24/7: Drone Operations and the Distributed Work of War

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ABSTRACT

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How does waging war effectively fade into the background for most Americans, even as it is one of the most defining aspects of the United States' actions and priorities, both domestically and internationally? This dissertation takes up one dimension of this question by ethnographically engaging with a particular mode of contemporary US war making that involves the deployment of drones, large and high-altitude aerial vehicles, remotely controlled from within the United States. Based on fieldwork conducted over fourteen months between 2010 and 2015 within the US with communities involved in the deployment, planning, or assessment of Air Force drone operations, a primary contribution of the dissertation is to refocus critical discourses around drones through the lens of labor and the work entailed in war. By examining the divisions of labor implicated in ongoing drone warfare, a wider set of questions and implications takes shape about the nature of contemporary American war and where different kinds of responsibilities and modes of normalization lie.

The dissertation begins by arguing that the distributions of action and control that characterize drone operations are neither obvious nor necessary, but rather have taken hold only in the context of specific historical conditions of possibility. These conditions are what enable drone operations to be seen as an effective and ideal form of US military engagement, and involve interwoven developments in post-World War II military command and control theory, digital data, global information networks, and a reliance on legal frameworks that render state violence justified. The dissertation also examines the

discrepancies between the imagined capacities of "unmanned" and "autonomous" drones and the current practices that constitute and maintain these technologies, which must be continually managed and constructed as effective and legitimate actors through professionalized military discourses and practices.

The second half of the dissertation, more ethnographic in focus, examines how drone operations are implicated in changing conceptions of military service and military-civilian distinctions. Through an examination of the tensions and controversies that have arisen around drone pilots, the dissertation presents how Air Force pilots and commanders involved in drone operations construct and position the value of drone operations as meaningful and honorable military service. The analysis demonstrates that while officers put forward the value of their work as professional and altruistic service, at the same time, an irreconcilable tension exists because the military labor of drone operations bears increasing similarity to other forms of contemporary civilian work, characterized by the language of compensation, flexibility, and in/security. The dissertation concludes by proposing the concept of the warzone as a way to encompass all the places in which war occurs, its consequences on the battlefield, but also its sites of execution and the range of people, places, and practices that are implicated in the ongoing conduct of war. The dissertation demonstrates that the increasing deployment of drone operations is a contributing factor to the seeming invisible state of war for the majority of Americans. However, this is not necessarily because war is being conducted at a distance, as most journalists and scholars propose. Rather it is because war is being conducted, sometimes literally, in Americans' backyards, close-by in the United States, in ways that are obfuscated or rendered merely mundane.

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List of Abbreviations

AFB
Air Force base

AVF
All volunteer force

CIA
Central Intelligence Agency

DoD
Department of Defense

GCS
Ground control station

DGCS
Distributed ground control station

FOB
Forward operating base

GAO
Government Accounting Office

ISR
Intelligence, surveillance and Reconnaissance

LOS
Line of sight

LOW
Laws of war

LRE
Launch and recovery element

MAM
Military aged male

MCE
Mission control element

PID
Positive identification

RMA
Revolution in military affairs

ROE
Rules of engagement

RPA
Remotely piloted aircraft

SOF
Special Operations Forces

UAV
Unmanned aerial vehicle

UAS
Unmanned aerial system

USAF
United States Air Force

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INTRODUCTION: REARTICULATING THE PRESENCE OF WAR

A true war story must not be only about what happens to combat soldiers and their guts, but also about the nation and its guts, about running one's refrigerator, which might use a refrigerant made by Dow Chemical, the company that manufactured Agent Orange. This herbicide debilitated thousands of American soldiers and their progeny, as the U.S. government admitted, and also thousands of Vietnamese and their offspring, as the U.S. government will not admit. The quotidian story about opening one's refrigerator and peering into it, stuffed with the plastic-packaged wonders of capitalist life, is just as true as and arguably more unsettling than the blood and guts story of throbbing disembowelment. (Nguyen 2016: 230)

For anyone born after 1984, the United States has been at war for over half of her or his lifetime. Contemporary American teenagers have never known a world in which the United States was not at war in the Middle East. At the same time, for the majority of Americans, the war remains largely out of sight, fought by and against people they do not know (Zucchino and Cloud 2015). The victims of bombings, drone attacks, and persistent surveillance remain unseen. The toll of military service falls disproportionately on only some American communities, generally rural and those of lower socio-economic status (Lutz 2008). Yet, as measured by economic expenditures, the Pentagon budget is second only to that of Social Security in the federal budget, totaling over $583 billion (Cooper 2016). Including war spending and other costs related to national security, some estimate that the U.S. government spends over $931 billion on military related projects, making this budget, if it were its own economy, the 19th largest in the world (Kramer and Silver 2012).

The majority of Americans appear unconcerned. “The American public has turned its gaze away from the two wars [in Iraq and Afghanistan],” summarized the Pew Research Center in a 2011 report on post-9/11 attitudes toward the war and the military (Pew 2011: 64). The study also reported that over half of Americans say that the wars conducted by the United States since September 2001 have “made little difference in their lives” (63). As journalist Tom Engelhardt starkly argues, “it's hard for Americans to grasp that Washington is a war capital, that the United States is a war state, that it garrisons much of the planet, and that the norm for us is to be at war somewhere at any moment” (Engelhardt 2011).

How does waging war effectively fade into the background for most Americans, even as it is one of the most defining aspects of the United States’ actions and priorities, both domestically and internationally? In this dissertation, I take up one dimension of this question by ethnographically engaging with a particular mode of contemporary U.S. war making that involves the deployment of drones, large and high-altitude aerial vehicles, remotely controlled from within the United States. The work is based on ethnographic fieldwork conducted during fourteen months between 2010 and 2015 in six locations within the United States where there were communities involved in the deployment, planning, or assessment of Air Force drone operations. This included Air Force officers, retired military personnel, defense contractors, UAV industry professionals, and academic researchers. My aim has been to expand and refine the frame by which we can analyze the nature of contemporary warfare as well as the consequences of increasing deployment of drone operations. Specifically, a primary contribution of this dissertation is to refocus critical discourses around drones through the lens of labor and the work

entailed in war. What are the divisions of labor implicated in ongoing drone warfare? By examining these divisions and their operating logics, what do we learn about the structures that enable and maintain perpetual war and its various visibilities within the United States?

In its largest frame, my argument suggests that the increasing deployment of drone operations is a contributing factor to the seeming invisible state of war for the majority of Americans. However, this is not necessarily because war is being conducted at a distance, as most journalists and scholars propose. Rather it is because war is being conducted, sometimes literally, in Americans' backyards, close-by in the United States, in ways that are obfuscated or merely mundane.

In some regions, the wars being waged by the United States are anything but invisible; their presence is plain in "the war-bitten" (Tahir 2016: x) regions of the Middle East, where, to quote scholar and journalist Madiha Tahir,

> The conflict has been churning and ploughing the ground in the border zone till it convulsed and threw places into view, some valleys so hopelessly beautiful you couldn't believe the stories, … how bodies, guts, and bone had rotted there till the land consumed them, places where the war had lacerated the land into stillness, … empty villages standing strange and serious. (Tahir 2016: x)

The war is evident in Afghanistan, Pakistan, Iraq, Syria, Yemen, and Somalia and in all the lives, and deaths, the war has affected. These places and these people must be drawn into view, given a voice and a place in the frame of public discourses around U.S.

actions. Other scholars, journalists, activists, and artists are engaging in such work and are creating avenues for presence and visibility.[1]

In this dissertation, I examine only some of the faces of war, those who conduct it here in the United States. While this view is incomplete, focusing on communities involved directly with conducting drone operations within the United States becomes a way to locate and make visible a set of infrastructures, both material and semiotic, through which perpetual war seeps into the everyday. However, this is not an ethnography of drone pilots. It is also not an ethnography that aims to make an argument about the morality of drone warfare or killing at a distance. I do not intend to condemn or excuse the lethal use of drones in war. My intention is to examine the emerging and increasingly troubling configurations through which perpetual war is sustained and normalized within the United States. Over the course of this dissertation, I aim to problematize familiar stories about the military, the civilian, and the automated, "autonomous," technologies currently in use.

An underlying but central intervention of this dissertation is to maintain focus on the extent to which robotic, "unmanned," and "autonomous" technologies are shaped by humans and must be continually maintained, operated, and authorized as legitimate and effective actors. In this sense, and as with previous transitions in the history of automation, new technologies do not so much do away with the human but rather obscure the ways in which human labor and social relations are reconfigured (Marx 1990; Noble

[1] See, for instance, ongoing work by scholar and journalist Madiha Tahir (2012, 2013, 2016), human rights and activist organizations such as Reprieve and Code Pink, the *Living Under Drones* (Stanford Law 2012) report published by Stanford and NYU, and the *Naming the Dead* (Bureau 2016) project by the Bureau for Investigative Journalism, as well as artworks such as the #NotABugSplat project (2014) and works by Akram Zaatari (2013), Josh Begley (2012-2016), and James Bridle (2012-2016).

1984; Zuboff 1988; Suchman 2007; Ekbia and Nardi 2014). To emphasize the human actors and social relations at stake, I employ the term "drone operations," rather than the more common term "drone" as the salient object of analysis. This framing moves away from a hardware-centric idea of an isolated object, and asks us to examine the infrastructures and surrounding networks that create, sustain, and authorize drone operations. By infrastructure I mean what Susan Leigh Star described as "a system of substrates" (Star 1999: 380), those systems that support and enable. Infrastructures might be roads or electric lines, software protocols or metadata standards, or they might be classification systems (Bowker and Star 1999) or color-coded terrorist threat advisory systems (Masco 2014). "Their peculiar ontology," as Brian Larkin has observed, "lies in the fact that they are things and also the relation between things" (Larkin 2013: 329). To study infrastructures, then, is to study the processes and forms by which relationships are not only made legible and formalized into large, organized systems but also generative of social logics and relations.

The extensive human and technical infrastructures required to operate and maintain drones are elided when drones, drone systems, and drone operations are equated, as is common in the popular media and much scholarly work. Attention is tuned to the object, rather than the system, through which its operation is enabled. In this dissertation, I employ the term drone operations rather than the more common term "drone," as the salient object of analysis in order to keep front and center the human actors and social relations at stake. When analytic attention is tuned to the *drone operation*, we are able to locate the specific configurations and conditions of possibility implicated in waging war through drone operations, and to ask more precisely how such

operations are emblematic of the current structures that maintain a perpetual state of war. Moreover, through an analysis focused on drone operations, I call attention to the divisions of labor at stake in waging this particular form of warfare. Examining the conditions and implications of these divisions provides a new and valuable perspective on broader sets of questions related to the nature and normalization of perpetual war.

In this introduction, I begin by positioning the dissertation within the existing literature on drones, orienting the reader in order to make clear the dissertation's points of continuity and intervention within existing scholarship. I then sketch the reframing of drone operations that I aim to make with this dissertation, leading into an overview of my arguments and chapters, as well as a methodological consideration of drone operations as an object of theoretical and ethnographic inquiry. I conclude by returning to the larger questions with which I began, that of the various visibilities of war.

What are drone operations?

The ground control station where a drone pilot, sensor operator, and mission coordinator sit is dark, cold, and plastered with screens that look three or four generations old. Displayed on the monitors are clunky-looking windows, some with maps and aerial video feeds, many with what looks like ordinary and old Windows software that might freeze. Far from the glistening look of high-tech combat envisioned in the movies, the "cockpit" of a Predator or Reaper drone is filled with beige plastic and painted metal, with mouses and keyboards attached to computers by tangles of power cords unsuccessfully hidden.[2] Seated side by side are the pilot, who controls the flight of the

[2] These descriptions are drawn from observations of ground control stations used in drone crew training at one of the Air Force bases I visited during fieldwork.

drone, known officially by the Air Force as an RPA, (Remotely Piloted Aircraft) and its weapons systems, and the sensor operator, who controls the set of cameras onboard the aircraft as well as the laser that is used for missile targeting. In ergonomically designed seats, they sit in front of at least six screens, which provide a world of information, including the aircraft's speed, altitude, and flight status; data gathered by the cameras and sensors onboard the aircraft; maps and information from other sources of military intelligence; and text windows that open into internet relay chat rooms (IRC). In these secure chat rooms and over secure telephone lines, the crew communicates with other Air Force personnel or defense contractors involved in the mission, all of whom may be on another base in the continental U.S. or "in theater," on the ground in Iraq, Afghanistan, or an undisclosed country in the Middle East. This "cockpit," referred to as a Ground Control Station (GCS), can look cobbled together, "like someone just kept adding another screen because it seemed like a good idea," as one pilot told me. Getting into an F-22 fighter jet feels "like putting on a second skin," a former fighter and now drone pilot confided. In contrast, the Ground Control Station of an RPA feels like the "worst designed system in history."

This scene is where most stories about U.S. drone operations end. However, the Ground Control Station (GCS) is only one node in an immense physical network through which drone operations, often described as "unmanned" aerial vehicles (UAVs) or "unmanned systems" (UAS), are deployed. Distributed around the globe, there are computers, screens, keyboards, sensors, ballistics, orbiting satellites, and underwater fiber optic cables, all designed, managed, deployed, and maintained by specialized personnel. For instance, in addition to the pilot, operator, and mission commander who operate from

within the United States in places like Nevada and New York, information analysts, in places like Florida and Virginia, review and coordinate military assessments that direct mission priorities. If a bomb is to be released from an Air Force operated drone, military lawyers will be involved in assessing the target, referring to judging potential civilian causalities. In order to carry out the standard 24-hour operation for an MQ-1 Predator or MQ-9 Reaper, a newer and more complex version of the Predator, four aircraft are required with 61 personnel forward deployed, meaning physically near the zone of flight operation, and 149 personnel operating from within the continental United States (Kreuzer 2014: 169). In total, 210 personnel are required. The number of drone personnel, including aircrew, intelligence, aircraft maintenance, and communications maintenance, has more than quadrupled since 2005 (USAF 2014: 18). And this is only counting one side of the people directly involved—that is, not counting the individuals and communities who are under surveillance and threat of attack during that shift. In every regard, drones are far from "unmanned."

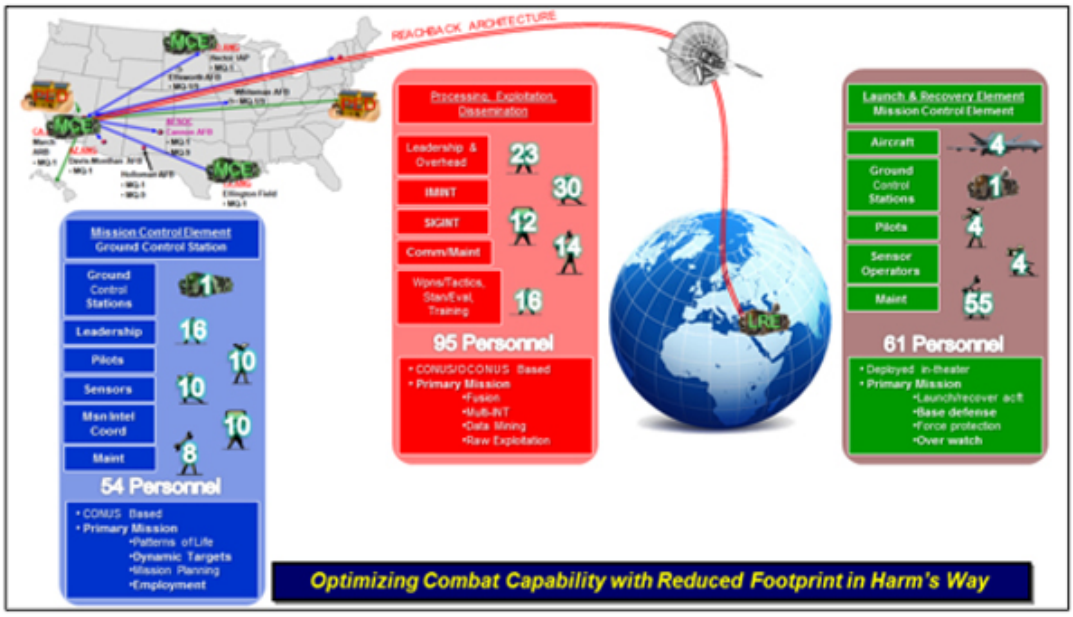

Figure 1: USAF MQ-1 Predator/MQ-9 Reaper manning diagram (Krezuer 2014: 169)

As drones have become central to U.S. military strategy, operational demand has increased steadily. For both officers and enlisted service members, positions related to Remotely Piloted Aircraft (RPA) have been among the most heavily deployed in recent years (Losey 2016). Since 2011, the U.S. Air Force has been training more drone pilots than traditional pilots (Gertler 2012). However, despite Pentagon planning for increases in the number of drone flights, the Air Force announced in 2015 that it would reduce the proposed number of flights due to insufficient numbers of trained pilots (Drew and Philipps 2015). This personnel shortfall highlights the substantial and undeniable human resources that are required to operate and maintain drones.

In addition to human resources, the financial resources required to sustain drone operations are significant. In 2001, Congress invested approximately $667 million for unmanned aerial systems (UAS) procurement. By FY2012 the Department of Defense (DoD) had requested approximately $3.9 billion for UAS procurement and development (Gertler 2012), with budgets steadily increasing each year. Even as the Pentagon has had its overall budget decreased during the Obama administration, and even as the wars in Iraq and Afghanistan are presented as nearing an end, the operational demand for drones is expected to continue to increase, according to drone industry analysts and official statements from all the military forces (Powers 2017; Yost 2013).[3] Many both within and

[3] In the final months of writing this dissertation, the Trump administration entered the White House. While it is likely that broad trends that have emerged within the Pentagon will continue, it is unclear and impossible to know what Trump and his administration will do, and how their decisions will affect military spending priorities and defense budgets. I have chosen not to attempt to conjecture what changes may occur or what the implications of the new administration will be for U.S. Air Force drone operations. Given what evidence we have so far, Trump has already expanded the use of drones and given the CIA new authority to launch its own strikes, while also relaxing requirements and restrictions on the use of drone strikes established by the Obama administration (Crilly 2017).

beyond the Pentagon are convinced that drones are the future of warfare (Bowden 2013a; Zegart 2015).[4] This holds true for both the Air Force, which operates in "conventional wars" where the United States has publicly declared war in Iraq, Syria, and Afghanistan, and for the CIA, which conducts classified and often covert operations outside the areas of "conventional war" zones, including Pakistan, Libya, Somalia, and Yemen (Shane 2016).[5]

Theories of the drone

The first known drone operation to kill a human being was in 2001 and took place several months after the September 11th, 2001 terrorist attacks in the United States (Woods 2015). However, it wasn't until the "targeted" killing of Anwar al-Awlaki, a U.S. citizen, by the CIA in 2011, that the American mass media began to cover drone operations more closely. Before this time, coverage was most likely to be found only in specialist publications or in-depth investigative articles. As more drone operations have occurred, more has become known about them. This is not surprising given that drone operations, run relatively publicly by the Air Force and covertly by the CIA, have become a cornerstone of U.S. military strategy.

[4] Cyber-warfare is the other new and growing priority for U.S. military policy.

[5] U.S. drone operations consist of two distinct programs: one is run by the Department of Defense (DoD) under the various military forces, including the Air Force which oversees the largest percentage of drone operations. These DoD drone operations generally are coordinated with troops on the ground, through military tactics known as "close air support." The CIA runs the other program, publicly unacknowledged until 2013. Debates over the constitutionality of "targeted" killings of U.S. citizens overseas, as well citizens of other countries with which the U.S. is not officially at war, most directly apply to the CIA program. Immense secrecy continues to surround the CIA program, and while public discussions and debates surrounding the program inform this research, my ethnographic work focused only on communities involved in Air Force operations.

