in the Department of Defense. There, Roper "oversaw the development and first flight of a future fighter demonstrator and advocated for the Advanced Battle Management System as an 'Internet of Things' to connect military platforms," (Defense News 2021). Under his tenure, the office grew from an annual budget of $50 million to more than $1.5 billion as of 2018, and ideas put forth by Roper are now being implemented across the Department of Defense. It was during Roper's tenure that employees at Google went on strike in protest of their company's work on Project Maven with the Department of Defense's Algorithmic Warfare Cross-Function Team, which sought artificial intelligence solutions to military problems. It was also Roper that led the development of the autonomous Skyborg drone system. His long list of drone and AI related accomplishments meant Volansi was excited about bringing Roper on board in 2021 and gaining from his "deep expertise in emerging technologies and the use of unmanned aerial vehicles," (Volansi 2021).

It is also within the context of the humanitarian delivery drone industry that former security and defense officials are able to pursue the development of drones as governance technologies in ways that might have been more restricted in the military setting. Just before joining Volansi, from 2018 to 2021, Roper served as Assistant Secretary of the Air Force for Acquisitions, Technology and Logistics where he managed a $40 billion budget. During Roper's tenure as the Assistant Secretary of Acquisitions, he awarded Volansi with the Air Force's Small Business Innovation Research award in 2020, a $400 million contract. It wasn't until a year later that Roper joined Volansi, who noted that interest his interest in commercial drones began with his wanting to harness the same kind of aerial logistics that companies like Amazon were experimenting with for the military. In an interview with Air Force Magazine, Roper noted that although he wanted to "harness [aerial logistics] for the military, it has not been mature at any time that I have been in service," (Roper 2021). Although he found it unfortunate that he "didn't have the time to complete that journey on the government side … it just happens to be that I've been given a chance to follow the journey" at Volansi (Roper 2021).

Drones were only part of what attracted Roper to Volansi; in fact, Roper said that what is "really understated is the software and autonomy in the company … if you got rid of all the drones, it's still probably a viable company," (Roper 2021). The company created certain proprietary softwares and Roper noted that he tried pushing for similar technological advances in the Air Force during his military career. While Volansi up

until then saw itself as an aerial logistics company that was beginning to make its mark in the humanitarian and medical delivery sphere, bringing Roper on board would ultimately detract from this trajectory as Volansi sparked the interest of the defense industry. Sure enough, in 2022 Volansi was bought out by defense giant Sierra Nevada Corp. While the technological affinities between the Air Force and Volansi drew Roper into the humanitarian delivery sphere, Roper would ultimately draw Volansi back into defense. All of these movements were easy because drones perform security in comparable ways to their performance of humanitarianism. The object may change, but the technique is the same.

ii. Regulatory approvals

To get off the ground in the US, biomedical delivery drone companies need to navigate a complex framework of regulatory approvals. Without these, the companies rely on temporary waivers to operate. Until 2020, all the drones who had Federal Aviation Administration (FAA) approval in the US had been military drones. In May of 2020, Zipline was the first company to receive approval from the FAA to fly its drones to distribute personal protective equipment and critical medical supplies in Charlotte, North Carolina, a project for which it partnered with Walmart. Although Amazon had been trying to score FAA approval for its own drone delivery system (Prime Air) for much longer than Zipline and Walmart, Amazon was second to receive FAA approval, months later, followed by Matternet, almost a year later. Zipline was much more experienced when it came to navigating the many regulatory obstacles that

came with flying drones due to its operations in Rwanda. As shown by Lockhart et al. (2021), the Rwandan government exerted strong regulatory control in order to make space for Zipline's operations there, thus giving Zipline a taste of what it would have to deal with in other countries as well.

Any significant delay in establishing a drone program translates to a delay in realizing returns, and the most significant delays are those caused by prohibitive regulatory structures. Therefore, collaboration with governments has been a crucial area of concern for many humanitarian drone companies. Companies in this industry can obtain easier regulatory approvals from governmental agencies when they employ military and defense officials who are familiar with the relevant regulatory schemes. Better yet, if one of your board members also sits on the US Department of Transportation's Drone Advisory Committee (DAC) as Draganfly's does, you get more say in writing the new rules of the game while it's still in its infancy. One of DAC's newest members is Draganfly's Molly Wilkinson, former Republican General Counsel for Homeland Security and Draganfly board member. In fact, Draganfly brought Wilkinson on board specifically for her "regulatory & enforcement background [which] has helped scale our secure government & public safety offerings," according to Draganfly's twitter (Draganfly 2020).