In addition to coverage by journalists, critical scholarship has begun to emerge. Authors from a wide range of disciplines have analyzed the implications of the increasing use of drone operations from within their own disciplinary commitments and literatures. For instance, legal and international relations scholars have focused on questions of domestic and international legality, limits of state sovereignty, and Just War theory with respect to drone operations. While I draw upon work within these areas when intersecting with my arguments, a comprehensive review of these distinct disciplines is currently beyond the scope of this dissertation.[6] However, it is relevant to observe that implicit in most of these arguments, as Jamie Allinson (2015) points out, is that "the use of drones has been subject to a debate about their tactical conditions of use rather than the strategies they serve or the structures of power of which they form a part" (Allinson 2015: 113). In other words, the literature has focused on the potential for illegality, abuse, or misuse of a weapon, rather than the "'correct and quotidian" (117) usage of drones.

In contrast or perhaps as a supplement to such literature, there is a growing body of scholarship emerging from the humanities and social sciences about the "correct and quotidian" (117) usage of drones, including work from within the disciplines of geography, media studies, philosophy, anthropology, and sociology. A primary research focus within these domains has been the particular forms of state power at stake in drone operations (Wall and Monahan 2011; Shaw and Akhter 2012, 2014; Allinson 2015; Parks 2016; Franz 2016). For instance, Allinson (2015) draws on the characterizations of racism and biopolitics found in Foucault's (2004) later lectures and Achille Mbembe's theorization of necropolitics (2003) to analyze the particular operations of power and

[6] See Kaag and Kreps (2014) and Plaw, Fricker, and Colon (2016) for comprehensive overviews of this literature.

enactments of violence at stake in drone operations. Allinson argues that a necropolitical logic, in which the sovereign's power is not to govern life but rather to command death and to assign grievable meaning to the dead, characterizes drone operations. In this sense, "the drone" operates as a "technology of racial distinction" (Allinson 2015: 120), as well as a technology of mechanical violence, defining "who matters and who does not, who is disposable and who is not" (Mbembe 2003: 27). Allinson's argument is intended as an intervention against the assumption that military personnel are "perfectly rational, liberal subjects sifting information about potential targets to carry out just acts of killing" (Allinson 2015: 114), an assumption that he sees as inherent in debates about the legality of drones and whether they should be fully autonomous or not. While this dissertation does not take up the operation of state power in the same register as Allinson, his work points to a fundamentally important and necessary intervention within military and most public and legal discourses about drone operations: the decisions and judgments at stake in drone operations do not and cannot operate outside of the contexts of racial distinction and colonial encounter.

Another focus of scholarship has been examining the moral implications of drone operations through the lens of the phenomenological experiences of drone operators (Williams 2011; Brandt 2013; Coekelbergh 2013; Wilcox 2016). Indeed, the drone, as what Noel Sharkey calls the "ultimate distance weapon system" (Sharkey 2012: 112), has generated profound anxiety about the ease with which warfare may be waged across academic disciplines, as well as within select military communities (Riza 2013). This anxiety most often has been localized on the figure of the drone pilot or operator, implicitly standing in as a synecdoche for all those who wage war in the context of drone

operations, and the distance between a drone operator and her target. This focus derives primarily from the assumption that distance is the primary function affecting the ease with which an individual may kill another. A basis for this is the work of David Grossman and his well-known book, *On Killing* (1995), in which he argues that distance is a powerful means of overcoming an otherwise natural resistance to killing, evocatively writing, "From a distance I can deny your humanity, and from a distance I cannot hear you scream" (Grossman 1995: 102). His essential argument is that distance increases indifference, and both have tended to increase over the course of the history of warfare.[7] Physical distance is crucial for Grossman's theory, but he also includes other kinds of "emotional" distance, including the dehumanization of others through racist ideologies, as well as technological mediation through a screen in the context of video games (1995: 189-190).

Yet, here emerges a crucial question: how is distance constituted and how should changing conditions of propinquity be accounted for? For instance, the visual images that drone operators see in a Ground Control Station (GCS) have led to claims that pilots and operators are "18 inches" from the battlefield, the distance between eye and screen. Drone crews are indeed in unique positions to view the battlefield compared to fighter and bomber pilots, who drop a bomb and then continue flying away to a base. Drone crews spend the majority of their flight hours conducting surveillance. If a bomb is dropped, the drone and its camera remain over ahead, and the crew conducts "battle assessment" of the bombed area and persons below. In this sense, drone crews might be seen as "closer" to the battlefield, and such visual connection seems to provide a

[7] This is, however, only true if one conflates the history of all warfare with the history of Western warfare.

counterpoint to Grossman's thesis. However, as geographer Derek Gregory (2011b) emphasizes, the sight afforded by drones is socially and historically specific. While the drone crews may see more than traditional pilots, Gregory argues that the sight afforded by drones is always already a militarized gaze, what he terms a "militarized scopic regime," in which racialized and colonial frameworks always already structure interpretation and do not present what many assume to be a transparent view of the battlefield. Gregory underscores that what can be seen is "necessarily conditional—spaces of constructed visibility are also always spaces of constructed invisibility" (Gregory 2011). He demonstrates that while seeing the battlefield through the cameras and sensors on the drone does not necessarily result in detachment from the battlefield, neither does it equate to equally distributed intimacy or affective attachment to the individuals who appear on the screens. Grégoire Chamayou (2015) makes a related point; while in some regards physical distance is collapsed, any perceptual proximity that can be said to emerge is, in turn, rendered distant again given what he articulates as "the filtered nature of perception, the figurative reduction of the enemy, the non-reciprocity of the fields of perception, and the dislocation of the phenomenological unity of the action" (Chamayou 2015: 119). For Chamayou, these conditions result in a radical disconnection, a kind of "drone psychopathology," in which an actor, the drone operator, is separated from the action being performed, ultimately facilitating the ease with which one may kill. In this dissertation, I do not wish to make assessments about the ease or difficulty of killing an individual. Rather, I see it as a worthy critical project to analyze how distance, physical or otherwise, is constituted and how changing conditions of propinquity are

implicated beyond the affective experiences of pilots and operators, particularly in the context of the distributions and divisions of labor in war fighting.

In this context, it is worthwhile to return to what is the most consistent theme of the emerging body of critical research around drone operations: the nature of the sensory mediation and its relation to action at a distance. Much of this work is shaped by the legacy of two recent scholarly discourses: media theories of the virtual and materialist theories of agency, such as actor-network theory, and here I turn to these legacies in greater detail. First, drone warfare has often been considered as "virtual warfare" (Ignatieff 2001), with the connotation that such a profound set of mediations separate a soldier from the battlefield that the reality of war does not exist for the person waging war. Drawing on critical media theory from the 1980s and 1990s, including the work of Jean Baudrillard and Paul Virilio, instances of digital representation are argued to produce profoundly alienating effects in which "virtuality destroys reality" (Der Derrian 1998: 5). Virilio is perhaps the most well-known and prolific writer examining the lethal conjunctions of war, mediation, and speed. In one of his most well known works, *War and Cinema* (1989), Virilio argues that the entwinement and co-evolution of cinematic and military technologies of perception has resulted in a "growing derealization of military engagement" (Virilio 1989: 1). Though never explicitly defined, I understand the term "derealization" to refer to both an increasing physical displacement of the human fighter from proximity to the enemy or target, as well as a rise of the centrality of the image—the representation of reality. Rather than immediate perception of an object or event, a mediating image interjects itself, not only mediating, but also cutting off the perceiver from that which is perceived. Virilio writes, "in industrialized warfare, where

the representation of events outstripped the presentation of facts, the image was starting to gain sway over the object" (1). Virilio's theory seems to imply a world pre-mediation, a bygone era when perception and representation were transparent. However, even according to Virilio's own argument, perception is socio-historically specific—not just in the 20th century, but in its essence. The rise of the image as a reality in its own right, not just as an index of reality, does not necessarily require that immediate reality be eclipsed, an argument I develop further below.

While *War and Cinema* was written before the Gulf War, many of the critical analyses that current drone scholarship draws on were based on the First Gulf War media coverage, which predominantly considered the coverage from the perspective of its public entertainment value. For example, James Der Derian (2009) builds on Virilio's work and explores what he terms the MIME-net, the military-industrial-media-entertainment network, in order to theorize the implications of the increasing interconnections between military and entertainment media. These interconnections serve not only to "virtualize" violence, but in this virtualization, to make the idea of "virtuous war" putatively possible. Describing what he sees as the nature of virtuous war, Der Derian writes:

> Fought in the same manner as they are represented, by real-time surveillance and TV 'live-feeds,' virtuous wars promote a vision of bloodless, humanitarian, hygienic wars. …Unlike other forms of warfare, virtuous war has an unsurpassed power to commute death, to keep it out of sight, out of mind. In virtuous war we now face not just the confusion but

> the pixilation of war and game on the same screen. (Der Derian 2009: xxxi- xxxii)

Der Derian's observation that contemporary forms of warfare claim a "technical capability and ethical imperative" (xxxi) to conduct war with no or minimal casualties is an important one, and one that is examined in chapters 1 and 2. However, it is important to note that Der Derian argues that this achievement of "virtuous war" relies upon the mediating effects of violence, in which awe and entertainment value replace "the reality" of an event, which has been "removed" (9) through video representation or simulation. He does not fully account for the other political, legal, or organizational logics through which "virtue" may be achieved, including claims to precision, which I discuss in further detail in the next chapter.

Still, many current scholars claim that drones, too, are "derealising" (Stahl 2013) war through its "virtualization." According to this essentially technological determinist perspective, warfare conducted with drones necessarily reduces war "to the vicarious gazing and gaming of a far-away war" (Shaw and Akhter 2012: 1496), "transmut[ing] killing into the stuff of video games" (Pugliese 2016: 501). Indeed, a related assumption at stake in media theories of the virtual as they are applied to the study of drones is the equation of video games and military video feeds. Such arguments point to reports that young drone pilots and operators come home and play video games in their off-duty hours. These arguments point out that the military services have increasingly invoked the skills of video games as assets in recruitment materials, and the Army commissioned what has since become a popular video game, *America's Army*, as a form of recruitment (Allen 2011). This has led many to assume a seamless conjoining of video games and

digitally rendered battlefields, "where public and game narratives merge, where game and weapon interfaces merge, and where player and soldier identities merge" (Stahl 2013: 666). In a related argument, sociologist Joseph Pugliese has articulated what he terms "drone-casino mimesis" in order to draw attention to a profoundly consequential "enmeshing" (Pugliese 2016: 501) of military and gaming technologies. He draws on reports by journalists to demonstrate how "the drone console here becomes interchangeable with that of a computer game," and proposes that the aesthetic similarity between the physical controllers of video games and those of flight controls "operat[e] as a type of spectral palimpsest, [in which] the template of video games haunts and inscribes the actuality of a drone kill" (502). His argument also draws on the physical location of Las Vegas, Nevada, to emphasize the ways in which the sites and technologies of drone warfare exist within civilian urban spaces, rendering a "conversion" of civilian practices and technologies into military ones. For Pugliese and others with similar arguments that hinge on aesthetic correspondences or the representative (in)capacities of video feeds, what is at stake is not only the gamification of war, but also the disappearance of "the reality of war" for drone operators.

The relations between video games and waging war are valuable sites of inquiry. However, in this case, several aspects of drone operations make a simple reduction of their status to video games problematic. It is not simply the case, as Gregory argues, that video games are "profoundly immersive" (Gregory 2011b: 208) and in many instances are experienced as intense and immediate experiences. It is also that, similar to the arguments above, a mediating technology is imagined as separable from its immediate context and conditions. Yet, from within a Pragmatist tradition, we know that meaning

and significance are particular to the social conditions that structure the creation and interpretation of a given action or sign. This is not to say that aesthetic similarities between video games and surveillance feeds are inconsequential, but rather to suggest that the pull and structuring potential of other social conditions is significant and must be carefully accounted for.

Central to the arguments of Virilio, Der Derian, and other scholars writing from within a media studies tradition are several entwined assumptions that merit closer consideration since they form the core of most current critical approaches. One assumption, albeit implicit in these arguments, is that technological mediation produces an inauthentic double, a mere representation that is not "reality." Such theories seem to imply an ideal state of human existence in which reality was experienced authentically and directly, placing "representation" at odds with "reality." Yet, consider that other forms of mediation, such as language, are constitutive of reality, such as speech acts that continually create and draw together the material world (Austin 1975; Goffman 1959), "laminating" (Goffman 1981) what would otherwise be disconnected moments of time and space.

Moreover, recent ethnographic studies of online worlds and online gaming have demonstrated the ways in which physical and "digital" worlds are not rendered distinct but rather interwoven in complex, inextricable ways (Hine 2000; Taylor 2009; Boellstorf 2010). Indeed, contrary to the original utopian hopes for internet technologies, which were imagined to have potential to free users from physical constraints or prejudices, digital technologies have served to reinforce and retrench structural disadvantages and

prejudices (Chow 2006; boyd 2014). The social context, more than the technology itself, structures the conditions of its reception and use.

In light of this work, we should be skeptical of claims that "virtual" representations, involving digitally mediated images on a screen, are experienced as independent, isolated, or "unreal" representations of a reality "out there." Examples from the technosciences—from genetic testing (Abu El-Haj 2012) to medical imaging (Prentice 2012) to nanotechnology (Daston and Galison 2010)—demonstrate that in many instances, visualization of phenomena enabled by technological mediation and enhancement becomes the grounds for those phenomena to be considered to be—and demonstrated as—*real* and able to be engaged or acted upon.

Still, this is not to say that technological mediation does not profoundly transform what we can call reality, and more so, the dimensions of the reality within which we can claim to effectively know and act. New technologies, in their extension of human sense perception in time and space, reconfigure the scales in which meaningful human action can be understood to obtain (McLuhan 1994). Examining the virtual can be implicated in a reconfiguration of what it is possible to think, not because reality has been eclipsed but rather because the conditions of what counts as reality have shifted (Foucault 1970; Hacking 1993).

The second prominent theoretical influence in the existing literature on drones is new materialist approaches to theorizing human-machine assemblages, including actor-network theory and feminist epistemology. Here, not the mediating function of drones but rather *the agency* of drones becomes the focus. This perspective often responds directly to claims about the "derealization" of war through virtualization by emphasizing the

materiality of the agents (sometimes on the ground below, but generally elsewhere) and networks at stake. In this literature, drones "see" and "want" (Greene 2015), "gaze" (Matthews 2015), and "stare" (Wall and Monahan 2011: 239) with "steely bodies" (Holmqvist 2016: 538). Drawing primarily on Latour, these arguments focus on the unique kinds of surveillance and control that are enacted by the drone. For instance, Daniel Greene analyzes a series of artworks about drone strikes in order to interrogate "the drone not as an isolated technological marvel but the tip of Empire's spear, the point at which the dispersed materials of the war machine can be seen coming together" (Greene 2015: 235). The artworks that Greene discusses anthropomorphize the drone, and in this way quite literally call attention to the agentic capacities of drones. Greene is careful to argue that his interest is not isolating human or nonhuman agencies but rather, following Bennett (2010), drawing out the complex assemblages "of contemporary surveillance and violence" (247). Caroline Holmqvist, likewise, proposes that "taking into account the possibility of material objects having 'agency' provides space also for new conceptions of political agency" (Holmqvist 2016: 545). For her, examining the agency of drones becomes a means to refocus the "materiality of drone warfare" (535) and the ways in which "bodies and bodily experiences of war" (538) are implicated in drone warfare.

Such critical orientations provide valuable insights on the complicated dimensions of distributed agency and how "matter comes to matter" (Barad 2007). However, this literature also suffers from a tendency to reify and fetishize the drone, even as it claims to be a project of de-fetishization. Theorists such as Jane Bennett (2010) propose that "a distributive notion of agency," which "does not posit a subject as the root cause of an

effect" (31), in fact expands and refines a capacity for politics and ethical justice through a reorientation of how political events can be understood to obtain. However, I worry that in this expansion of the frame we lose important dimensions of resolution, meant both in the sense of losing important detail and losing a focused commitment. We must acknowledge that in many contexts, and even as the theoretical aim is to establish mutual dependencies within "collectives" (Latour 1993), the attribution of agency to non-human actors and the reification of agential artifacts may obscure questions we wish to address, for example, how responsibility and accountability for actions undertaken in the world can and should be adjudicated. In the context of theories of the drone, materialist orientations direct critical attention away from the human infrastructures and agencies, as capacities for action, at stake and leave room for the articulation of actors without the capacities to be held legally or morally accountable in society.

The work of war

Chamayou, in his book-length study of drones, seeks to elucidate "a theory of the drone," a philosophical investigation and "theorization of a weapon" (Chamayou 2015: 15). Drawing on the insights of Simone Weil, Chamayou proposes: "Begin by taking apart the mechanism of violence. … What is important is not so much to grasp how the actual device works but rather to discover the implications of how it works for the action it implements" (Chamayou 2015: 15). In this dissertation, I, too, aim to take apart a "mechanism of violence," but the mechanism I wish to investigate is the drone operation and the everyday infrastructures in which it is implicated. This leads me not to a theory of the drone, but rather, to the *practices* of the drone *operation*.

As both a contribution to and intervention within the existing literature overviewed above, this dissertation examines drone operations not only as a technology of mediating sensing but also acting, particularly through the frame of work and the distribution of human labor. This frame allows me the conceptual space and ethnographic purchase to explore and tie together themes that run throughout the dissertation, including the dimensions of human agency within automated and "unmanned" systems, the changing nature of military service and war work, and the essential entwinement of traditionally received categories of military and civilian. For this reason, I analyze the drone operation, articulated above, rather than just the drone. I propose that we cannot fully comprehend the implications of the increasing use and concomitant invisibility of U.S. drone operations without expanding our inquiry into the more mundane infrastructures that facilitate perpetual war.

In the context of anthropological studies of postcolonial violence, Daniel Hoffman (2011) suggests that there is much to be learned in considering the violence conducted by militia fighters of West Africa's Mano River War as a form of productive labor. In contrast to considering postcolonial violence in Africa primarily as a process of identity formation, Hoffman argues that considering the practices that constitute war *as labor* allows us to see the ways in which violence remakes the world. War and the forces that sustain it are beyond localizable configurations of enemies and boundaries; war and the particular forms of "flexible" labor it requires are inextricably enmeshed in local and global political economies that exceed the boundaries of any particular conflict. Central to Hoffman's argument about the labor of the militia fighters is its context within global neoliberal economies, and one of his primary aims is to examine the kinds of life and

labor of young men "at the margins of the economy and society" (52), as well as the kinds of movements and flexibilities required.

In particular, he calls attention to the parallels between the acutely precarious and disadvantaged position of labor within a post-Fordist mode of production, in which "the workday is ill-defined, if not perpetual" (43), and the position of the militia fighters. As Hoffman points out, the militia fighters think of themselves as "workers" as much as they think of themselves as "patriots," and the language they use is that of what he describes as postmodern work: "employment, gain, compensation, reward, security" (34). In order to call attention to the stakes of these formations for the youths of contemporary West Africa; Hoffman observes, quoting the post-Fordism theorist Paolo Virno (2004), that "the old distinction between 'labor' and 'non-labor' ends up in the distinction between remunerated and non-remunerated life" " (Virno 2004: 103, quoted in Hoffman 2011: 46).