Zipline also emphasizes on the Safety page of its website that "many of [Zipline's] team members are military and GA pilots themselves," (FlyZipline 2022). These pilots

"monitor and track every move of our drones in-flight," (FlyZipline 2022). A few lines below that on this webpage, Zipline boasts that it is an "ARGUS gold UAS operator," (FlyZipline 2022). To receive a gold certification from ARGUS, or the Aviation Research Group United States, the company must have pilots that have at least 3,000 hours total flight time, at least 1,500 hours of pilot-in-command time, and other qualifications which are most easily obtained through military service. ARGUS' Vice President of Helicopter & UAS (unmanned aerial systems) Services is Susan Cadwallader, a former US Navy Operations Officer as well as former Remote Pilot Operator at Raytheon.

Drone Delivery Canada (DDC), a Canadian based drone company which has partnered with GlobalMedic to delivery humanitarian aid and supplies to indigenous people living in remote areas, created a new position in 2018 for the Director of Regulatory Affairs USA as it announced plans to expand into the US Market. James Williams was given the position, which was fitting as not only was Williams manager of the FAA's Unmanned Aircraft Systems Integration Office at the Department of Transportation, but he also had a history working with drones as a flight test engineer at Lockheed Martin. During his tenure at the FAA, the FAA approved the first commercial drone operations in the USA and published the regulatory structure that enabled routine commercial drone deployments. Also joining DDC at around the same time was Mark Wuennenberg, a 33-year veteran of the Royal Canadian Air Force with 4300 hours in numerous aircraft serving at the National Defense Headquarters, US

Space Command, and the Canadian Forces where he was active in numerous UAV committees. He is now the Vice President of Regulatory Affairs at Drone Delivery Canada. Only after adding Wuennenberg to the team was Drone Delivery Canada able to secure its position as the first licensed drone delivery operator in Canada. The trend seems to be that as soon as companies bring military and government personnel on board, they are quicker to achieve regulatory approvals.

IV. Conclusion

The purpose of this Part of the dissertation was to foreground various components of the drone's infrastructure. Infrastructures are channels through which power is exercised — in this case, infrastructures allow states to perform biopolitical and necropolitical governance via drones. To further this dissertation's principal question (What are the spatial pre-conditions of governance-via-drone?) *Drone Infrastructures* aimed to convey an exposition of infrastructures as enablers of things (drones) but also, offered a dedicated study of infrastructures as things in themselves. Components of the drone's infrastructure such as its bases, its communications networks, its apps, maps, sensors, and people are all sites of political significance in their own right.

For instance, the bases from which drones are controlled and which are indispensable to the drone's operation are often significant political and economic liabilities for the countries on which they are installed. Drone bases are also themselves geopolitical and geoeconomic pawns that project US power globally. The satellite networks that make up the drone's communication infrastructure are in many ways sites of political-economic dispossession as the US military seeks to gain proprietary access to networks originally intended to connect the "other three billion" disconnected people on the other side of the digital divide. In following the military's footprints, humanitarian drone delivery companies do little to create new communications infrastructures to increase connectivity, but create their platforms to be able to leverage what is already there, obviating the need to enhance connectivity in the places they

operate. These infrastructures, unlike traditional infrastructures, facilitate the movement of drones – but nothing else. They do not have wide-reaching effects on communities the way roads and robust internet infrastructures do.

The struggle waged by defense companies to open up the software architecture that holds the various apps that link to the sensors fitted onto drones tells yet another story of the politics of infrastructure — in that case, Raytheon's move to own the open-architecture demonstrates the profound political significance of infrastructure. The data upon which the drone's entire operation depends is mined from often unsuspecting populations, yet another instance of the political significance of infrastructure as a thing in itself. Finally, the other class of people that make up the drone's infrastructure, the class which owns, operates, and benefits from the enactment of drone governance, and the revolving door that connects the military and humanitarian drone industries through which these actors walk, underscores the politics of drone infrastructures as things in themselves.

Infrastructures are not only things in themselves, but they are also enablers of things. In this case, drone infrastructures are enablers of drones, and it is in this sense that the study of drone infrastructures is itself a political act. Making visible an often-invisible infrastructure is the first step in articulating a politics of resistance. This implication is taken up more fully in the conclusion of this dissertation.