While Hoffman's argument is instructive for my approach, my arguments are not parallel to his. The contexts and conditions of work are significantly distinct between West Africa and the U.S., which cannot be understood to exist on any kind of global periphery. As members of the U.S. military, drone pilots are not in the same positions of precarity—nor are their lives at risk in the same ways. Although, as I will discuss in the third and fourth chapters, the increasing usage of the National Guard and defense contractors within drone operations follows a related post-Fordist logic (King 2006) of organizing and compensating labor, as well as requiring resilient, "flexible bodies" (Martin 1997).

My intent in bringing up Hoffman's work is to demonstrate the substantial analytic value of taking an approach that examines war *as work* and the forms of labor war demands. Being attentive to the work of drone operations *as work* helps us understand more fully the implications of drone operations for organizing not only forms of state violence, but also local economies and individual life-worlds, and the new kinds social infrastructures that authorize and legitimate these formations.

Indeed, historically, new divisions of labor—which create new meaningful frames of action and distributions of accountability—have produced new social relationships and new conditions of possibility for the constitution of power and subjectivity (Durkheim 1997; Foucault 1995; Marx 1990; Smith 1976). In this context, my research examines remote warfare as a new and consequential division of labor that can be contextualized within particular histories of automation and theories of human-machine integration. I begin this work in the first chapter, tracing how the conditions of possibility for drone operations to be seen as an effective and efficient mode of warfare are rooted in particular genealogies of military expertise and command and control systems. In the third chapter I ask how drone operations are changing the conditions within which airmen can feel pride or shame for their work.[8] If we think about responsibility as not just the capacity to be blamed, but also as the ability to be recognized as the responsible agent, for good or bad, we are presented with valuable opportunities to think about how human agency can be transformed or masked in complex human-computer systems.

[8] The masculine plural, "airmen," not soldiers, is used by the Air Force to refer to individuals within their branch. Throughout the dissertation I repeat the gendered terms *airman* and *airmen* when referring to Air Force personnel, as my interlocutors did, the majority of who were men. The gender dynamics at stake in the military and within drone operations will be a consistent theme within the dissertation, although it is not focused on here in the introduction.

This dissertation is also concerned with an expanding web of inter-related questions around the various visibilities of war and the changing experiences and perceptions of military service and military/civilian divides. How, I ask, are drones implicated in new visibilities, not only of the war to those within the United States generally, but also more specifically within local economies, where military bases are located and war is executed? Another central theme of my research has been to examine the traffic between military and civilian worlds. How are civilian and military spaces blurred in the context of drone operations? But how also are they maintained as distinct and to what end? How are social, affective, and economic infrastructures (Masco 2014) suturing military and civilian worlds and world-views, and how are these infrastructures implicated in normalizing war and particular modes of state violence?

In this regard, another significant body of literature with which this dissertation engages, and to which it contributes, is the study of the American military within the United States. I attempt to connect studies of the military from within the disciplinary legacies of both anthropology and sociology in order to develop a more complicated understanding of American military communities and the processes of what historian Michael Geyer (1989) has termed, "militarization," defined as "the contradictory and tense social process in which civil society organizes itself for the production of violence" (Geyer 1989: 79). As a thread throughout the dissertation, my aim is to demonstrate how clear separations between military and civilian—whether technologies, beliefs, or lifeworlds—are contingent and provisional. I focus explicitly on these separations and the constitution of military and civilian boundaries in the fourth and final chapter.

My arguments emerge in the context of anthropological studies of war and war-related work in the United States, which have generally have focused on technical war-related research and planning, most notably among nuclear scientists (Cohn 1987; Gusterson 1996; MacKenzie 1993; Masco 2006). The socioeconomic implications of military bases and military service have also been a focus of study (Lutz 2001; Markusen et al. 1991; Nash 1989). Ethnographies that focus on active-duty soldiers within the militaries of the U.S. and other industrialized countries remain scarce (Ben-Ari 2004; Simons 1999). This is most likely due to issues of access, as well as both real and perceived ethical dilemmas.[9] Recent works by Ken MacLeish (2013) and Zoë Wool (2015), as well as Seth Messenger (2010) and Erin Finley (2011), have deeply enriched the anthropological study of U.S. military issues. This work has focused on veterans of the Iraq and Afghanistan wars, and mostly enlisted veterans, those who tend to come from lower socio-economic and educational backgrounds, examining how veterans live and re-craft their worlds following often-traumatic returns from war and separation from military service. For instance, MacLeish's work is guided by an imperative to show that "the people producing its violence can appear as complex and conflicted persons rather than caricatured tragic heroes or anxiety-provoking victims" (MacLeish 2013: 10). His critical project, as he sees it, is to demonstrate the traumas and vulnerabilities of soldiers, particularly those on the edges, who may "fall through the cracks." Wool's work, as well, has focused on the psychically and physically wounded bodies of Army veterans through

[9] The discipline of anthropology and the U.S. military have had a long and at times problematic relationship, and an important body of literature has emerged in recent decades that critiques the ways in which anthropological research has been implicated in covert and explicit war efforts, including the recent Human Terrain System (HTS) program (Gusterson 2003, 2007; Gonzalez 2007; Price 2002). See also Hoffman (2010) for a discussion of other potential sites of intersection between social science and the military.

her ethnography of recovering soldiers and their spouses at Walter Reade. She, too, is interested in moving away from the sensational or over-determined meanings for the lives and bodies of returning soldiers, and instead focuses on the tensions between ordinary and extraordinary life, examining how each is experienced and constituted, and focusing on how ordinariness gets constructed materially and discursively. These ethnographies have contributed rich and nuanced portraits and understandings of the ways in which the state of perpetual war is experienced by those on—or who have been on—the frontlines of the battlefield.

However, less work has used ethnographic methods to study contemporary military institutions and structures of war making. The ethnographies cited above contribute to understanding the effects of military service on those who fight and on their immediate communities. These ethnographies are less concerned with unpacking how war making is normalized and perpetuated beyond an individual soldier's life. My focus on drone operations, rather than on soldiers, provides an additional and necessary perspective on the techno-political logics and formations of state power implicated in U.S. war making.

Moreover, very little work has been done by anthropologists studying officer cultures within the U.S. military.[10] Indeed, Morris Janowitz's opening observation in his 1960 sociological study of military elites, *The Professional Soldier,* still resonates:

> The civilian image of the professional soldier remains firmly rooted in the past. His style of life, his day-to-day tasks, and his aspirations change as

[10] The divisions are strict between military officers, who have received a college degree, and enlisted personnel, who have not. The lowest ranked officer still outranks the highest ranking enlisted airman or soldier. Hierarchies both on and off-duty are enforced, and officers "fraternizing with enlisted" are subject to censure.

> the technology of war is transformed. Yet, outdated and obscure conceptions of the military establishment persist because civilian society, including the alert political public, prefer to remain uninformed. Military officers, especially those who occupy posts at the highest echelons, are only dimly perceived as persons, decision-makers, and political creatures. (Janowitz 1974: 3)

While these observations may be slightly hyperbolic of current perceptions of military officers, from my own experiences I do not think such conceptions have changed dramatically since Janowitz's study.[11] However, as Janowtiz argued, such communities, have the potential to offer rich insights into questions of military power and authority, for officers are in positions of relative power and represent a range of institutional and organizational logics. As opposed to portrayals that, in many ways, paint veterans or enlisted soldiers as cogs in a vast war machine, or as victims themselves of larger bureaucracies in which they have little agency, officers are "those who shape attitudes and actually control institutional structures" (Nader 1969: 284). While the extent of any individual's power is, of course, limited, the relatively powerful position of officers within military organizations is important to study, in its own right, as well as to engage with intellectually as interlocutors.

Like Janowtiz's work, this dissertation engages with Air Force officers, who represent the majority of people I interacted with during fieldwork, as they saw themselves, that is, as professionals with commitments and careers. Rather than

[11] A recent USAF major I met at a law and robotics conference, unrelated to military drones, confided to me that his fellow graduate students at Princeton were at first very wary of him. After getting to know him, one explained, "We are so relieved you're normal! When we heard there was going to be someone from the military in our cohort, we didn't really know what to think, but we thought you'd be terrible."

retrenching what Peter Asaro has articulated as the "heroic/antiheroic mythologies" (Asaro 2013: 5) of drone pilots, in which scholarship falls into binary praise or condemnation, this dissertation aims to complicate such conceptions. In this way approaching drone operations as reconfiguring dimensions of military work enables a more complete picture of understanding how experiences and perceptions of agency have developed, as well as the kinds of subjectivities and institutional logics at stake in drone operations.

Drone operations as an object of study

To take U.S. Air Force drone operations as an object of study poses a series of methodological dilemmas. How are such operations to be bounded? Who is to be studied, and where? What access to military communities or sites is possible, and under what conditions? While the notion that a study of culture is appropriately bounded in a physical space has been problematized for some time now (Gupta and Ferguson 1997), the question remains: what are ideal relations between sites in multi-sited ethnographic projects? Is one to "follow the person," "follow the object," or "follow the metaphor," among other orienting directions, as George Marcus (1998) has suggested?

There are many approaches one might take to study drone operations. Because the questions I ask are concerned with the drone operation as a sociotechnical system in which particular configurations of humans and machines are implicated, it has made sense to track and to trace how these configurations were reformulated and rearticulated over time, in different contexts, and with networked effects. For this reason, I selected sites across a range of academic, military, and commercial domains. While I wished to remain attentive to the agentive capacities of artifacts, I also wanted to locate a critical

imperative in identifying the new kinds of agencies and actors that emerge, surely hybrid but steadfastly human, within sociotechnical systems.

Jenna Burrell (2009) has suggested that a productive mode of conducting multi-sited ethnographic fieldwork is to start with "an entry point," rather than a specifically located field site. For this research, my "entry point" was attending the largest drone industry conference, known as AUVSI, the Association of Unmanned Vehicle Systems International. I became aware of AUVSI and subsequently attended, thanks to a recently retired Air Force officer, Robert, who had been a fighter pilot as well as involved in strategic planning within the Pentagon around early drone operations. I was introduced to Robert by an acquaintance I met at a conference, who had a family connection to this man. Both formal and kind, Robert, a man in his early 60s, spent several hours on the phone with me over the course of two months thinking through the project and assisting me with articulating it in a way that would be legible to military audiences. Articulating my research and positioning myself as a legible actor was a significant activity during my fieldwork. It was a significant activity both in terms of time spent as well as implications for potential access. I eventually had different versions according to military rank, age, or service. To know the importance of creating various versions, as well as making each version effective, had involved acquiring specific sets of knowledge and appropriate vocabularies, including of military jargon, body language, and organizational politics.

My path toward access continued on later that year, when I attended AUVSI and Robert introduced me to several other current and former officers who he thought would be interested in the project.[12] Starting from that entry point, my contacts and potential

[12] When I was first beginning this research in 2010, I was most interested in the media reports that drone pilots were suffering from PTSD (Lindlaw 2008). As a long time student of visual media

informants slowly began to expand, with people referring me to other people, who sometimes would speak with me and sometimes would not. For several months, I was in discussions with the Office of the Chief Scientist of the Air Force, and it seemed like there was a real possibility that I would conduct interviews with pilots as part of a research cooperation with the Air Force. This relationship ultimately broke down, and such a research cooperation was never reached. During this time, I met numerous journalists who were able to get more access to bases, and whose interactions were not limited by my institution's IRB protocol, which was required to adhere to a DoD Directive that severely restricts research interactions with military personnel. Rather than considering such thwarted attempts as research dead-ends, I attempted to incorporate my experiences of trying to gain access as part of the research, itself, and some of these experiences are described and analyzed in the final chapter.

Ultimately, from August 2013 to December 2014, I conducted full-time fieldwork at six locations throughout the United States. I selected a series of sites that offered different inflection points in the conceptualization, evaluation, and use of drones. Even as the particular locations remain unnamed, here I would like to detail more about the kinds

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and theories of mediation, but knowing nothing of drones, I was compelled to learn more about how such profoundly mediated acts could result in physically manifested trauma. Other scholars also turned their attention to this situation, as briefly described above, and while I discuss these issues of PTSD and trauma further in the third chapter, this has not been the focus on my research. Over the course of my fieldwork the questions surrounding drone pilots and PTSD became less compelling, and ultimately seemed to lead away from what were emerging as the most pressing the research questions. This was in part due to the fact that the drone operations communities that I interacted with did not discuss or even circulate rumors about such issues. There are, of course, strong stigmas within military communities associated with admitting to trauma and combat related stress, as well as potentially being relieved of duty. Such attitudes would influence community talk about drones and PTSD. Still, the narratives of drones and PTSD, when they did come up, were treated as misinformed media stories pressing in from the outside. This seemed to be not because a dirty secret was being aired but rather because "they just didn't get it." These were not the most pressing issues facing the drone operations community; they were impositions from a public who didn't understand.

of interactions that constituted my fieldwork. The process for designing this research involved multiple iterations and required non-traditional modes of participant-observation, what Hugh Gusterson has termed "polymorphous engagement" (Gusterson 1997). This included conducting interviews with retired as well as active-duty Air Force officers and enlisted service members, defense contractors and other professionals employed within the drone industry, as well as academic and military research scientists and engineers. More specifically, whenever and wherever possible, I attended conferences, networking events, lab meetings, protests, and job fairs. I gave talks, followed by discussion and question and answer sessions, to military and academic audiences, and asked for tours of labs and physical structures. As a visiting scholar at MIT for four months, I attended aeronautics and astrophysics as well as computer science and engineering classes about autonomy, robotics, and Unmanned Aerial Systems. During this time, I met several Air Force officers who were completing PhDs related to the subject of drone operations, and a great deal of my thinking is informed by conversations with them, and people to whom they referred me. I also volunteered with a civilian drone industry development advocacy organization for six months, the majority of whose leadership was composed of former Air Force officers who had been involved with military drone operations, embodying the blurring of boundaries I examine in detail in the final chapter.

According to the wishes of the majority of military officers I spoke with, as well as the IRB protocol for this research, I maintain the anonymity of my interlocutors, unless quoted from a public document. To do this, I have also had to anonymize Air Force bases where these officers were deployed or where I visited. Characters are amalgamations of

individuals in order to further prevent re-identification of specific individuals but reflect the views and backgrounds of interlocutors I met in the field. Whenever possible, I maintain the appropriate rank and branch of force (USAF, Air or National Guard, Army, Navy, Marines). The names of the bases and wings I describe are pseudonyms, but I have maintained analytically key distinctions between Air Force and Air Guard bases. The irony of writing about the variously visible infrastructures of war within the United States without identifying any particular places is not lost on me. Unfortunately, both legal and ethical concerns outweigh, at this time, providing more specific and localized accounts.

In one sense, this research has positioned me as studying war, itself, from a distance. I never witnessed or took part in active U.S. military operations. I never saw a bomb drop, heard explosions, or felt the ground shake. I was never near the death and destruction that are wrought by drones, nor did I speak with people who had endured such attacks. In another sense, however, one which I feel is of critical importance, I was not studying war at a distance, but rather up close. This is true if we consider war as not only when the bomb drops but all that has led up to and enabled the act. To emphasize the presences of war and the waging of war here is not meant to belittle the sites of destructive violence and death, but rather to enlarge what is considered as waging war, in order to more fully comprehend the extent of war and its far-reaching implications.

In this context, I understood my role to be as an anthropologist who wanted to take seriously and analyze the dimensions of the lived realities that I encountered. As best I could, given my own experiences and subjectivity, a motivating goal for me was to see the world, and its order and disorder, from the perspective of officers within the drone operations community. There are limits to any such view. And one might object that a

position of critique could be lost from this vantage. However, I believe that my role as a scholar is to provide a foundation and set of orientations through which to understand and analyze contemporary phenomena. Indeed, the recent 2016 U.S. elections laid bare the extent to which the worlds and realities within which Americans live are radically divergent and do not necessarily intersect. I believe that projects that attempt to present specific and complex perspectives are essential. But this is not because some kind of imaginary potential for empathy can resolve fundamental disagreements about the ways of living and being that should exist and be protected. Rather, it is precisely because different logics and worldviews must be taken seriously and analyzed in order to more clearly identify sites of productive engagement, critique, and intervention.

A note on terminology

It was only when I returned from fieldwork that I began to use the term "drone" to describe the aerial vehicles that crew operate remotely from Ground Control Stations (GCS). In the field, I tended to use the terms UAV (Unmanned Aerial Vehicle) and RPA (Remotely Piloted Aircraft). For the first several decades of deployment, until around 2010, UAVs or UAS (Unmanned Aerial Systems) were the most predominant terms within military or technical communities. In 2010, the Air Force began to refer to UAVs as RPAs, apparently in order to more accurately reflect the human resources required. The term "drones," I was told by numerous officers and defense contractors, was a "bad word" because they understood it as the term the media, anti-drone activists, and the "misinformed" public used and conflated with the image of "killer robots." One commander joked that if I used the "d-word" he would end the interview. (I'm almost certain he wouldn't have.) In fact, using the terms RPA and UAV fluidly and

automatically became a signal that I was not an immediate threat, that I was not a complete outsider. In turn, when I returned from the field, *not* using the term "drone" marked me as likely residing in a "pro-drone" camp, as if I had been coopted by the military.

With respect to the terminology I use in this dissertation, I have decided to use the term "drone" as a default when referring to a remotely piloted aerial vehicle, and use the term "drone operations" when referring to the complex network of humans and machines that enable these remote split operations. I have done so for the sake of clarity, first and foremost. Drone is the term most widely used outside of technical and military communities. However, I use the term RPA when describing or analyzing current or recent events or perspectives within Air Force communities. I have thought it important to mirror, in order to emphasize, the degree to which different communities are actually speaking about different things.[13] That is, the sets of connotations and structures of potential interpretation for each term are different. Likewise, when referring to drones or drone programs that existed before 2000, I use the terms UAV or UAS. Both because these were the most common terms used, including by mass media publications like the *New York Times,* but also because the techno-scientific imaginaries (Marcus 1995) that inform "unmanned" and "autonomous" technologies inform the history of drone operations, a point I develop further in the second chapter.

[13] Other sets of terms also subtly delineate the military-related actors and events I discuss, such as defense/military and service/force. Throughout the dissertation I have chosen to employ the less-euphemistic term, unless in direct quotation. For instance, I refer to "military" rather than "defense" communities, and the "military forces" as opposed to the "military services" to refer to the Army, Air Force, Navy, and Marines.

Dissertation overview

Each chapter in the dissertation examines drone operations from a different perspective, drawing on information gathered during fieldwork, as well as analyses of publicly available government documents, mass media, and trade publications. In the first chapter, *Remote split: A history of U.S. drone operations*, I analyze the historical conditions of possibility for drone operations to be seen as an effective and ideal form of U.S. military engagement. The *remote split* operational paradigm is what allows a drone operator to watch and attack the enemy from thousands of miles away. In this chapter I describe in detail the composition of this human and material network, and I argue that the distribution of action that characterizes remote split drone operations is neither obvious nor necessary. Rather, the particular division of war work at stake, with roots in cybernetic and systems theory, has emerged in the decades since World War II through interwoven developments in military command and control theory, epistemological commitments to digital information as transparent and "raw data," global information networks, and legal postures toward war. By considering the development of Predator drone operations in these contexts, I trace how new forms of authorized evidence and expertise have shaped military operations and priorities from the Cold War and the "electronic battlefield" of Vietnam through to today's use of drones.