Epilogue: Understanding Drone Space as a Precondition of Resisting Drone Space

I. Research Summary

This research was about drone space, and all that needs to happen on the ground before the drone can take flight. I have argued that just as drones rewrite space in their theaters of operation, rearranging and reconfiguring social reality, it is also true that space has had to be reorganized and remade for drone use in these theaters. I have attempted to show that these spatial preconfigurations are direct results of global political-economic processes of neoliberalization.

I explored the making of drone space at three levels: the cartographic, the architectural, and the infrastructural. At each level, I aimed to show how neoliberal discourses and processes contribute to the making of drone space. Rather than casting neoliberalism as the grand explanatory factor, I pursue the point that drone governance today is facilitated by processes that are distinct to this neoliberal era and which also tell us much about how neoliberalism is evolving through various roll-back, roll-out and roll over phases that are interlinked. I employed different methodologies and began with different framing questions for each scale.

At the level of *Drone Cartographies*, I asked what discursive and cartographic imaginaries were associated with different forms of foreign intervention, and whether an investigation into these could explain the shift from high-footprint interventions that were more common early on in global neoliberalization process, to low-footprint intervention by drone that are common now. I found that neoliberal ideals which saw interdependent liberalized economies as the solution to both military and humanitarian insecurity drove the interventionist policies of the past, and this took the form of integrating politically remote states into the globalization processes through the integration of major cities into the global urban network. The retreat from these high-footprint interventions, this study argued, was not due to any waning of neoliberal ideals but rather, low-footprint interventions via-drone manage the most explosive expressions of disconnected space on a targeted, just-in-time basis, in a way still very much structured by neoliberal discourses of cost-effectiveness. Governance has just been recast as a supply-chain issue – how can we administer governance in the form of biopolitical caring or necropolitical killing in the least costly way and on target?

At the level of *Drone Architectures*, I followed two case study areas sequentially to reconstruct a theoretical model for deducing how certain political-economic processes shape space, and how that space is conducive to certain modes of governance. At this level, the question was, what makes some places targetable, and others not targetable? What specific variables account for their material distinction? By comparing the triangular relationship between political-economic model, spatial

distribution, and governance styles for two eras (pre-neoliberal and neoliberal) in my two case studies, I was able to isolate a few tendencies of neoliberal political-economy's effect on space that makes it conducive to drone governance. Neoliberal economies distinguished by large-scale privatization among other things creates a patchwork mosaic of development and underdevelopment in Afghanistan which is subject to military drone bombardment, and Ghana, over which humanitarian delivery drones fly.

In Afghanistan specifically, pre-neoliberal era models of development distributed the security apparatus in a more regionally holistic manner, whereas neoliberal political-economic imperatives that privatized many government functions and invited foreign investment resulted in a variegated security apparatus that is now supplemented by drones. That is, drones are not only a hand-me-down technology from the US government to the Karzai government (and now to the Taliban government) – they are also now necessary solutions to address the spatial failures that resulted from neoliberal policies. In Ghana, I abstracted a similar historical process to explain the recent integration of biomedical delivery drone into the public healthcare system. Although Ghana was en route to a model of spatially holistic development in the pre-neoliberal era, neoliberal structural adjustments created the same sort of uneven spatial development. The privatization of health systems and other government functions, and the economic pressure of a newly neoliberalized global economy also resulted in

uneven investments and disinvestments throughout the country. Here, drones stand in as compensatory devices that address the spatial failures of these processes.

And in *Drone Infrastructures,* I began with the contention that drone programs, whether military or humanitarian, cannot appear anywhere — in fact, the drone war is highly contingent on infrastructural constraints and previous foreign military and current corporate presence. If *Drone Architectures* outlines the systemic *under*development that creates targetable space (and by extension, untargetable space), then *Drone Infrastructures* details the material *over*developments — or stuff — that enable and enact governance via drone. I use the term "overdevelopment" as opposed to just "development" to indicate the compensatory, contingent, and frivolous nature of these developments. The infrastructures that enact drones do not necessarily address the causes of underdevelopment but instead build on top of them. I considered three levels of infrastructure that directly enact drone governance: the bases, the communications and digital infrastructures, and the people, that is, the actors, leaders, visionaries, and board members that enact drone governance.

Three propositions emerged out of the exploration of the different base assemblages of the US military and a selection of humanitarian drone companies. First, it appears that contrary to the aspirations of the drone industry, the space and cost-related footprint of drone operations is larger than the industry might boast. Because of the limitations of drones and how they operate, drone bases must be widely proliferated —

a presence that diminishes the illusion that drones require a light footprint in their area of operation. Next, while drones, drone companies, and drone users need drone bases, the countries in which they are stationed may not need them: on the contrary, the bases are often political and economic liabilities for the countries where they are stationed. This is true for both military bases and the facilities from which humanitarian delivery drones are operated — as structures owned by one actor but established in space that belongs to another, distributed drone bases raise questions about ownership and liability. Finally, a base is never just a base: the study of drone bases reveals the way that drone bases are geopolitical and geoeconomic pawns for the actors that use them.

As remotely controlled aerial technologies, drones need not only bases to operate from, but also certain communications and digital infrastructures. These include hardware components as well as software components, or infrastructure's "digital twin." The hardware components that create connectivity are in the form of fiber optic cables, satellites, communication towers, and sensors. The sensors that are fitted onto drones are the interface between the physical hardware and the digital software. The software components are the collections of code, digital mappings of space, cloud platforms, and applications that codify, map and analyze space as well as act as the digital medium of communication between drones and operators. The last crucial piece of the digital infrastructure was not easily categorized as hardware or software. The drone's digital infrastructure and its operative logic is informed by large swaths of data – data collected from *people.* Drones leverage existing and collect new data from

people; drone digital infrastructures analyze and operationalize the data which is then used to govern people.

Finally, the focus on bases and communication and digital infrastructures risks invisibilizing an important component of the drone's infrastructure, that is, the actors, local and global, that establish this infrastructure and are tasked with its operation. These actors make up the innovation networks that exist between government and private industry. To be sure, though people who act as nodes and data points are crucial parts of the digital infrastructure, the people involved in leadership and innovation are another class of people in the broader infrastructure, who perform an altogether different role.

What was the purpose of this exploration into the several dimensions of drone space? The theoretical and practical significance of foregrounding drone space is explored below. This concluding section first considers how understanding drone space is a condition for resisting drone governance. In *II. Resistance*, I explore how drones can and are already being resisted from the starting point of asserting territorial sovereignty. That is, drones flying above are resisted from the starting point of the ground below.

II. Resistance

In 2017, five Nigerien and four American soldiers were reported dead after a large group of militants ambushed their unassuming convoy in Niger. The story made headlines in both the US and in Niger, albeit for different reasons. In the US, headlines focused on the failures of leadership to prevent this from happening: ABC News reported on the unintentional abandonment of the soldiers by their convoy (Meek 2018); the New York Times emphasized the "series of intelligence failures and strategic miscalculations" that led to the death of American soldiers (Callimachi et al. 2018); USA Today focused on "command mistakes," insufficient training and the lack of preparedness which led to the death of four American soldiers (Bacon 2018).

In Niger, the news reflected sentiments of not only sorrow and regret but mainly, *surprise*. Nigeriens were surprised at the news that American soldiers were fighting in Niger to begin with. As reported by the Intercept, one parliament member said that the ambush was "the moment I found out, as a Nigerien, as a member of parliament, as a representative of the people, that there is indeed [an American] base with ground operations," (Penney 2018). Typically, people know about the defense activities their countries get up to with other countries by means of a system of legal checks that makes it people's business to know. For instance, Niger's constitution holds that all treaties of defense, like those that enable the US to build drone bases on Nigerien land, must be authorized by the country's legislative body. In another example, Ghana's regulatory framework for the award of public-private contracts to companies requires that the

government release a tender for bid and survey the market before making any drastic decisions. In both cases, protective frameworks were bypassed by colluding host governments with drone actors (the US government in Niger and Zipline in Ghana), drone bases were built without satisfying the requirements of the law, and citizens were shocked to find drones hovering overhead.

The countries that host American bases are quiet about these arrangements for good reason. Ghana's former President Kwame Nkrumah wrote in 1965 about the people's mood relating to the presence of foreign military bases in Africa, which had been commonplace during colonialism that

> The presence of foreign bases arouses popular hostility to the neo-colonial arrangements which permit them more quickly and more surely than does anything else, and throughout Africa these bases are disappearing. Libya may be quoted as an example of how this policy has failed (Nkrumah 1965: 58).