Having explored a set of historical conditions of possibility for drone operations, the second chapter, *Near certainty and the myth of techno-autonomy*, takes up the discrepancies between the imagined capacities of "unmanned" and "autonomous" technologies and the current practices that constitute and maintain these technologies. My analysis is based on close readings of several texts about drone operations: official Air

Force "roadmaps" forecasting the future of U.S. air power, a declassified report from an Air Force incident investigation in which dozens of civilians were killed in the Uruzgan province of Afghanistan in 2010, and a redacted dissertation written by an Air Force officer about RPA crew training. I interrogate how discourses of precision and technological advancement not only sanitize war but also attempt to elevate it to a perfectible, objective science. In turn, I analyze the ways in which particular kinds of digital information are circulated and rendered actionable for military ends, examining a range of discourses and practices that undermine claims to precision or certainty. Far from what I term the techno-autonomy, referring to a particular set of beliefs and discourses in which autonomous technologies are positioned as capable and independent actors apart from their human creators or maintainers, that discourses around drones suggest, I demonstrate the ways in which such presentations obscure the constitutive human labor that compose these systems.

The third chapter, *Knights vs. employees: Drone operations and the labor of war*, examines the ways that Air Force officers construct and position the value of drone operations as meaningful and honorable military service. Through the lens of the changing conditions of individual pilot agency, I analyze the ways in which drone operations are implicated in new forms and valuations of military service within drone operations communities. In particular, I examine how officers work to repair the destabilizing forces of drone operations on traditional Air Force frameworks of valor, masculinity, and expertise, while also continuing to grapple with irreconcilable destabilizing contradictions—namely, that the military labor of drone operations bears

increasing similarity to other forms of contemporary civilian work, characterized by the language of compensation, flexibility, and in/security.

In the fourth chapter, *Signs, gates, and buffer zones: Constituting the warzone*, I explore the local topologies of the "everywhere war" (Gregory 2011a) within the United States, and the civilian and military distinctions that have been brought into question in the context of drone operations. Building on encounters I had at the boundaries of the warzone, including with military police at the gate of an Air National Guard Base, a group of anti-drone protesters, and defense contractors at the largest professional conference of drone manufacturers, I interrogate how the boundaries of war are conjured and rendered variously visible. I argue that current theorizations of "militarization" do not adequately account for the ways in which military and civilian infrastructures and economies are consistently and continuously intertwined.

By way of conclusion, what I hope to draw attention to with this dissertation are the ways in which, in very real senses, warfare is not being conducted at a distance; it is being conducted here in the United States. When we consider war as not only when the bomb drops but all that has led up to and enabled the act, a wider set of questions and implications opens up about the nature of contemporary American war, and where different kinds of responsibilities or modes of normalization lie.

As the epigraph to this introduction suggests, the war stories that need to be told in order to comprehend the consequences of war are complex and too often over-looked, at once extraordinary and mundane. In a similar vein, Ken MacKleish writes, "There is no end to the things we think we already know about war, any of which might be true in one or another instance, and none of which is a good explanation all on its own"

(MacKleish 2014: 14). In the following chapters, I offer some of the war stories that I encountered or was told, not as means to comprehensively explain drone operations or their implications, but rather as a means to call attention to, and potentially begin to unravel, the infrastructures that maintain a permanent and only variously visible state of war within the United States.

CHAPTER 1: REMOTE SPLIT: A HISTORY OF U.S. DRONE OPERATIONS

On an early September morning in 2001, a crew of three Air Force pilots, disguised in civilian clothing, walked into a trailer located on the grounds of CIA Langley headquarters and participated in the first *remote split* Predator drone operation. The unprecedented operation, overseen and controlled by the CIA but carried out by Air Force personnel, followed the September 11th 2001 terrorist attacks and had one clear mission: to locate and kill Osama bin Laden (Woods 2015). According to investigative journalist Richard Whittle (2014), the Air Force officers, who had been working with Predator operations located in Germany in the previous months, had been instructed not to wear their uniforms so that they would not draw attention to their presence at Langley. The trailer itself, according to Whittle, was camouflaged to look like a construction site, hidden in plain sight (Whittle 2014: 216). While the mission did not succeed in locating Osama bin Laden, it did demonstrate the feasibility within the Pentagon of *remote split operations*, a military term used to describe the distributed command and control of drone operations around the globe, allowing analysts, operators, and pilots to conduct surveillance and lethal attacks from thousands of miles away.

It is this distribution of action, this particular capability to conduct warfare at a great distance, which has come to define drone operations. However, drones do not require remote split operations, nor were they always operated as such. The Predator drone, the earliest, most widely used, and well-known type of unmanned aerial vehicle (UAV), was first used in 1995 but first operated through remote split operations in 2001. Canada does not utilize this paradigm of control, and only as recently as 2012 has the

United Kingdom begun to operate its drones as remote split operations (Ledwith 2012). Yet, especially in the United States, the use of drones (and by implication the remote split configuration) is presented as a natural, if contentious, development in technologies of warfare. The configuration is often described as an inevitable development in the history of warfare (i.e. Singer 2009), either as a teleological progression of increasing "sophistication" of warfare or as the straightforward outcome of technological affordances. Both narratives reflect the tendency toward a technological determinism in which technologies and their uses develop as *effects* of material affordances. However, critical histories of technological development demonstrate that far from any teleological trajectory, technologies develop through anticipated and unanticipated alliances and contestations that are profoundly historically and socially contingent (Bijker, Hughes, & Pinch 1987; Latour and Woolgar 1979; MacKenzie and Wajcman 1999; Shapin and Schaffer 1985).

From this perspective, the conception of remote split drone operations as an efficient and effective means of warfare is not a necessary progression of warfare as proponents of drone operations suggest (Bowden 2013a; Lewis 2013). Instead, in this chapter, I argue that U.S. Air Force (USAF) drone operations are the result of a set of particular sociotechnical and historical conditions of possibility for warfare to be conducted as remote split operations and to be perceived as appropriate and effective in U.S. military engagements.

In nearly every account, from general audience publications to academic journals, the history of drones is narrated as one of increasingly sophisticated aircraft that can be controlled from a distance. These histories invoke aerial surveillance balloons used

during the American Civil War, radio-controlled aerial torpedoes, like the Kettering Bug developed during the first decades of the 20th century, and pilotless radio-controlled aircraft, like the Queen Bee, used during World War II mostly for target practice, as early examples of drone technology. In turn, they go on to present experiments and developments of increasingly "autonomous" aircraft used for surveillance following World War II as the standard historical account of drones. These technological developments are certainly central to the genealogies that must be understood in order to understand how drone operations developed as they did. However, in this chapter I reframe how the history of drones should be considered and argue that a history of drone operations requires investigating how particular arrangements of humans and machines emerge as effective sociotechnical systems for waging war. My interest is not in assessing whether drone operations are a new mode of warfare, but instead in locating the continuities and discontinuities with the past. This allows us to call attention to the range of material, epistemological, and semiotic infrastructures that both constitute and enable this kind of military action.

First, I describe remote split operations in their current configuration to provide a foundation for understanding the ways in which information flows and military actions are distributed. Based on interviews with my interlocutors, as well as analysis of Air Force drone accident reports, I map in relative detail how USAF remote split drone operations currently occur. Following this, I take up three key moments in the history of command and control systems used by the United States military: the "electronic battlefield" of Vietnam; the precision guided missiles (PGM) of the Gulf War; and the use of unmanned aerial vehicles (UAVs) during the conflicts in the Balkans in the early

2000s. The moments I examine should be seen as what Peter Galison has termed a "mesoscopic history" (1997: 61), in which moments are meant neither to produce a comprehensive history nor to present a universalizing progression of technological development, and yet are meant to be taken as more than singular, unrelated case studies. My intention is to locate points that can help us see the crystallization of the particular logics that establish the conditions of possibility for remote split operations to take hold.

The moments I focus on are of particular significance to the drone operations officer communities with whom I conducted fieldwork. For drone pilots interested in constructing a historically rooted professional identity as a means to legitimate their roles, they call upon the sensor-based observation missions during Vietnam to be their "lineage."[14] As one Air Force major, who had been deployed to Creech Air Force Base in Nevada during the early days of Predator operations, told me,

> When we were thinking about how to develop a Predator pilot identity, we identified more with the persistent sensor-shooter gunships or other low-flying observation pilots in the jungles of Vietnam, not units who had worked with early drones, like the Firebee.[15]

This self-selected and "mission-based" (Blair 2016) professional lineage stands in contrast to that which is most often assigned by historians or journalists, who focus on the aerial hardware and not the human work required, or categorize drones. Moreover, the Gulf War was a significant time for many of the officers, active and retired, with whom I

[14] Controversies surrounding drone pilot professional identity and work are discussed in greater detail in the third chapter

[15] The Firebee drone, along with the Lightning Bug, was one of the first "unmanned aerial vehicles" built in the 1950s and was used as a target drone for targeting practice. For a comprehensive history of military unmanned aerial vehicles, see Ehrhard (2000, 2010) and Chandler (2014).

spoke and who had been involved with commanding drone operation squadrons. This was the case because they had deployed flying experience during that war and throughout the 1990s, a time when many currently commanding officers were in the formative stages of their careers.[16] Thus, the moments I examine are of particular salience not only to the development of remote split but also to Air Force pilots and officers involved in drone operations.

This chapter analyzes drone operations through the remote split configuration as a means to emphasize the particular arrangements of humans and machines implicated in drone operations. To call attention to these arrangements, rather than just the aerial vehicle itself, allows us to denaturalize what is often taken for granted, and to examine how the carrying out of warfare has come to be understood as divisible and able to be distributed across global military networks.

Maintaining the network

Remote split drone operations incorporate networks of humans and hardware that are distributed around the earth, from orbiting satellites to undersea cables to installations in multiple countries including Afghanistan, Germany, the Seychelles, and the United States. An MQ-1 Predator or MQ-9 Reaper, a newer and more refined version of the Predator, as every publicly available accident report emphasizes, "is actually a system, not just an aircraft, which consists of four aircraft (with sensors and weapons), a GCS (Ground Control Station), a Predator Primary Satellite Link (PPSL), and spare equipment along with operations and maintenance crews for deployed 24-hour operations" (USAF

[16] For instance, a 55-year-old officer today (in 2017), would have been twenty-four years old in 1991, when the Gulf War started.

2011b: 3). Operating an MQ-1 Predator or MQ-9 Reaper involves four sorties, or flown missions, within a 24-hour shift with four aircraft. These sorties require 61 personnel forward deployed, physically near the zone of operation, and 149 personnel operating from within the continental United States. Totaling 210 personnel, this includes 14 pilots, 14 sensor operators, 56 intelligence analysts, and an unspecified number of legal analysts (Kreuzer 2014: 169). This is all in addition to those people who manufacture and maintain the vehicle and sensor hardware, as well as those who develop and code the systems architecture and software.

A clear separation of the network of hardware and network of humans required to operate remote split is artificial and potentially misleading because neither works in isolation without the mutually constituted agencies inherent in sociotechnical systems. However, for the sake of clarity, I will first articulate "the physical footprint" of remote split and describe one typical flow of information. In practice the information loop is continuous and multi-directional, with various other military networks potentially contributing, intersecting, and distributing information.

On a military base, termed the Forward Operating Base (FOB), relatively near to the area over which the drone will be flown is the aircraft itself, a Ground Control Station (GCS), and associated equipment, including a radio antenna that establishes a line-of-sight (LOS) data link between the aircraft and the ground data terminal. A Launch and Recovery Element (LRE), consisting of an Air Force or defense contractor crew, is responsible for launching the aircraft (controlled through the LOS data link), getting it to a specified altitude, accomplishing a systems check, and "handing the aircraft off" via multi-user internet relay chat (IRC) or a phone call to a Ground Control Station (GCS)

located in the United States (USAF 2011b: 5). Both takeoffs and landings are monitored by and coordinated with Air Traffic Control (ATC) personnel at the FOB. During fieldwork, I was told that often the LRE, and almost always the maintenance crews of aircraft at FOBs, were defense contractors, not military personnel. My subsequent research into awarded defense contracts supports this observation. For instance, Battlespace Flight Services LLC was awarded the "Support Contract" for the MQ-1 Predator in 2009, the second consecutive such contract.[17] Lockheed Martin Support and Logistics has been awarded a 10-year contract to support Special Operations Forces, which includes aircraft, vehicle, and equipment repair and maintenance. And Merlin Global Services supports all MQ-1 and MQ-9 flight test activities managed by the UAS (Unmanned Aerial Systems) Air Force Program Office, which is located at Wright-Patterson Air Force Base (AFB) in Ohio.

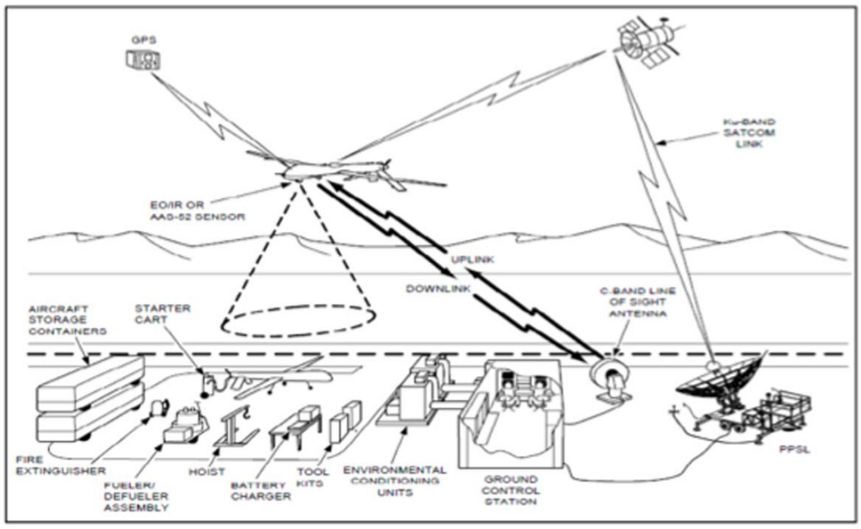


Figure 2: MQ-1B Predator FOB system diagram (USAF 2011b: 4)

[17] Information about awarded contracts is typically available on a company's public website in the form of a press release (i.e. Battlespace Flight Services 2010) or on a program page (i.e. Lockheed Martin n.d.; Merlin Global n.d.). Contractors are also sometimes listed as involved components in accident reports (i.e. Lockheed Martin in USAF 2015a: 4).

When control is "handed-off" from the LOS data link, an antenna onboard the drone connects with a commercial Ku-band satellite, which the military leases from a private company, and in turn, transmits information to Ramstein AFB in Germany or potentially Italy (Michel 2015). From this U.S. base in Europe, information travels via undersea fiber optic cables to an array of locations, known as the Distributed Ground Control System (DGCS). Once this "hand-off" occurs, the aircraft is controlled through a satellite data link (SATlink), which introduces a three-second delay (1.5 seconds each way) in transmitting information between the aircraft and the GCS. This delay, in addition to not infrequent satellite data link drops, is the reason why an LRE is necessary and why the aircraft must be controlled via an LOS data link during takeoff and landing.

The drone aircraft, whether an MQ-1 Predator or MQ-9 Reaper, is a surprisingly small and grey aircraft, approximately the size of a small personal plane, like a Cessna. Both aircraft (as well as the GCSs) are manufactured in Poway, CA. The letters and numerals before the system names are Department of Defense (DoD) designations, in which the "M" stands for multi-role RPA (as opposed to "R" standing for reconnaissance-only missions), series "Q," and then what follows specifies the model and version number. The MQ-1 is approximately 27 feet long, 7 feet high, and with a wingspan of 55 feet (USAF 2015b). The MQ-9 is larger, and is approximately 36 feet long, 12.5 feet high, and with a wingspan of 66 feet (USAF 2015c). To provide a comparison with a standard intercontinental passenger jet, an Airbus A320 is approximately 123 feet long with a wingspan of 118 feet (Airbus n.d.).

The "payload" of a drone includes equipment, such as sensors, as well as weapons. Both the MQ-1 and MQ-9 have what is known as a Multi-Spectral Targeting

System (MTS), which integrates color/monochrome daylight TV camera, infrared sensor, laser range-finder/designator, and laser illuminator sensor data. The full motion video that results from each of the imaging sensors can be viewed as separate video streams or layered into one video. An MQ-1 Predator can carry two laser-guided AGM (Air to Ground Missile)-114 Hellfire missiles. An MQ-9 Reaper can carry four AGM missiles.

Once the aircraft has taken off and reached a specific altitude, control is handed-off, described above, to a Mission Control Element (MCE), part of the Distributed Ground Control System (DCGS) within the United States, on an air base and located in a trailer, about the size of a shipping container. The teams located at Creech AFB in Nevada have become the most high profile. But teams are also located throughout the United States. In addition to an MCE, which includes a pilot, a sensor operator, and a mission commander, information analysts and other personnel are involved in analyzing and coordinating intelligence, both SIGINT (signal intelligence) and HUMINT (human intelligence).

Physically controlling the aircraft, sensors, and weapons constitutes only one element of the human resources required for an operation. In fact, we might identify five different kinds of roles for personnel involved in deployed drone operations: 1) control of the aircraft and associated weapons system, 2) control of the sensors onboard the aircraft, 3) maintenance of the aircraft, sensors, and associated equipment, 4) analysis of information generated by the sensors and finally, 5) verification of information and direction of future action, including legal assessments as well as overall mission planning. As described above, only maintenance of equipment is not distributed among

multiple bases.[18] The control of aircraft, weapons systems, and sensors are split between two primary locations and two different kinds of teams, the LRE and the MCE. The tasks of analysis, verification, and planning are distributed among multiple bases and teams with potentially different missions continuously occurring. People working within these categories are on American military bases throughout the world. And as of 2016, active-duty Air Force, Air Reserve, and Air National Guard personnel are involved in U.S. Air Force drone operations within the United States in Arizona, Arkansas, California, Florida, Missouri, Nevada, New Mexico, New York, North Dakota, Ohio, Pennsylvania, Tennessee, Texas, and Virginia.

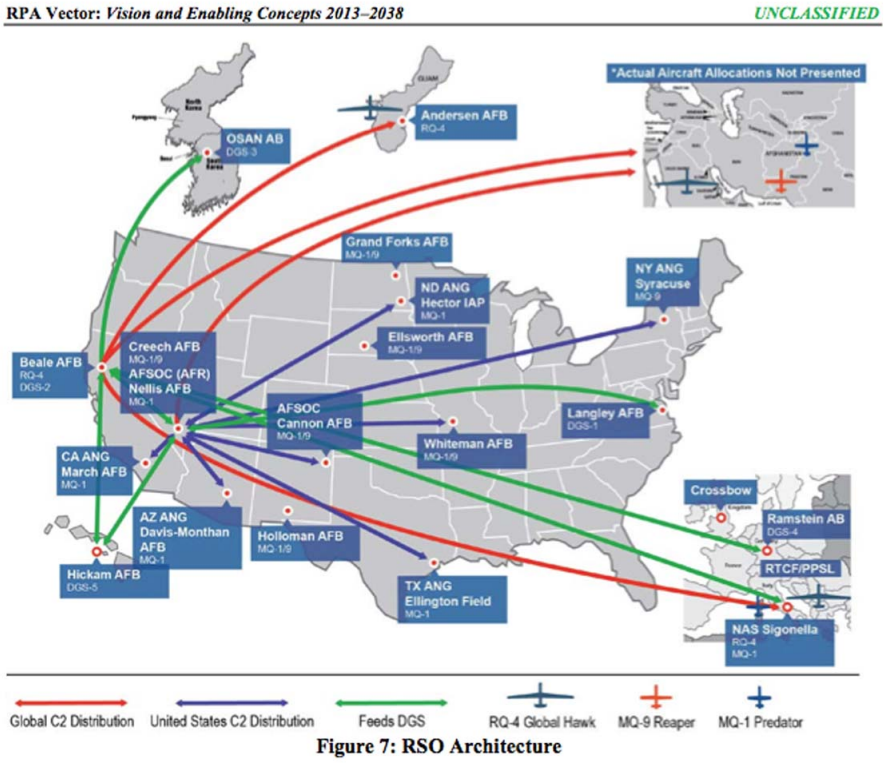


Figure 3: Remote split architecture diagram (USAF 2014: 21)

[18] This is true only if particular boundaries of the system are articulated; for instance, all aircraft and weapons systems are built within the United States and undergo extensive maintenance as needed at General Atomics factories located in Poway, CA. The networks entailed within the sociotechnical system of drone operations that I articulate are not self-evident but rather the result of an analytic choice of where to "cut the network" (Strathern 1996).

An insatiable demand for data, despite the increasing impossibility of reviewing and analyzing all the data collected (Ackerman 2012), has made developing strategies for data processing a top priority for Air Force project procurement and research agendas (USAF 2009, 2014). This is not surprising given that the information received through sensors must be interpreted and analyzed with respect to ongoing missions in a continual process of making physical phenomena legible as "military intelligence." The majority of Air Force, as opposed to CIA, operations are conducted as close-air support, meaning that most drone operations occur in tandem with U.S. troops on the ground.[19] For instance, if the operation is in Afghanistan, intelligence and action must be coordinated not only between the team flying the aircraft but also with the JTAC (Joint Terminal Attack Controller) embedded with ground troops in the area and the local JSOC (Joint Special Operations Command) in Afghanistan, which would include at least a battle commander, a signal intelligence officer, and a JAG (Judge Advocate General). Personnel at other locations in the United States would also be involved, such as Air Force Special Operations Command at Hurlbert Field in Florida, with intelligence analysts and drone feed screeners, and also potentially the CIA and Pentagon officials and lawyers present.[20]

Having described the distributions, I now turn to interrogating the foundational logics of such distributions. Rather than taking for granted technological affordances or

[19] The intertwined history of Air Force and CIA programs makes problematic definitive distinctions between current CIA and Air Force operations. Nonetheless, during fieldwork when I interacted only with USAF personnel, the insistence on a difference between the two programs was a major point of emphasis. Many interlocutors claiming the legitimacy and necessity for drone operations in Iraq and Afghanistan explicitly did not extend those claims to CIA operations.

[20] The configurations are difficult to know precisely and likely change according to mission. See Gregory (2011b) for an example of the rungs of communication implicated in a lethal strike; Gregory (2015) for the kinds of potential miscommunications between JSOC and drone crews; and Niva (2013) for the likely entanglement of Air Force and CIA communication as well as a discussion of the role of JSOC in current military strategy and command.

understanding remote split drone operations as an obvious result of technological development, in the remainder of this chapter I propose that a particular set of historical and sociotechnical conditions allowed the concept of remote split to take hold.

The cybernetic equation

As the term denotes, remote split operations are characterized by conducting operations *remotely* and by *splitting* actions that previously were unified. Fundamental to these divisions and distributions are a set of assumptions about the nature of digital information and communication, between humans as well as between humans and machines. Such logics do not have any one particular origin, and my interest is not to provide a comprehensive genealogy of such logics. In this section, I provide a brief background on the emergence of the entwined disciplines of cybernetics, information theory, and what David Mindell (2002) has termed "the systems sciences," in order to draw attention to a series of foundational principles within digital networks and human-machine interaction that are at stake in remote split operations. Specifically, I highlight three animating and idealized principles in the early visions of these disciplines that have continued to be orientating themes in contemporary command and control networks: seamless human-machine interaction, comprehensive representative capacity of digitally encoded information, and the universality of systems theories.

Although cybernetics was built on decades of research, the term was coined and popularized by Norbert Weiner in the late 1940s. Derived from the Greek, *kubernetes*, meaning "steersman," or also "governor," Weiner famously began formulating the concept during his research into antiaircraft mechanisms during World War II. Previously, antiaircraft gunners of World War I would use range tables to calculate, by

hand, the future position of any given target in motion, an extremely time-consuming and only occasionally effective method. Weiner wanted to create a mechanism that would assist in hitting a target in a more time-efficient and precise manner. Describing his conceptualization of the problem, Weiner wrote,

> The antiaircraft gun is not an isolated instrument. While it can be fired by radar, the equivalent and obvious method of firing it is to have a gun pointer. The gun pointer is a human element; this human element is joined with the mechanical elements. The actual fire control is a system involving human beings and machines at the same time. *It must be reduced from an engineering point of view, to a single structure, which means either a human interpretation of the machine, or a mechanical interpretation of the operator, or both*. (emphasis added, Weiner 1988: 67-68)

The notion that the components involved in solving the problem—the antiaircraft gun and human gun pointer—should be reduced "to a single structure" is essential to understanding how cybernetic theories proposed to reformulate complex phenomena and problems in the world. That is, central to these formulations was the idea of the system, whose heterogeneous components could be fundamentally equated, regulated, predicted, and managed. Cybernetics, itself, David Mindell (2002) has argued, is best understood as one science within the "systems sciences," which took recognizable shape during and in the years following World War II and included systems engineering, control theory, systems dynamics, information theory, and operations research among others. "Common to these arenas," Mindell writes, "was not so much a particular theory or methodology as

the idea that various aspects of the world could be understood as systems and modeled as flows, feedbacks, and human-machine interactions" (Mindell 2002: 316).

Considered key to the effective functioning of any system was the principle of self-regulating feedback. Principles of feedback and human-machine integration were not new in and of themselves: Governors, self-regulating mechanisms, had employed feedback processes and had been developed as part of steam engines; the conceptualization of humans working as functional components within technological systems was not new or unique to cybernetic theory. For instance, around the turn of the 20th century, Frederick Taylor (1998) and the field of what was termed "scientific management" proposed to increase production efficiency by maximizing labor productivity as a function of better coordinating human workers and the machines they worked with. Still, the group of theories that came to be known as cybernetics rearticulated and consolidated emerging trends in control engineering and communication engineering in novel ways (Mindell 2002). In particular, emerging theories of information facilitated the theoretical equation of a human component and a machine component within a system. In his classic formulation, Claude Shannon proposed a mathematical theory of communication (Shannon and Weaver 1975), which focused on the problem of communication as one of transmitting a message through a channel in which some amount of noise would be introduced. By reducing information to a self-contained message that could be encoded, information was theorized as separable from its original material and social context. The range of ontological and epistemological implications of this theory of information have been explored at length elsewhere (i.e. Slack and Fejes 1987; Hayles 1996; Halpern 2015). My point here is to call attention to

the historically-specific theories of information that inform contemporary beliefs about how digital information effectively represents the world, especially those that are at stake in drone operations.

Although Weiner was never successful in building his antiaircraft mechanism during the war, the field of cybernetics continued to develop and expand in influence (Heims 1993).[21] In fact, Weiner envisioned cybernetics as a "universal science," (Galison 1994); while developed in the context of military applications, those researchers working on cybernetic systems saw the application of cybernetic principles as applicable to practically every area of human activity (Mindell 2002: 316).

The notion that "the system sciences" could encompass and be effectively applied to all manner of problems formed a core logic of what Paul Edwards (1996) has identified as "closed world discourse." For Edwards, "closed-world discourse" was a set of practices, rhetorics, and technological systems that both shaped and were shaped by the unique interplay between computational technologies, politics, and military strategy in the post-war and early Cold War eras.[22] Edwards emphasizes that the development of computers and computer networks were in a mutually constitutive relationship to cybernetics and the "system sciences." Computers were not just the tools of this logic, but also an enabling conceptual metaphor, allowing,

[21] The literature examining the influence and implications of cybernetics on the 20th century is too vast to be catalogued here. In addition to work discussed below, see Light (2003), Medina (2011), Mirowski (2002). Orit Halpern (2015) has argued, in particular, that the epistemic value of data that developed out of cybernetics heralded a gradual but substantial transformation of data observation, analysis, and management, creating what she terms a "communicative objectivity." She writes "the cybernetic reformulation of reason produced new forms of measurement and methods in the social and behavioral sciences, encouraging a shift toward 'data-driven' research adjoined to a valorization of visualization as the benchmark of truth, and as a moral and democratic virtue" (148).

[22] Pickering (1995) makes a related argument about the emergence of what he terms the "World War II regime."

> The practical construction of central real-time military control systems on a gigantic scale…they [also] facilitated *the metaphorical understanding of world politics as a sort of system subject to technological management.* (emphasis added, Edwards 1996: 7)

Edwards' argument is that computers and computational networks facilitated a vision of the world as a closed system that could be managed through information technologies. The assumptions and approaches of the "systems sciences," including techniques of probabilistic statistics, game theory, and computational modeling, came to define the ideal approaches to problems, be they technical, social, or political.[23] Indeed, the reordering and reframing discourses and techniques of cybernetics and its associated sciences, from theories of human-machine interaction to claims of the comprehensively representative capacity of digitally encoded information, were foundational components of the sociotechnical systems of command and control that would develop in the following decades.

Data points in the dark: The "electronic battlefield" of Vietnam

U.S. Defense Secretary Robert McNamara, formerly the president of Ford Motor Company, hoped that advanced computer technologies would provide an answer to the failing, messy Vietnam War. The war was going badly for the United States in 1966, despite the increasing numbers of American troops and the Rolling Thunder sustained bombing campaign (Nalty 2005). McNamara had become well known for bringing his

[23] Light (2003) argues that these approaches, and more specifically, defense intellectuals and institutions such as Rand, in which these techniques and approaches were refined, profoundly shaped the ways in which local and federal officials conceptualized and attempted to solve the problems of post-war urban planning.

commercial industry experiences at Ford with systems analysis, referring to the applied statistical methods used to analyze large-scale organizations, to the Department of Defense (DoD) (Betz 2006: 515). Based on what he saw as the successes such techniques had brought, he continued to bring more technical expertise into the DoD. One group he brought in from the Institute for Defense Analysis, a Rand-style think tank, was an elite selection of nuclear scientists who became known as the Jasons. Tasked by McNamara with finding a way to prevent the North Vietnamese from transporting supplies and people, the Jasons decided to focus on the seemingly indestructible supply route through Laos known as the Ho Chi Minh Trail (Finkbeiner 2007: 65). They proposed to build an electronic barrier, thousands of square miles long, which would effectively prevent anyone from crossing it, thereby preventing the transportation of supplies. The barrier was comprised of a network of electronic sensors and communication devices. Among a series of code names, Operation Igloo White was the most well known name for the project and comprised three basic parts. First, thousands of sensors were dropped into the jungle, calibrated to sense signs of life like movement, sound, and scent. Second, circling above the jungle canopy, aircraft, including the persistent sensor-shooter gunships (referenced by drone pilots as their "lineage"), were outfitted to detect the triggered sensors, and then amplify and retransmit the information to a secret base in northeast Thailand, Nakhon Phanom. This secret base was the third and most vital part of the project because this was where computer programs processed the sensor data and predicted future movements in order to generate bombing targets. The location was known as Task Force Alpha, the "brain" of the "automated battlefield," as it was called in a declassified 1968 Air Force report (Gatlin 1968). Within an enormous air-conditioned

building containing immense computers, teams of analysts sat in dark rooms in front of glowing screens. The triggered sensors appeared on the screens as white, glowing worms within a grid, so-called target "signatures." The coordinates of the target signature would be communicated to a bomber pilot who would then drop a bomb over the coordinates, likely only seeing the thick jungle canopy below.

Task Force Alpha was viewed by the Department of Defense as a technological triumph and hosted official visitors and journalists to demonstrate their achievements. One high-ranking Pentagon official who visited in 1968 declared, "Just as it is almost impossible to be an agnostic in the Cathedral of Notre Dame, so it is difficult to keep from being swept up in the beauty and majesty of the Task Force Alpha Temple" (Dickson 1976: 26). In operation from 1967 to 1972, analysts working at Task Force Alpha were able to generate statistics that created the illusion of mission success. Encouraged by McNamara, an evangelist for the validity and necessity of such statistical methods (Van Creveld 1985: 236), the DoD continued to present these figures as proof of success even as internal disagreement over the validity of the statistics was growing (Cockburn 2015a: 27). However, Task Force Alpha and Operation Igloo White were far from successful in their mission objectives. Some observers at the time and most present historians argue that Operation Igloo White was an embarrassing failure, with an immense price tag, taking up at least $6 billion as a secret program hidden within the overall defense budget (Nalty 2005: 283).

The program was an example of the fallacy of what Gibson (2007) termed "technowar," characterizing the blind belief in neat technological solutions produced by Vietnam-era military intellectuals. For instance, engineered in offices in southern

California with calculations and simulations, the physical realities that might impact the strategy were easily forgotten (Finkbeiner 2006: 68-70). Many of the sensors dropped into the jungle were rendered inactive due to humidity or loss of battery power (Gibson 2007: 397). Moreover, the entire premise of the "electronic barrier" assumed an unthinking enemy; to the system's planners, it was impossible that their sensors could be outsmarted. However, North Vietnamese soldiers developed multiple tactics to trick the sensors within weeks of the sensors' deployment, running cattle along insignificant paths as decoys or hanging bags of animal urine to confuse the sensors (Cockburn 2015a: 26), a clear example of the limits of converting phenomena in the world into decontextualized digital information. The North Vietnamese also began to rely on moving their supplies by sea, bypassing the Ho Chi Minh trail altogether. Considering that the system's ultimate purpose had been to prevent the North Vietnamese armies from transporting supplies from one area to another, the system was far from successful.

Figure 4: "The pinball machine battlefield," The New York Times Magazine *front cover, 1975*

Operation Igloo White and Task Force Alpha are not only programs in which the fallacy of technological solutions to complex war-fighting as well as political problems can be seen, but also a moment in which we see the emerging centrality of sensor networks and digital data to military strategy. General Westmoreland, the commander of U.S. forces in Vietnam, maintained in a 1969 speech:

> On the battlefield of the future, enemy forces will be located, tracked, and targeted almost instantaneously through the use of data links, computer assisted intelligence evaluation, and automated fire control. With first round kill probabilities *approaching certainty*, and with surveillance devices that can continually track the enemy, the need for large forces to fix the opposition physically will be less important. (emphasis added, Westmoreland 1969)

Despite the evidence on the ground, such strategies and command structures continued to assume that the more technology and digital data were used, the more accurate and effective the results would be.

Moreover, these assumptions about what could be sensed, understood, analyzed, and acted upon were deeply implicated in the changing nature of military command and force management. Task Force Alpha, and indeed the overall strategy in Vietnam, can be seen as an example of the ways in which the new kind of knowledge and expertise required in a cybernetic world gradually supplanted battle experience as the primary grounds for developing military strategy (Van Creveld 1985: 258-260). That is, numbers, statistics, and abstracted qualitative assessments were more valued than subjective, expert

assessments based on years of experience in the field, intuition, or even classic battle strategy. In this equation, Edwards writes,

> Numerical analysis superseded military experience as the discourse of decision makers. The new language interpreted the war using the categories of games, bargaining, production and management. It reinforced the view of war as a rational problem, rather than a struggle with its roots in ancient feelings of patriotism, desires for justice, and resentments of foreign intervention that might not respond to a 'rational' challenge. (Edwards 1996: 143)

In place of battle experience, the methods of systems management, relying on computational modeling and analysis, became the foundation for military strategy and acquisition programs (Johnson 2000). The gradual but substantive transformation represented here demonstrates how a "closed world" conceptualization of the problems of war and how they might be effectively overcome forms a foundation on which remote split could be developed as a thinkable form of contemporary warfare.

Examining Task Force Alpha and Operation Igloo White demonstrates that an examination of the histories of increasingly "autonomous" drone platforms can only tell part of the history of the remote split paradigm. The distributions and divisions of war work at stake were able to take hold only in the context of a particular set of beliefs about the effective cooperation between humans and machines, the accuracy of digital sensing networks, and the veracity and transparency of digital information.

It is interesting to note that in media coverage of Task Force Alpha we can see the emergence of anxieties around technologically mediated warfare and its resemblance to

the banality of everyday office work, a theme that will emerge throughout this dissertation. In a 1971 *New York Times* article titled "Sensors Don't Bleed," a reporter described the operations at Task Force Alpha, "target[ing] and send[ing] forth printouts as impersonally as next month's bills" (Mitgang 1971). A *Washington Post* article from 1973 describes the Task Force Alpha operation in forms that echo current debates around drone operations and is relevant to quote at length,

> The whole operation is like a gigantic stock brokerage office, only less noisy and more lethal. Our sources, who visited areas barred to newsmen, reported back to us on the clinical atmosphere. 'It's just an office where men work 9 to 5 or might have an early morning shift,' one source said. 'Men doing their job, business-like, orderly, rather neat, efficient, a slight air of tension in the room. Nothing very blood-thirsty.' …
>
> 'For the man sitting at his console in Blue Chip,' the sources added, 'bombing is just a pencil notation or two. That is it. To the pilot, it is flying over Cambodia and pushing a button and seeing bombs fall within the proper target. A few minutes later he's back at his swimming pool, tennis courts, air-conditioned bars. Everyone's compartmented. Everyone's doing his little job. And somehow each of these little compartments fit together in such a way that every day maybe another dozen villages are wiped off the earth.' (Anderson 1973)

Similar concerns were held by some who had been directly involved in the operation. In 1971, Vietnam veteran Eric Herter testified as part of a public meeting of the antiwar Winter Soldier movement about his involvement in the "electronic battlefield." He stated,

> We have been participants in the new forms of war that are to replace the unpopular struggle of infantry and patrol against guerrilla bands… It is hard to feel responsible for this type of war, even for those who were close to it. There is little personal involvement. The atrocity is the result of a chain of events in which no man plays a single decisive part. The technicians who program the computer perform no act of war, the man who places the sensor does not see it operate. The man who plots the strike never sees the plane that conducts it. The pilot, navigator, and bombardier do not see the bomb hit. The damage assessor was not in the plane, and all the others who helped mount the raid never participated in it all. (Branfman 1971)

Here it is not so much the distance from the battlefield that haunts Herter, but rather the way in which this new form of war divides the acts of war into piecemeal tasks. This division may have been the explicit intention of its designers in a move to "increase efficiency," and was likely intended to protect American lives. The political motivations for finding ways to decrease deaths of American soldiers are, in this sense, complexly intertwined with the logics of technologically mediated warfare. However, there arose unanticipated consequences of such a division. We see a language developing in which war is transformed into work and in which anxieties are expressed around the agency and accountability of individuals who wage war with digital technologies as work. Like previous developments in automated technologies, new techniques of management created new divisions of labor that transformed meaningful frames of action, in this case, challenged the integrity of the soldier as a heroic, or even accountable, actor.