The popular rejection of foreign presence holds true even when the base-owning country believes that the security of the base is assured by the fact that it has situated its base in a country "which is so constituted economically that it cannot survive without substantial 'aid' from the military power which owns the base," (Nkrumah 1965: 58). This, Nkrumah argued, like many other assumptions on which neo-colonialism is based, is false. What assures the base's security is that it remains hidden from popular view. Thus, since its inception in 2008, the US government's Africa Command (AFRICOM) has been unable to establish its headquarters anywhere on the

African continent. It remains headquartered in Stuttgart Germany as African peoples continue to ensure their governments don't cave to US demands to move the headquarters to Africa.

Even in places like Germany, the bases fair no better when they are held up to public scrutiny. When people do find out about the bases, they organize to protest the way their territorial space is used. Every year, several thousand demonstrators form a human chain along the perimeter of the US drone base in Ramstein Germany to protest drone operations carried out from the base by the US military. It was a lawsuit brought by three grieving Yemeni nationals against the German government (*bin Ali Jaber and others v. the Federal Republic of Germany* 2019*)* before a German high court that inspired the Ramstein protests. In the suit, the plaintiffs submitted that they had lost close relatives as a result of a 2012 US drone strike in Hardamaut, Yemen. Originally, US courts declined to hear the case "because it was considered to be a political question" as opposed to a legal one (*Ali Jaber vs. Germany* 2019). With knowledge that emerged in 2013 when a former sensor operator revealed Ramstein's crucial role in the transfer of data between drone pilots in the US to aircraft on missions in the Middle East, the plaintiffs made the Ramstein drone base in Germany central to their grievance claims and brought their case to a German court. Knowledge of the intricacies of *drone-supportive infrastructures* was thus more crucial than knowledge of the identity of the offending perpetrators (the US military) for the process of obtaining justice for wrongful death. The German high court determined that there were

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"substantial indications" known to the German government that US drone missions operated from Ramstein were "violating international law," (*Ali Jaber vs. Germany* 2019).

Demonstrations like the annual Ramstein protests against drone bases are popping up globally in response to the growing knowledge of such infrastructures. In 2015, "Ground the Drone" demonstrations began to protest the notorious Creech airbase in Nevada. Protesters set up banners, signs, and a symbolic graveyard representing all of the children killed by MQ-1 Predators and Reapers, both drones that were operated from Creech (through the Ramstein connection).

The idea is that knowledge of drone-supportive infrastructures results in populations putting pressure on governments. For instance, the US lost access to both Iraq and Pakistan in 2011 after growing pressure was placed on these host countries to limit the drone strikes. Base building has largely gone under the radar since then in the countries of the Arabian Gulf instead of the target countries. However, as discussed in *Architectures,* this greatly diminishes the precision and effectiveness of drone strikes.

The lack of knowledge about drone-supportive architectures and infrastructures is only one way drones fly under the radar, so to speak. In other instances, drone governance is *naturalized* as the best solution to the problem countries face. Governments and drone companies would like the space they service to be thought of

as a taken-for-granted unfortunate condition that they are remedying through their use of drones. The humanitarian industry's entire selling point is that their drones overcome the problems of geography and save lives. Zipline's CEO Keller Rinaudo notes that Rwanda made a good place to start developing Zipline's drone technology because it was "known as the *Land of a Thousand Hills…* Roads tend to by windy" and dramatic, and Zipline's drones swoop in to establish a "predictable, reliable, ultimately boring" logistical system with no surprises (Rinaudo 2017). Zipline's drone's thus combat natural geographic obstacles.

But what happens to this story and selling point if the history of a space is not a natural history but a *naturalized* one? What if the story is one of consistently underdeveloped space, historical disinvestments, political decisions that result in fragmented security architectures and fragmented health systems, as shown in this dissertation? Indeed, Ghana does not have a similar topography as Rwanda, but has integrated drones into its healthcare system after seeing Zipline's success in Rwanda – other countries like Nigeria are soon to follow suit. How does the knowledge that the problems that drones solve are not natural but *naturalized* expand the parameters of the question — the focus is not necessarily how drones are our superheroes in a natural disaster but instead, whether there are supervillains in this story instead? What happened here that drones are compensating for?