Promising precision: The 1990s and the Revolution in Military Affairs

In February of 1991, near the end of the Gulf War, an article in the Science section of *The New York Times* declared the beginning of a new era of warfare. The article stated, "for the first time in history, precision-guided bombs and missiles have played a decisive role in war," allowing the United States and its allies a swift victory "while suffering surprisingly light casualties" (Browne 1991), referring to both military personnel and civilians. The glowing assessment of the precision-guided munitions (PGMs) declared that the names of some of these "remarkable" weapons, like the Patriot, Tomahawk, and Hellfire missiles had "become household words." The marketing slogan of Texas Instruments, who produced the Paveway III laser bomb guidance system, was frequently repeated in media articles and government statements: "One target, one bomb." Images on television news reinforced this idea by replaying video feeds from cameras mounted on bombs that seemed to fly unerringly toward their targets.[24] The *Times* article, like many articles at the time, marveled at the unprecedented level of accuracy, which was linked to a purportedly more "just" form of war:

> Even small, armored targets like tanks and personnel carriers, previously almost impossible to destroy with bombs, have now fallen victim to the new bombs' accuracy. The same accuracy has substantially reduced the accidental damage that would otherwise have befallen civilian buildings. … An allied military spokesman reported last week that of the many thousands of precision-guided bombs and missiles launched at Iraqi

[24] While Vietnam has been called the first television war, although technically it was probably the Korean War (Taylor 1992: 2), the Gulf War established the role of television in portraying and shaping perceptions of war through the then-relatively new 24 hour news channel, CNN (7).

> military targets, fewer than one-tenth of 1 percent had gone astray and fallen in civilian areas. (Browne 1991)

Such emphasis on accuracy in the popular media coverage reinforced arguments made by the Pentagon that PGMs were technologically superior forms of power that minimized the human and economic costs of war. It is important to note that the value of precision was a claim to humanitarian interests; more "precise" bombing, it was proposed, was a more humane, just, and justifiable form of waging war. The emphasis on precision continues to be central to discourses around the justification and efficacy of drone operations, and is discussed in further detail below.

In the days and weeks following the war, the aerial campaign was described as a success. Yet, while the claims of these technologies and their role in the war went unchallenged at the time, later investigations provided evidence that the claims of precision and perfect system performance were vastly overstated. A Government Accounting Office (GAO) report released in 1996 concluded, "Many of the DoD's and manufacturers' post-war claims about weapons system performance—particularly the F-117, TLAM, and laser-guided bombs—were overstated, misleading, inconsistent with the best available data, or unverifiable" (GAO 1997: 19). Military historians continue to debate the role that air power played in wining the war, and most acknowledge that the preliminary assessments made by the DoD were misleading (Keaney and Cohn 1995; Press 2001).

Nonetheless, the Gulf War stands as a new era in discourses of "precision bombing," particularly with respect to how the value of such "precision" is proposed. The history of aiming to attain precision is as long as the history of warfare, and precisely

hitting targets was, of course, the goal of Task Force Alpha. The use of computationally enhanced analysis of targets in order to make attacks more precise was an originating problem of cybernetics, itself. However, for most of the 20th century, "precision targeting" was a technological goal—and means to secure defense-spending dollars—but could in no way be claimed as a completed achievement. In fact, as Sven Lindqvist (2001) has argued, military strategies during World War I and World War II were less concerned with the precision of aerial bombardment than with its utter destructive power. That aerial bombing was indiscriminate and a form of "total war," a term first used during World War I, was its virtue (Lindvist 2001: 68). For instance, Lindqvist quotes the famous American fighter pilot, Billy Mitchell, who stated, "Destruction should be total, not selective" (106).

Still, between 1960 and 1980 the estimated accuracy of ICBM, Inter-Continental Ballistic Missiles, which were seen to represent the ultimate in achievable accuracy, increased exponentially (MacKenzie 1993: 165-240). Of course, the claims of accuracy made by the Pentagon and the scientists working on Inter-Continental Ballistic Missiles (ICBMs) were likely overstated and based on disputable evidence (MacKenzie 1993), nonetheless the probability that a missile launched would hit its intended target increased substantially compared to previous decades. The rapid increase in relative accuracy was due in part to the refinement of technologies like gyroscopes, computer processors that were increasingly small and powerful, and eventually the installation of GPS, the Global Positioning Satellite System. [25] All three of these technologies—gyroscopes,

[25] The system that comprises GPS was originally called the Defense Navigation Satellite System, was initiated in 1973, and emerged from Navy and Air Force research labs. See Burrington (2015) for a discussion of the history of GPS and its integration into civilian applications for navigation.

microprocessors, and GPS—are now commonplace in any "smart" consumer device, like an iPhone, Android, Nintendo Wii, or Fitbit.

These technologies, as well as increasingly sophisticated global communications networks, represented the technological capabilities of what came to be known as the Revolution in Military Affairs (RMA). The RMA, referencing both an observed trend and a proposed strategic development, revolved around three basic functionalities that, when integrated into a "system of systems" approach, was proposed to change the way militaries fought and won battles (Cohen 1996; Davis 2010): sophisticated sensor networks could provide accurate locations of targets; information networks could inform and coordinate within the Joint force (all the military services); and "precision weapons" would allow more effective and efficient lethal effects (Lindsay 2013: 8).

The proposition that warfare was undergoing a profound and transformative shift due to advanced technologies dates to several decades earlier, in the 1970s, during the height of the Cold War. In the mid-1970s and early-1980s, Soviet military intellectuals articulated the notion of a Military-Technical Revolution (MTR), which would eventually be incorporated and rebranded by American military intellectuals in the early 1990s as the Revolution in Military Affairs (RMA) (Adamsky 2008: 263). Observing Western technological innovations, Soviet military intellectuals began to theorize how new innovations, such as automated technologies, telecommunications, and the increased efficacy and precision of missiles, would potentially transform the balance of power even in nuclear warfare, making "conventional" weapons key to winning any future battles (265-269, 278-280). They used the idea of a Military-Technical Revolution (MTR) to indicate "both the latest state-of-the art technology, which made it possible to 'see and to

strike deep' in the future battlefield, and the organizational changes, which had to be made to accommodate this emerging weaponry" (Adamsky 2008: 264). In these writings, great attention was paid to the potential role of simultaneous aerial surveillance and reconnaissance, precision munitions, and new command and control techniques.

Although documents related to the MTR began to be translated into English in the mid-1970s, and although it was Western technologies that were the focus, the significance of the MTR did not become widespread in the American military community until the early 1990s (Tomes 2007; Adamsky 2008: 285-286). A widely circulated memo, and subsequent technical assessment led by Andrew Marshall of the Office of Net Assessment (ONA) is generally credited with bringing the ideas of the MTR to prominence within American military communities. It was Marshall's team that reformulated the MTR as the "Revolution in Military Affairs," emphasizing that "changes of the scale that we were talking about would involve new concepts of operation, and new organizational structures and processes to execute these concepts" (Krepinevich 2002: ii).

The ONA document received significant attention within the American military establishment (Adamsky 2008: 284), and the RMA became official military guidance with the Joint Chiefs of Staff publication, *Joint Vision 2020,* overseen by Admiral William Owens, Vice Chairman of the Joint Chiefs of Staff. Throughout the 1990s, the Department of Defense underwent the most comprehensive reforms since the Vietnam War, including then Defense Secretary Donald Rumsfeld's "Defense Transformation" agenda, whose goal was to improve military performance while reducing force size and expense (Rumsfeld 2002: 20; see also Lindsay 2013: 8).

A central tenet of the RMA was, and is, the notion of "information awareness." As articulated by one of its prominent architects, Admiral Owens, the RMA promised to "challenge the hoary dictums about the fog and friction of war" (Owens 2000). In response to Clausewitz's famous dictum about the "fog of war," advocates believed that the new technologies of the RMA would once and for all cut through the fog.[26] Owens also coined the acronym ISR, "Intelligence, Surveillance, Reconnaissance" (Cockburn 2015a: 47), now ubiquitous in discussions of contemporary military operations.

One well-known aspect of the RMA revolved around conceptualizing the battlefield as a global network of interlinked but individual nodes and the concept of "network-centric warfare:" a truly "closed world" (Edwards 1996) vision. Vice Admiral Arthur K. Cebrowski, credited with developing the term "network-centric warfare," (Cebrowski and Gartska 1998) argued that the RMA required new sets of assets and new modes of organization and coordination between those assets, including a networked joint force (involving unprecedented coordination between the forces), which would improve the quality of information and situational awareness, facilitate information sharing, and allow rapid synchronization between sensors and shooters within the network. According to this vision, "network-centric warfare" would dramatically increase mission success. As strategist and historian Jon Lindsay has summarized, "The RMA promises unprecedented improvement in converting information into action, particularly in the age-old military problem of hitting something from a distance" (Lindsay 2013: 10).

Moreover, central to the RMA was not only the notion of networked action and intelligence, but also speed and synchronicity. In the words of one critical strategist,

[26] In *On War* (2008) Carl von Clausewitz argued that "the factors on which action in war are based are wrapped in a fog of greater or lesser uncertainty" (101).

"network-centric warfare holds the notion of *speed* in high esteem: information technology is meant to profoundly multiply the speed and effectiveness of command, control and communication allowing the achievement of 'information dominance'" (Betz 2006: 507). The "kill chain," referring to the process through which a target is identified and attacked—described in Air Force jargon as F2T2EA, "Find, fix track, target, engage, and assess"—can be compressed (Tirpak 2000), which is ideal in military theory so that opponents can be outmaneuvered.[27]

The Gulf War and the RMA are also a means to glimpse the restructuring of military operations after the Cold War and in the context of the All-Volunteer Force (AVF). Citing the need to work with a "lean force," the reorganizations included increasing privatization of military services as well as increasing reliance on the military Reserve and National Guard forces. As much as financial efficiency was put forward as a motivating goal, it is important to keep in mind the existing political context, in which the return of the draft was a political impossibility. The calculus of what sacrifices could be asked of—and accepted by—American citizens had changed, and military planning had to take this into account. Secretary Rumsfeld, promoting his reorganization of the Department of Defense and budget priorities in 2002, wrote in *Foreign Affairs*, "We [the DoD] must promote a more entrepreneurial approach: one that encourages people to be proactive, not reactive, and to behave less like bureaucrats and more like venture

[27] In a recent article, Jon Lindsay (2013) compares what may be seen as competing military doctrines which have arisen in the past decades: the RMA and COIN (Counter-insurgency), the former seen as "platform-centric," the latter seen as "population-centric." Lindsay argues that while COIN doctrine dominated strategy in the early 2000s, especially during the early years of the war in Iraq, and after what amounted to disillusionment with RMA doctrine, the increasing use of Special Operations Forces should be seen, in fact, as a merging of these two military doctrines.

capitalists" (Rumsfeld 2002: 29). Claiming inspiration from Wal-mart and other large corporations, key architects of the RMA stated,

> Here at the end of a millennium we are driven to a new era in warfare. Society has changed. The underlying economics and technologies have changed. American business has changed. We should be surprised and shocked if America's military did not. (Cebrowski and Gartska 1998: 28)

Such an explicit emphasis on the putative efficiency of the commercial sector and its models of innovation was a frequent theme among RMA advocates, who pointed to the corporate sector's profitable embrace of networked digital communication and coordination.

Developing strategy and deploying forces during the Gulf War provided an opportunity for military leaders to put into practice the theories that had been developing as part of the RMA. At the cornerstone was a commitment to the belief that new technologies would facilitate more precise and effective targeting. These theories involved not only information networks and reliance on digital hardware, but also assumptions about the kinds of information that could be sensed, known, and acted upon in the battlefield and the kinds of actors who were most appropriate—tech savvy, efficient, and low cost, with an entrepreneurial drive. As in the "electronic battlefield" of Vietnam, the imaginary potentials of such theories were often more important to the DoD than the actual outcomes.

Locating an eye in the sky

A central tenet of the Revolution in Military Affairs (RMA) was "complete battlefield awareness," which fostered an insatiable demand for data by military

commanders, especially aerial surveillance data. Since the 1970s, the CIA had been cultivating a number of unmanned aerial vehicle (UAV) projects, including one that eventually became known as the Predator project. Developed by an Israeli company in the mid-1980s, the General Atomics MQ-1 Predator was first used in 1995 during the conflict in the Balkans. It was used for what was termed "persistent" surveillance and reconnaissance, supporting streaming video, not quite in real time, to the United States. Because of limitations on how quickly and securely information could be transmitted, the Predator was controlled by a team located on a U.S. base relatively close to Kosovo. Through an elaborate network of satellites and cables, the video was eventually transmitted to the United States. This ability to stream directly from the battlefield, so-called "CNN in the sky," (Cockburn 2015a: 63) had a profound impact within the Pentagon about what was believed could be known about the battlefield and by whom (Canan 1999). Journalist Andrew Cockburn writes,

> When not talking to each other they [generals at the Pentagon] could watch the drone videos as they were being streamed directly into their offices, inevitably encouraging them in the belief that they had a close-up understanding of the ongoing war. (Cockburn 2015a: 64)

Cockburn reported that General Wesley Clark was particularly obsessed with "drone TV," and would micromanage generals in the field, reportedly calling a commander to ask at one point, "when are you going to do something about those two Serb tanks sitting at the end of that bridge?" (Cockburn 2015b)

While such information networks were intended to decentralize decision-making and allow units increased flexibility to react to changing environments, military

strategists have argued that such networks proved to retrench and centralize command. The question quoted above from General Clark demonstrates that when "high-level commanders have such a detailed operating picture they are tempted to meddle and 'micromanage' tactical engagements" (Betz 2006: 520). Ideals of de-centralized command and control end up being reconfigured in practice, and the acts of surveillance are often under surveillance, themselves.[28]

Moreover, another dimension of decision-making capability was seen to be expanding during the conflicts in the Balkans: the role of international law in justifying and carrying out war. As Richard Betts observed in *Foreign Affairs,* "one of the most striking features of the Kosovo campaign, in fact, was the remarkably direct role lawyers played in managing combat operations—to a degree unprecedented in previous wars" (Betts 2001: 129). For Betts and some American military strategists, "hyperlegalism" and the interjection of lawyers into combat operations represented a hindrance to effective and timely military action; Betts lamented:

> Without understanding the operational problems that made such requirements impractical, NATO lawyers insisted that all targets had to be directly observed shortly before firing. Carried to this extreme, NATO's lawyers thus became, in effect, its tactical commanders. (Betts 2001: 130)

However, for others within the military community, the growing focus on "lawfare," a term popularized by USAF Col Charles Dunlap in the late 1990s, was simply a fact. Dunlap explained,

[28] This has been described as commonplace in the context of contemporary drone operations. As one sensor operator explained, "You would have people saying, 'All right, the President is watching what you're doing right now, so don't mess up" (Sommerstein 2014).

> Lawfare—in both positive and negative forms—is now a fact of modern war. … The rise of lawfare has stimulated something of a 'revolution in military legal affairs' that has made JAGs [Judge Advocate Generals] an indispensable part of a commander's warfighting team. (Dunlap 2008: 149)

For many, the "positive forms" of lawfare established important grounds for justifying the use of force. Representing a perspective held by those strategists and lawyers who advocated for the expanding role of law, Richard Schragger wrote, "*Law makes just wars possible* by creating a well-defined legal space within which individual soldiers can act without resorting to their own personal moral codes" (Schragger 2006). Adherence to the law—and the idea of law—was seen as a central avenue for justifying and rationalizing military action. While the co-mingling and co-constitution of war and law is far from a new phenomenon (Moyn 2013; Jones 2016), the stakes of relying on legal infrastructures to carry out war are important to call attention to and examine. Below, I return to a discussion of lawfare and drone operations in more detail.

During the first years of use in the Balkans, the Predator was used exclusively for Intelligence, Surveillance, and Reconnaissance (ISR) missions. Since its inception, the program was subject to multiple organizational claims over jurisdiction (Cockburn 2015a: 57). Inter-force competition for prestige and, more importantly, budgetary resources, results in each service carefully protecting every technology platform that might fall within its mission. This was the case with the Predator program and other unmanned aerial vehicles (UAVs) (Whittle 2014); while resisted and mistrusted by Air Force leadership (composed primarily of fighter pilots), the Air Force fought to remain in

control of the program, thereby keeping the associated budgets under its control. Still, the CIA had initially procured the program, and early operations were often commanded by the CIA, but operated by Air Force personnel. In close collaboration with the CIA, the Air Force's semi-secret research division, Big Safari, developed and supervised the Predator program, which was always in a state of testing and development (Whittle 2011). This meant that it was essentially a prototype in action, with a variable and unproven track record of accuracy or durability. Still, such a variable and limited performance record did not prevent General Atomics from claiming an unprecedented level of accuracy and mission success in its program updates. One such update stated "Predator® has established new levels of performance for airborne reconnaissance" increasing "reliability, image collection and dissemination, real-time video of areas of interest to the operational commander and to operators in the field," all while "performing tactical reconnaissance at a fraction of the cost of Manned Aircraft" (Ernst 1997: 56). The update concluded: "Predator® provides an awareness level of the Battlefield Never Before Achieved" (Ernst 1997: 56). Once again, belief in the potentials of a technology overshadowed its existing performance record.

The split

In the late 1990s engineers working on the Predator program began experimenting with moving the control of the Predator drone to locations closer to the United States. Existing accounts of the development of the Predator program describe how CIA mission priorities played a central role in the program's development. For instance, the mission to kill Osama Bin Laden was the prime motivation behind arming the Predator with Hellfire missiles (Michel 2015; Woods 2015). The most detailed account currently available

comes from journalist Richard Whittle (2014), who had worked both as an official historian for the Air Force as well as a newspaper reporter covering the Pentagon from 1984-2006. As Whittle narrates it, while the possibility of arming the Predator was being tested within the United States in the late 1990s, a new configuration began to be tested in 2000 that allowed the CIA to control the Predator's flight from Ramstein Air Force Base (AFB) in Germany, with control of takeoff and landing remaining closer to the area of flight.

In turn, a new kind of legal dilemma emerged with the potential to locate lethal operations at Ramstein AFB in Germany. Although classified as a CIA mission, Air Force officers were operating the Predator (Woods 2015), and there would be legal and diplomatic problems if the Air Force were to conduct secret air strikes from Germany. Whittle quotes General "Soup" Campbell, the CIA liaison to the military at the time:

> There was concern that they [the Air Force] couldn't have a military officer [in Germany] actually pulling the trigger in a situation that wasn't declared war, was part of a covert action… So the idea was that maybe we would actually put a trigger or switch in there [the physical setup at Ramstein] and a CIA guy who was covered under the [presidential] finding would push it. (Whittle 2014: 224)

This idea became known as the "monkey switch," and essentially suggested that Air Force officers would control all operational aspects of the mission, but leave the strike, itself, to be carried out by the CIA officer with the press of one button, "so simple a monkey could do it," a thinly veiled gibe against CIA officers. In this way, through a technical modification, the CIA, rather than the Air Force, would be responsible for any

lethal strikes. Although the idea was never seriously tested, the logic behind this solution, which favors adherence to the letter rather than spirit of the law, is an undercurrent in contemporary justifications of drone operations, discussed in more detail below.

Instead of the "monkey switch," the engineers began testing a configuration that would allow operations to be directly controlled from within the United States. In Whittle's account, the lead scientist on the project, a contractor who had been working with Big Safari and the Predator program for years, had the idea to move the Predator crew to Indian Spring Air Force Auxiliary Field (now Creech Air Force Base) in Nevada. Proposing the idea in a meeting, he suggested "the pilots could fly their missions during the day, then go home to their families for dinner in the evening and sleep in their own beds" (Whittle 2014: 212). Apparently most in the room thought the idea was absurd. He had presented the idea a couple of years earlier, and an Air Force officer assured him "we will never operate that way" (Whittle 2014: 212).