Although the Ghanaian government sings the praises of Zipline after they committed to at least four years of acquiring its service, a contract the government intends on renewing, a growing segment of society remains skeptical. Some are even beginning to articulate their apprehension along lines of territorial sovereignty. Another commentator on a Ghanaweb article about how Nigeria is following in Ghana's footsteps in bringing in Zipline drone delivery notes that it is only one state in Northern Nigeria that is adopting Zipline into its health care system. Under a comment titled: "This is why Ghana needs a federal system!" the commenter writes:

> This is Kaduna, a state in Northern Nigeria undertaking a major project on their own without the involvement of the federal government. Imagine Ghana had regional governments, the Savannah region for instance could focus on solutions for problems peculiar to them that the central government would otherwise not have done. Regional ministers and regional assemblies should be elected. The capital should also be moved away from my Accra, it's become a burden to us (Anon 2022).

Anonymous directly engages with questions of territorial sovereignty and democratic participation in their critique of Accra's signing up with Zipline. If Ghana had more regional political structures, the commenter argues, certain solutions to problems would be more fitting as opposed to a one size fits all. Another commentator on Ghanaweb, a popular news source, writes:

> These our useless leaders use our money for stupid things just because of chop chop. The millions u used to buy these drones could have built an entire university to train students in medicine. Our leadrs don't thin that at all [*sic*]. They should keep building the cathedral we will bury them there. Fools (Manso 2020).

Yet another commenter has similar concerns:

> The drone service is needless and expensive. Doctors warned that emergency drugs need to be at the place of treatment when needed and puts lives at risk if there's a wait for them. So we need an efficient system of distribution, not some fancy drone service. Anyway, this useless Vice President like to boast about the drones, but, never mentions the cost of the service and how much has been spent to date, what's he got to hide. (United Ghana 2022).

Instead of using that money to build hospitals, healthcare workers are being trained to receive drone shipments. Indeed, as several USAID documents about drone-led development in African contexts insist, the process hinges on the need to train health workers, thereby "eliminat[ing] the need for additional staff," (USAID 2019: 6). Healthcare workers need to become "comfortable and fluent in the operation of drones; [this] is critical to the daily operation, and … integration of drones into their daily work. It is unavoidable that the introduction of drones will require flexible adaptation on the part of health care workers," (USAID 2019: 6). Apart from doing actual healthcare work, which there is already a shortage of in many of these areas, healthcare workers will need to adjust how they communicate and document when ordering healthcare goods, they will also need to be available to assist with preparing, sending, and receiving of goods, among other responsibilities. Largescale shifts in the healthcare political economy will therefore have to occur – in Malawi, for instance, the future "African Drone Academy of Malawi" will be established to design, implement, and

roll-out a tailor-made curriculum to train local healthcare workers in in the operation of drones, including even analysis of drone acquired imagery.

Not only should populations realize what kinds of disinvestments each of such investments build off to allow for drone governance, but crucially, people should realize that they themselves are critical nodes through which such new modes of governance operate. That is, not only has the space been shifting from under people to allow for drone governance, but as data is increasingly the drone infrastructure's center of gravity, they themselves have been interpolated into this system as its necessary components. Data is made actionable only after much of it is collected from people. This research thus joins scholarship on the politically charged questions surrounding data and data ownership. The most important question about such emerging technologies is who gets to use this data to create value, and why is it these drone companies? Also, who can decide if they want to be a data point or a node? Who can decide if they want drones or if they want more healthcare workers?

The datafication of society on which drones rely not only reflects the newest manifestation of capitalism but also a new form of colonialism, of extractivism that enriches actors from the global north at the expense of the global south. Populations that endure drone governance are already beginning to resist what has been called "data colonialism" and the appropriation of their data which is then used to govern them in ways that they have not consented to. However, strategies for resistance are still not

fully articulated – as of 2020, only 43% of the least developed countries had established data and privacy protection legislation compared to 96% of European countries (UN 2020).

Knowing is the first step to empowerment for those populations that live under regimes of drone governance. There needs to be ways that people know — not just that a drone base or drone infrastructures are being erected around them, but that space around them has long been shifting to accommodate for new modes of governance. The spatial preconditions for new modes of governance need to become common knowledge and readily identifiable if people are going to have any say in how they will be governed, especially when governance has become so elusive and technologically mediated. What happens in the air (and tech-cloud) above are contestable from the starting point of the ground below.

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