A network prototype was developed and tested in the summer of 2001, and the first operations to be successfully carried out as remote split were in the days following September 11th 2001, described at the opening of this chapter. While the CIA had been hunting Osama Bin Laden for the previous months, the attacks on the World Trade Center provided the necessary political commitment to carry out strikes as rapidly as possible (Michel 2015).

American Civil Liberties Union (ACLU) lawyer and legal scholar Jameel Jaffer (2016) has observed that the Obama administration has emphasized the legality of drone strikes as much, if not more, than describing those strikes as "precise," "closely supervised," "effective" or "indispensable" (Jaffer 2016: 2). In fact, he offers, "perhaps

no administration before [the Obama] administration has tried so assiduously to justify its resort to the weapons of war" (7). These are striking observations for they pinpoint a unique logic that is also implicated in remote split drone operations, that of the emphasis on legal regimes for the justification of war.

A detailed analysis of these legal frameworks and the evolution of "lawfare," which are also invoked in Military Operations Other Than War, the concept itself formalized into the acronym MOOTW, are unfortunately beyond the scope of this dissertation. However, a line of inquiry that would investigate the genealogy of these new laws of the "new wars" (Kaldor 2013) would provide an important perspective on the use and potential for abuse of state power. Jaffer (2016) argues, in his introduction to a recently released edited collection of official legal documents pertaining to the drone programs, that the efficacy of the legal justifications during the expansion of the drone programs under the Obama administration is founded on the "perceived trustworthiness of its officials" (30), including Harold Koh, a well-known and widely respected human rights lawyer, a "hero" to many young progressive lawyers and who had been a vocal critic of the Bush administration's torture policies. Moreover, several White House officials were quoted repeating a common theme: "the drone program rests on the personal legitimacy of the president" (31). While legal scholars have for some time debated the legality of the drone programs in the context of international law, to my knowledge Jaffer's essay is unique in its critical articulation of the deployment of laws—not particular laws, but the idea of the law—as a consequential infrastructure of drone operations. Further research from legal, anthropological, and historical disciplinary perspectives would be valuable.

For it is not only that, as Derek Gregory suggests, "the invocation of legality works to marginalize ethics and politics by making available a seemingly neutral, objective language" (Gregory 2011a: 247), but also, and quintessentially, that such appeals to legal frameworks re-inscribe a set of political logics in which state violence can be justified against certain populations more than others (Asad 2007). A more comprehensive genealogy of lawfare in the context of drone operations and its implications are beyond the scope of this dissertation; my primary aim has been to call attention to the emphasis on legal frameworks and justifications in creating the conditions for authorizing drone operations to be perceived as effective and appropriate.

Conclusion: ~~No~~ humans here

In a presentation during a research session at the largest annual industry conference called AUVSI (Aerial Unmanned Vehicle Systems International), a manager at the Air Force Research Lab in Ohio posed the following question to begin his presentation: "When will the technology of unmanned vehicles [drones] render the human operator essentially obsolete? (A) It is already here – saw it on YouTube; (B) 10 years; (C) 20 years; (D) 30 years; or (E) Never –stop watching so much sci-fi!" He asked for a show of hands, and the audience of project managers, engineers, marketers and military officers was roughly divided between the choices of 20 years, 30 years and never.

In this chapter, I examined from a historical perspective under what historical and sociotechnical conditions it is possible to ask such a question in the context of warfare. My argument has focused on a particular set of conditions, and I do not claim them as the only relevant and necessary conditions that should be accounted for. For instance, my

argument has not focused on the colonial and post-colonial logics that structure how certain kinds of American military interventions are rendered appropriate and justified as "legalized" state violence within, in the words of Talal Asad, "a particular kind of international order, an order in which the lives of some peoples are less valuable than the lives of others and therefore their deaths less disturbing" (Asad 2007: 94).

Still, my argument has demonstrated that hardware-centric histories of the development of "unmanned vehicles" that emphasize the increasing "autonomy" of aerial vehicles miss a crucial set of historical conditions of possibility for remote split to become thinkable and perceived as effective. A full accounting of such conditions is worthy of a much longer and more deeply rooted historical inquiry. In place of a comprehensive genealogy of drone operations, in this opening chapter of the dissertation, my aim has been to denaturalize not only the development of drone operations, itself, but also the standard historical accounts that emphasize hardware over sociotechnical system. In doing so, my goal has been to demonstrate through a "mesoscopic history" (Galison 1997) how remote split drone operations rely on material, epistemological, and semiotic infrastructures, from global information networks and digital sensors to theories of command and control and "lawfare" to discourses of bombing precision and comprehensive digital data, all of which have taken shape in the decades following World War II and without which remote split operations would not have taken hold as the primary paradigm of drone operations.

CHAPTER 2: NEAR CERTAINTY AND THE MYTHS OF TECHNO-AUTONOMY

"What was it like on the ground?" *Wired's* war correspondent rhetorically asked in a 2003 article about the use of technology during the U.S. ground invasion of Iraq. The correspondent, sent to write about the purportedly transformative role of technology in military operations, sought out networked technologies ranging from generals sitting in Central Command headquarters on American bases to forward detachments in the Middle East. What he found was "something entirely different from the shiny pictures of techno-supremacy touted by the proponents of the Rumsfeld doctrine" (Davis 2003). What he saw were technologies not working as designed, cobbled-together or reconfigured technologies, and what he perceived to be ingenious hardware hacks by soldiers. He pointed out, "And during two weeks in the war zone, I never heard anyone mention the Revolution in Military Affairs."

Another example: During an official U.S. Air Force (USAF) investigation of a 2010 incident in which dozens of Afghan civilians were killed, described in detail below, a USAF officer was asked what could be learned from the incident. The officer responded: "Not to trust birds, and I say that honestly, sir, in our community we have been brought up to believe we can rely on the Preds [Predators] and ISR [Intelligent, Surveillance, Reconnaissance] for good intel [intelligence]" (USAF 2011a: 001507). "Relying on the bird," referring to the Predator flying in the sky above had *not* produced "good intel" and had resulted in misinformation, confusion, and tragedy.

In the last chapter, I examined the historical conditions of possibility for remote split operations to take hold. In this chapter, I examine the practices and beliefs that these conditions have contributed to creating, examining in closer detail the circulation of

information and rationales for action at stake in drone operations. I argue that in contrast to the claims of technical precision and the ways in which drones are envisioned as autonomous "unmanned" actors, the actual practices that constitute drone operations are imprecise, incomplete, and dependent upon forms of distributed human agencies.

An inquiry into the daily practices of conducting drone missions is limited in many regards. Very few details are known publicly about the U.S. drone programs. My fieldwork may have brought me in conversation with those who work in the planning and deployment of these programs, but very little, if anything at all, was said, or could be said legally, about the micro-dynamics of active-duty missions. What is known comes from published first person accounts by drone pilots or sensor operators in the form of memoirs or as told to journalists (e.g. Martin and Sasser 2010; Power 2013; McCurly and Maurer 2015). In this chapter, I base my arguments on two other forms of publicly available material: official USAF documents and published dissertations by USAF officers. The specific materials I examine include an official incident report, including interview and radio transcripts, obtained through a journalist's Freedom of Information Act (FOIA) request, and an ethnographic but partially redacted dissertation of Remotely Piloted Aircraft (RPA) crew training written by a USAF officer when he was a graduate student at Massachusetts Institute of Technology (MIT). These materials likely represent two extreme perspectives on drone operations. The aim of presenting and analyzing them is not to uncover what "really happens" during a drone operation, but rather to examine a set of discursive mechanisms through which the practices of drone operations emerge as authorized and effective forms of military action.

Both of these documents reflect the constructed and contingent status of digital information and evidence as it circulates within the remote split operations network, albeit from dramatically different perspectives. The incident report presents one of the worst possible consequences of drone operations and evokes some of the worst stereotypes of American soldiers. On the other side, the descriptions in the USAF officer's dissertation present a process of training that many officers and airmen would likely recognize and be proud of. Both documents underscore the immense human and technical infrastructures that are mobilized in the service of "unmanned" aircraft, and the extent to which observed phenomena are not self-evident fact but rather are rendered as actionable military intelligence only after individual human interpretation and translation through distributed military networks.

Before analyzing these documents, I begin by articulating a techno-scientific imaginary of drones that positions them as effectively possessing what I term techno-autonomy, that is, functional apart from humans and as potentially autonomous actors and decision makers. I rely on reports and roadmaps published by the Air Force and the Department of Defense (DoD), supplemented by mass media news coverage of these reports and the drone technologies deployed in U.S. military operations. Having established how drones are discursively envisioned, the rest of the chapter analyzes the extensive human practices and acts of interpretation that constitute drone operations.

Praise the machine

Drones tend to be positioned as the first step on an inevitable path toward autonomous technologies, capable of sensing, judging, and acting on their own. In the same constellation of vague but widespread terms that describe technological capacities

such as "artificial intelligence," "smart" technologies, and "machine learning," autonomous systems claim salience in the present moment even as their existence in the future is uncertain. Lucy Suchman and Jutta Weber have argued, in fact, that this conflation of "the descriptive and the promissory" (Weber and Suchman 2016: 91) is a quintessential characteristic of current military rhetorics around automated and autonomous systems.

To begin, it is worthwhile to define more specifically the terms at stake. An autonomous technology refers to a system that operates without human intervention. What constitutes "human intervention" is key to defining autonomy and varies within different domains. A Defense Science Board (DSB) 2012 report, *The Role of Autonomy in DoD Systems*, defines autonomy as "a capability (or a set of capabilities) that enables a particular action of a system to be automatic or, within programmed boundaries, 'self-governing'" (Murphy and Shields 2012: 1). Very few systems are currently completely autonomous, and all require human design and maintenance.

Both autonomy, as well as artificial intelligence, usually refers to activities or processes that were previously carried out by humans. The term automation, as defined by leading researchers in human factors engineering, refers to "a device or system that accomplishes (partially or fully) a function that was previously, or conceivably could be, carried out (partially or fully) by a human operator" (Parasuraman, Sheridan, and Wickens 2000). These researchers have also proposed a framework for designing and analyzing automated systems through varying *levels* of automation, rather than an all or nothing state of affairs. The framework of levels or degrees of automation, with full machine autonomy on one end of a continuum has become the predominant way of

describing automated and autonomous systems in engineering and robotics fields. In this way, artificial intelligence and autonomous technologies can be thought of as technologies of automation. In the DoD report referenced below, the term automation is used as a pre-figuration of autonomous systems.

The nuances of these precise and refined definitions tend to be lost outside the confines of technical laboratories and research centers. As the authors of the 2012 DSB study note:

> Unfortunately, the word 'autonomy' often conjures images in the press and the minds of some military leaders of computers making independent decisions and taking uncontrolled action. While the reality of what autonomy is and can do is quite different from those conjured images. (Murphy and Shields 2012: 1)

Still, the "conjuring" abilities of words like autonomy allow significant definitional slippage. Such slippages may lead toward fears of out of control robots. But they may also lead toward beliefs in attainable technological perfection, a perception of techno-autonomy. By techno-autonomy, I mean to refer to a particular set of beliefs and discourses in which autonomous technologies are positioned as capable and independent actors apart from their human creators or those others who sustain and maintain the technologies. I find the term useful for its emphasis on a particular kind of autonomy at stake that is unique to technology and idealizes the capabilities of such a potential autonomy.

Formal publications by the DoD and USAF are clear instances in which the imaginaries of techno-autonomy become visible as both supporting frames as well as

idealized goals. For instance, the *Unmanned Systems Integrated Roadmap: FY2013-2038* (hereafter referred to as *USI Roadmap*), published by the DoD in 2013, should be understood as both a "vision" document as well as a medium of communication to defense contractors about future technological requirements and acquisition priorities. The document is intended to give an overview of current capacities of unmanned aerial systems (UAS) across the forces (Army, Air Force, Navy, and Marines) as well as outline future potential capacities of autonomous systems. An autonomous aircraft, as the 2013 DoD *USI Roadmap* defines it, is "an aircraft or balloon that does not carry a human operator [and] is capable of flight under remote control or autonomous programming" (DoD 2013: 15). The report emphasizes that when an aircraft is controlled remotely, it is not autonomous, and that "current DoD UAS are remotely operated and capitalize on automation in extreme circumstances, such as a lost [satellite] link condition, to automatically perform a preprogrammed set of instructions" (15), such as maintaining a specific altitude or returning to a takeoff location. The distinction between current capacities to remotely control an aircraft, which may have some degree of automated self-stabilizing capacities, and future autonomous vehicles is important, the report emphasizes, because "our community vernacular often uses the term 'autonomy' to incorrectly describe automated operations" (15). The report goes on to state that, "research and development in automation are advancing from a state of automatic systems requiring human control toward a state of autonomous systems able to make decisions and react without human interaction" (15). Weber and Suchman (2016), who have analyzed this document in detail, point out that this simple sentence is a precise example of the conflation of "the descriptive with the promissory" (Weber and Suchman

2016: 91). That is, this sentence suggests a straightforward and unproblematic development from automation into effective autonomy. The implicit claim to future research accomplishments elides substantial material realities. For example, several "barriers" to machine autonomy, presented as solvable by the *USI Roadmap* in the "Middle-Term (4-8 years)" (DoD 2013: 16), remain fundamental, unsolved problems in the fields of computer science and robotics, and indeed have remained fundamental problems since early research in the field of artificial intelligence (Weber and Suchman 2016: 94-95). By consistently invoking a potential future of effective and fully autonomous systems, the *USI Roadmap* creates a world in which such systems exist, if only just around the corner. This becomes problematic when the imagined potential and efficacy of such technologies informs how the capabilities and efficacy of *current technologies* are understood.

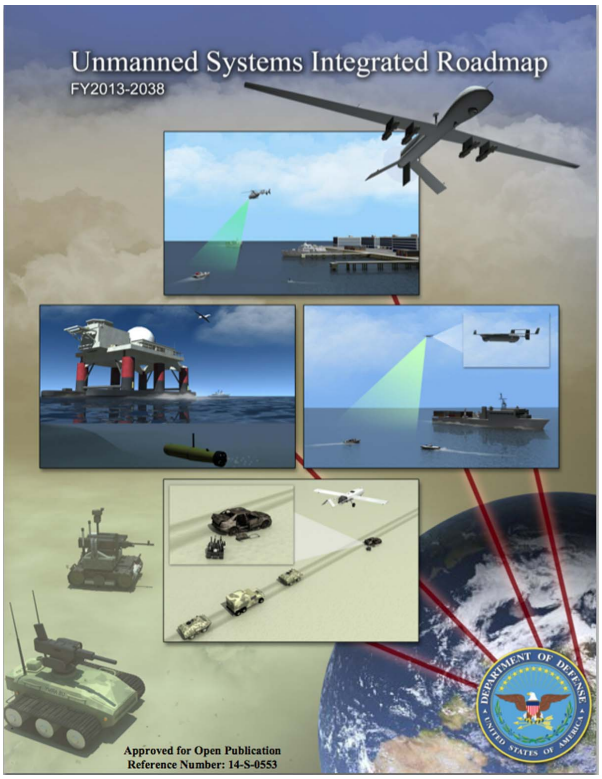


Figure 5: DoD Unmanned Systems Integrated Roadmap: FY2013-2038

Moreover, the document assumes machine autonomy as inevitable while also rhetorically emphasizing the necessity of human supervision. For instance, the report reminds the reader:

> It is important to note here that automation is only as good as the software writer and developer because the control algorithms are created and tested by teams of humans. … Ensuring accuracy and correctness requires a continual process in which the observe – orient – decide – act (OODA) loops in the software are continually updated via manual analysis, training, and operator understanding of algorithm inputs and outputs. (DoD 2013: 67)[29]

The report emphasizes humans as both necessary but essentially insufficient.

A similar dynamic is found in the Air Force's most recent force-specific roadmaps for unmanned aircraft systems (UAS). For instance, on one hand, increasing automation is presented as leading directly into effective autonomy, lessening "the warfighter's workload" while making the warfighter more effective with more information. Autonomy is presented as necessary because "Air Force missions increasingly involve tasks that must be accomplished on a scale beyond human capability" (USAF 2014: 39). "Future UAS," the 2009 report states, "able to perceive the situation and act independently with limited or little human input will greatly shorten decision time [on the battlefield]" (USAF 2009: 16). In a later section, the report

[29] The OODA loop is an acronym that refers to the specific steps of a decision making process proposed by the military strategist USAF Col John Boyd in the 1970s for use by fighter pilots during evasive maneuvers. The OODA loop refers to a cycle of steps: Observe, Orient, Decide, Act. The term and the cycle it lays out have become central to Air Force doctrine and strategy.

promises, “Today the role of technology is changing from supporting to fully participating with humans in each step of the process” (41). The report goes on to state:

> Increasingly humans will no longer be ‘in the loop’ but rather ‘on the loop’ – monitoring the execution of certain decisions. Simultaneously, advances in AI will enable systems to make combat decisions and act within legal and policy constraints without necessarily requiring human input. (41)

Conflating a potential future with an immediate present, autonomous machines are positioned by the report to do everything faster and better.

On the other hand, the USAF roadmaps consistently emphasize that the human is the keystone of the system. In the opening pages of the 2014 USAF roadmap, a pull-quote from an RPA commander, Col Bill Tart, emphasizes,

> Like the Rickenbackers and Lufberys of their day, it was the RPA lieutenants and captains, staff sergeants, and senior airmen who took these new instruments of airpower, as imperfect as they were, and integrated them into the evolving fight, transitioning the platforms from reconnaissance-only to true multirole Intelligence, Surveillance, and Reconnaissance (ISR) and strike. They delivered disciplined and effective combat airpower every day; another generation of the Air Force’s great captains is born. (USAF 2014: 11)

Less dramatic, but still significant, the 2009 roadmap reminds the reader, “Regardless of where the human interfaces occur, or the sophistication of the system and its flight control capability, the ultimate success of the systems will depend on the effectiveness of

the human interfaces" (USAF 2009: 31). While technology is positioned as necessary because the human is not enough, the human is also positioned as quintessential to the system's success.

Whether with a "human in the loop" or "human on the loop," such autonomous systems are presented as technological solutions that not only provide "raw data" and improved "situational awareness," but analyze and act on information: "UAS will automatically process imagery requests from low level users and will 'detect' threats and targets through the use of artificial intelligence (AI), sensory information and image processing" (USAF 2009: 34). The USAF 2009 roadmap goes so far as to state that:

> Today the role of technology is changing from supporting to *fully participating* with humans in each step of the process. In 2047 technology will be able to reduce the time to complete the OODA [Observe, Orient, Decide, Act] loop to micro or nanoseconds. Much like a chess master can outperform proficient chess players, UAS will be able to react at these speeds and therefore this loop moves toward becoming a 'perceive and act' vector. Increasingly humans will no longer be 'in the loop' but rather 'on the loop' – monitoring the execution of certain decisions. Simultaneously, advances in AI will enable systems to make combat decisions and act within legal and policy constraints without necessarily requiring human input. (emphasis added, USAF 2009: 41)

While the "capturing" and "processing" of information is described as the most important task, it is envisioned as the one most able to be automated. Implicit in this positioning is

not only a belief in the existence of "raw data" but also that such data itself is sufficient for effectively understanding the situation and planning appropriate actions.

In the more technical sections of the DoD and USAF roadmaps, current and potential problems of UAS are enumerated. These include a range of problems with the current global communications infrastructure. For instance, the DoD *USI Roadmap* lists current issues like "poor global connectivity," "costly satellite and network contracts," "stovepipe infrastructures," and" poor information sharing" (DoD 2013: 40-41). As the 2009 USAF roadmap bluntly concedes,

> The reality is that while we can continually improve the capability of systems providing communication from one point to another, there is never a 100 percent guarantee it will reach the other end. From a terrestrial standpoint, we have all witnessed when the 'network's down' even the most robust architectures are subject to some level of degradation at one time or another either due to malfunction or malicious intent." (USAF 2009: 44)

There can be no denying, the report emphasizes, that technology can and will physically fail to function as intended.

Another point of concern in the roadmaps is the future availability of radio frequencies and bandwidth, which "just like fuel or power, is an essential enabler for UAS operations" (USAF 2009: 45). In addition to the availability of bandwidth, which the report notes is an "open commodity" that is, shared with "other [civilian] communications users (i.e. TV, international telephone, data, and facsimile)," the cost of bandwidth is a significant point of consideration. For the standard Predator/Reaper CAP

(Combat Air Patrol) of 50 aerial vehicles, there is a recurring cost of $25 million per year for leasing commercial satellite communications technology and bandwidth (USAF 2009: 43-44). Moreover, the 2014 USAF roadmap emphasizes that more resources must be devoted to "link security, link ranges, assuredness, reliability and network infrastructure to ensure continuous undisrupted availability" (USAF 2014: 22). The potentials for technical shortcomings are significant, even by the reports' own admissions. The reports emphasize the need to address the potential ways in which technologies will physically fail or remain resource-intensive, and implicitly suggest that if these potentials are addressed UAS operations will meet mission requirements, that is, work to effectively achieve a specific military goal. Such visions elide not only constitutive human roles within sociotechnical systems but also the possibility that the collection of digital data will not provide adequate information about the mission and its context.

These reports are significant to examine not only in order to understand how DoD leadership aims to bring particular futures into being, but also how future imaginaries of warfare and autonomous technologies are shaped more broadly within the United States. For instance, many popular articles in newspapers and magazines echo the visions of techno-autonomy found in the documents above. A recent and emblematic CBS *60 Minutes* feature, titled "New Generation of Drones to Revolutionize Warfare," opens with the following narration:

> One of the biggest revolutions over the past 15 years of war has been the rise of the drones—remotely piloted vehicles that do everything from conduct air strikes to dismantle roadside bombs. Now, a new generation of drones is coming. Only this time they are autonomous—able to operate on

> their own without humans controlling them from somewhere with a joystick. Some autonomous machines are run by artificial intelligence which allows them to learn, getting better each time. It's early in the revolution and no one knows exactly where it is headed, but the potential exists for all missions considered too dangerous or complex for humans to be turned over to autonomous machines that can make decisions faster and go in harm's way without any fear. Think of it as the coming swarm, and if that sounds like the title of a sci-fi mini-series, well, stay tuned. As we're about to show you, it's already a military reality. (Walsh 2017)

In general, mass media reporting of autonomous and artificially intelligent technologies tend to present such technologies as far more sophisticated and robust than they are in practice, over-estimating the capacities of machines and under-emphasizing the necessary roles of humans and essential limitations of the systems (Stanford 2016; Elish and Hwang 2016).[30]

This section has highlighted predominant themes in the ways in which automated, unmanned, and autonomous systems are described and imagined to be effective and efficient. In the following sections, I contrast these discourses with what we know about how specific missions within drone operations are constituted in actual practice. What emerges is a distinctly different picture.

[30] As Lily Irani has observed, while most media discussions elide the role of humans or frame it as a temporary obstacle that will soon be solved by computers, this kind of human work is *constitutive* of "intelligent" systems (Irani 2015).

Uruzgan 2010

One of the most complete accounts of a drone operation is found within a 2010 official Air Force incident investigation report, obtained through a Freedom of Information Act (FOIA) request, regarding the killing of at least 23 Afghan civilians, including women and children, in the Uruzgan province in February 2010.[31] The FOIA, filed by investigative journalist David Cloud, was made public in 2011. The documents, released awkwardly in thirty-two pdf files and containing over 2000 pages, are currently available on the American Civil Liberties Union (ACLU) website.[32] Including executive summaries, correspondence, interviews, and transcripts, the report provides a glimpse into the networks of communication and miscommunication that construct the warzone and the potential for mis/interpretation and mis/understanding. In this section, I cover in detail the event as it has been recorded in the Air Force investigation documents.

In mid-February of 2010, a U.S. Special Operations team had been dropped into the Shahidi Hassas district of Uruzgan Province in central Afghanistan, a reported stronghold of the Taliban. The commander of the unit was "alert" to a possible attack because the previous year another Special Operations unit had been attacked in the area. Additionally, U.S. intelligence analysts had picked up calls over radio for men to mount an attack on U.S. and U.S.-supported Afghan forces in the area. To protect the Special Operations unit, an AC-130 gunship, two armed Kiowa helicopters and an MQ-1 Predator were in close-air support of a team on the ground. On the early morning of

[31] Because of the rare comprehensiveness of the information, the incident is frequently discussed in accounts of drone operations.
[32] The documents can be downloaded from a page on the ACLU website: https://www.aclu.org/drone-foia-department-defense-uruzgan-investigation-documents (accessed 4/4/2017).

February 21, airmen on the AC-130 spotted three vehicles flash their headlights and begin traveling in a group, making them automatically suspect. The three vehicles began to be closely surveilled by the MQ-1 Predator drone flying overhead.

According to the USAF incident investigation, for three hours a network of American military teams monitored the situation. The Special Operations commander on the ground, in contact with surveillance and intelligence teams, was made aware of the vehicles, which were approximately seven and half miles (12 km) away. During these early morning hours, he remained in constant radio contact with the multiple teams who were providing him information, including the Predator flight crew in Nevada and the Predator video screener in Florida. Located at Creech Air Force Base in Nevada, the mission of the Predator crew, including a pilot, sensor operator, mission coordinator, and safety observer, was to monitor the vehicles and provide PID (positive identification) of weapons. Assessing PID involves confirming the "demographics" of the people in the vehicles (whether they were military-aged men, at the time referred to as MAMs). Making such an assessment involved the Predator video screener, who was located at the Air Force Hurlburt Field installation in Florida and who was part of a larger team, composed of contractors from the defense contractor, SAIC, and Air Force imagery analysts. The screener's role was to monitor the video feed from the Predator, confirming and assessing the information (including PID) that the pilot "called," that is announced on the radio. Also monitoring the communication, including the video feed, the radio chatter, and the mIRC (internet relay chat) was a group of officers at Kandahar Air Force Base in Afghanistan. Within this group at Kandahar, there was an array of officers who were responsible for monitoring and coordinating activity in the Afghan province. These

officers included a night battle commander, a signal intelligence non-commissioned officer, and a military officer trained in the laws of warfare.

According to the transcripts, after three hours of monitoring, the situation appeared to change, largely propelled by observations "called out" by the Predator crew. According to the transcript, the sensor operator stated that he had seen a weapon, and then the mission commander and the sensor operator bemoaned the apparent appearance of an MQ-9 Reaper, the larger, updated version of the Predator which might obviate the need for the Predator (and Predator crew's) presence. The sensor operator (sensor) stated, "*Expletive* that man." The mission commander (MC) responded, "just claim we're here first." In the minutes that follow, the sensor stated again that he has just seen a weapon:

[Sensor]: Hey, that dude just put a weapon down right above the truck. See it?

[Pilot]: See it. See if DGS [Distributed Ground Station] will call that.

[Sensor]: I think that was there when he walked by it. Come on, focus, get better.

[Pilot]: [Redacted], be advised all three vehicles are stopped at this time. A few of the pax [passengers] are dismounting. It looks like they're taking a break real quick. We'll keep you updated. See if we can PID something [redacted] copies

[Sensor]: This is where I can see the most people so I'm gonna try to stay here and get some decent PID. … That's about the best picture I've seen here all night.

> *[Sensor]:* The MAMs [military aged males] who've dismounted had possible. But try to get more dudes and see. More dudes more chances. (USAF 2011a: 10-0218 002013)

The sensor operator alternately made declarative statements, "dude just put a weapon down," and explicitly expressed the limits of what he could see, coaxing the sensor ball, with its camera, to "come on, focus, get better."

In the following five minutes, the sensor operator and pilot informed others (names redacted) about what they were seeing and what they might be seeing. They discussed whether the people in the cars were Afghan National Police (ANP), how many weapons might be present, and the presumed "demographics" of the people on the ground. At one point in the transcript, the sensor operator said he saw 24 or 25 people, with one looking "short enough" to be a child. Soon after, the pilot confirmed that the screeners in Florida at Hurlbert Field had also seen "21 Military Aged Males (MAMs), no females and 2 possible children." In the course of the next minute, the children at first described as "about twelve," became "adolescents," and then "teens." Within two minutes, the evolving speculation that the short figure was a teenager had taken on the presumption of fact as it circulated on the radio among the pilot, sensor, screeners, and redacted coordinators, likely including someone at SOTF (Special Operations Task Force) and the ground force commander of the Special Operations unit who had been dropped into Uruzgan. Once described as children, the figures had transformed into adolescents in the "double digit age range."

Following the resolution of this observation into evidentiary fact, the sensor operator and pilot continued to conjecture about how many people might be in the cars,

and how much cargo they might be able to be carrying. At one point in the transcript, someone relayed information that had just been received, "we just had traffic saying that all Mujahedeen need to start moving and come together." This person and the pilot stated that they would continue looking for signs or waiting for confirmation that the vehicles were part of the purported Mujahedeen movement. During this period in the transcript, the sensor and pilot also discussed for several minutes whether the trucks in the convoy they were watching were Jeeps or Toyotas. They also observed that at one point, it looked like some of the men were changing a tire.

Over the course of the next thirty minutes, the transcript indicates that more information trickled in from sources other than what could be seen by the Predator video feed. The Reaper crew that threatened the relevance of the Predator crew early on in the mission was eventually called off to another TIC (Troops in Contact)[33] for close-air support assistance. Additional intelligence was relayed to the Predator crew that suggested that there might be other vehicles in the area with insurgents. During a lull in the inflow of additional information and when the vehicles were stopped for awhile, the pilot and sensor operator decided they would agree that the trucks were Fords, and not Jeeps or Toyotas as they had originally thought.

Early in the transcript it becomes clear a specific motivation was influencing the analyses of what they saw; the pilot and sensor operator team wanted to shoot their weapons. During the discussion of who might be on the ground below, an unidentified person interjected:

[Unknown]: What's the master plan fellas?

[33] "Troops in contact" (TIC) refers to troops who are under attack or have encountered enemy forces. USAF drone operations are primarily used as close-air support, conducting coordinated missions with troops on the ground or assisting troops who are under attack.

[Pilot]: I don't know, hope we get to shoot the truck with all the dudes in it.

[Sensor]: Yea. (10-0218 002017)

Forty-five minutes later, still with no confirmation of weapons or insurgents, the pilot and sensor operator discussed for three minutes how "awesome" it would be to fire their missiles:

[Pilot]: That would be awesome.

[Sensor]: That would be badass. But… we're not killers, we are ISR [Intelligence, Surveillance, Reconnaissance]

[Sensor]: Tell me… Still training south west, huh. (10-0218 002025)

In the early hours of the monitoring, the Predator pilot and sensor operator were clearly hoping, and therefore looking, for weapons. When the screener in Florida stated that she observed a child near the vehicles (the child that later became an adolescent), the sensor operator called "bullshit:"

[Mission Commander (MC)]: Screener said at least one child near SUV.

[Sensor]: Bullshit… where? Send me a fucking still [picture]. I don't think they have kids at this hour, I know they're shady, but come on.

[Pilot]: At least one child… Really? Listing MAM—that means he's guilty.

[Sensor]: Well maybe a teenager, but I haven't seen anything that looks that short, granted they're all grouped up here, but.

[MC]: They're [the screeners] reviewing.

[Pilot]: Yeah, review that shit… Why didn't he say possible child, why are they so quick to call fucking kids but not to call shit a rifle. (10-0218 002001)

The pilot and sensor operator were frustrated, and in fact demanded visual evidence to justify what they felt was some sort of bias against them. The sensor wanted to see "a fucking still," despite the fact that the essential contention was over the interpretation, not mere presence, of what was visible.

The sections described above, as well as following portions of the transcript, reveal a set of fundamental uncertainties, misunderstandings, and miscommunications among the teams involved. Still, after approximately four hours of monitoring the vehicles and discussing and debating what was seen, what might be seen, and what might happen next, the command and control unit of the Special Operations task force (SOTF) authorized an attack on the convoy, and the helicopter crew fired missiles on the vehicles.

As described in the USAF official narration of the event, what happened next was that the helicopter pilots "ceased their engagement when they spotted bright clothing and suspected women were present" (10-0218 000094). The helicopter pilots, observing the ground after firing three missiles, realized that they had potentially shot at and killed innocent civilians. The reasons why no one saw the colored clothing previously were not a point of discussion. In the minutes after the helicopters ceased firing, the transcript from the Predator crew documents disbelief and confusion. The transcript of the helicopter crew was redacted. While the Predator crew was tasked with maintaining their presence in the area and conducting damage assessment, the commanders responsible for reporting

civilian causalities did not report the incident for over five hours, a serious violation of military protocol.

The vehicles that were destroyed contained villagers traveling within the province, some shopkeepers going for supplies, some on their way to Iran in search of work, some traveling to school or seeking medical care, and some visiting relatives. According to the official U.S. DoD statement, sixteen men were killed and twelve people were wounded, including a woman and three children. However, according to elders from the Afghans' home villages who were interviewed by journalists, there were several women and as many as four young children (Cloud 2011). The elders stated in interviews that twenty-three people had been killed, including two boys, ages three and four. Later that day, the top U.S. commander in Afghanistan, Army General Stanley McChrystal, visited President Hamid Karzai in Kabul to apologize for the incident. Several weeks after the attack, U.S. officers went to the villages to apologize to the survivors and victims' families and to give them each a few thousand dollars (Cloud 2011).

Some proponents of drone strikes argue that the technological mediation of violence creates the conditions for rational, and therefore just, action because judgments can be divorced from emotions.[34] However, this ideal of detached rationality disregards the ways in which threat, innocence, and what constitutes "grievable life" (Butler 2009) are constructed and acted upon in military engagements. The Predator crew intentionally and explicitly wanted to use the weapons under their control and were clearly not

[34] In an article entitled "Warheads on Foreheads" for *Air Force Magazine*, journalist Anna Mulrine voices the Air Force's position and writes: "In counterinsurgency wars, the line between civilians and insurgents gets blurry, since insurgents and noncombatants live side by side. As a result, said Manwill, the chief of combat operations, rules-of-engagement questions abound. Having someone standing by to consult on legal issues, he added, gives commanders a useful check on their options" (Mulrine 2008: 47). This comment is an example of one type of argument that claims drone operations as more rational and precise.

governed by "rational" or "detached" assessments of threat. This is obvious from the excerpts of the transcript included here, as well as in numerous other moments in the transcript. This was so clear that the Major General leading the USAF investigation concluded that he was deeply disturbed by the conduct of the Predator crew. In his report, he called for the Air Force to carry out another internal investigation of the crew's entire Predator wing at Creech Air Force Base. In the report, he described the Predator crew as "almost juvenile in their desire to engage the targets" (USAF 2011a: 10-0218 000095). During one of the many interviews he conducted, he was told that it was "like Top Gun around there [the Predator Wing at Creech]" (10-0218 000950), meaning that there was a culture of fighter pilot machismo and showing off. The Major General is at times angered by or incredulous of what he is told during his interviews during the investigation. In a harsh but staid official summary of the investigation, the Major General concluded:

> The Predator crew demonstrated a propensity for kinetic operations based on their internal communications transcript. They clearly hoped this operation would lead to Predator weapons employment, and seemed to bias their assessments to support this. Simply stated, their lack of professionalism in their communication, coordination and behavior contributed to a faulty threat assessment by the ground commander. (10-0218 000114)

The transgression of the Predator crew, as narrated by the incident report, becomes not a transgression of racism or cruelty, but rather of professionalism.

As the report makes clear, what constitutes professionalism here is not only about maintaining appropriate attitudes and affects during a mission, but also the ability to

adhere to established protocols, directives, and other explicit professional bodies of knowledge. For instance, also monitoring the Predator video feed and mIRC chat was the Special Operations commander on the ground (ODA CDR) who was directing the helicopter'' engagement, and the SOTF [Special Operations Task Force] [redacted] Operations Center, including the night Battle Captain of Joint Operations Center at the Kandahar base. This captain had been monitoring the incident since the early morning hours. But when the day Battle Captain took over, in his assessment, he decided that a consultation with the Judge Advocate (JA) would be needed before any strike could be called. The interviews with the captains technically in command of the operation display a profoundly confused sense of who was supposed to be in charge of everything that was happening. The JA who had recently joined the unit and whose job was to interpret and advise commanders on the laws of war (LOW) and Rules of Engagement (ROE), made inconsistent statements about his role in the incident, as well as at times incorrect statements about the LOW and relevant ROE, when interviewed by the Major General (10-0128 000674). The final report also cites the lack of adherence to, or even knowledge of, standard relevant definitions, protocols, and directives.

Moreover, even the report acknowledges that PID became a matter of desire to use weapons, the report also emphasizes that even what officially constitutes "positive identification" (PID) is problematically open to interpretation. According to the report "the understanding of the terms PID, imminent threat, and hostile intent are not to standard" (10-0218 000053). During the investigation interviews, various personnel define each of these terms differently, or say they don't know exactly what they mean. The report states:

> They [the pilot and safety officer] also were only vaguely familiar with COMISAF's [Commander of International Security Assistance Force] Tactical Directive.[35] This contributed to an incorrect estimate of the threat situation, as well as a bias to kinetic [firing] solutions. (10-0218 000115)

In this way, it is also interesting to note that the integrity of the Air Force and the DoD remains intact, by way of the protocols that they have established to exercise justified force. By citing a lapse in correctly estimating "the threat situation," the report finds fault not in the reasoning, but rather in its execution. As Mair et al. note in an analysis of a friendly fire incident during Desert Storm, discussed in more detail below, for military investigation boards, "a moral actor is a procedural actor" (Mair et al. 2012: 93). By moral, in this case, they mean to refer to one who can claim correctly justified action, and in that specific case, not be held guilty for killing "friendly forces." In the Uruzgan incident, appropriate procedures and protocols were not followed, and an assessment of wrongdoing and unjustified action was clear.[36]

The executive summary of the Air Force investigation concluded that there were four major causes of the tragedy: (1) ineffective command posts, (2) Predator crew actions (3) decision to engage, and (4) ill-defined terminology. In the words of the report, the incident occurred,

> When the convoy they [the Afghan civilians] were travelling in what was mistaken for an insurgent force and engaged with air-to-ground fire. The

[35] This directive had been recently issued by General Stanley McCrystal and directed forces to, among other things, to prioritize the minimization of civilian causalities.
[36] Following the investigations, four U.S. military officers, two of whom were senior officers, were given career damaging letters of reprimands, but no disciplinary action was taken against the primary screener in Florida because she was a contractor, and the military has no jurisdiction over disciplinary actions (Clanahan 2013: 123).

> tragic loss of life was compounded by a failure of the commands involved to timely report the incident. The strike occurred because the ground force commander lacked a clear understanding of who was in the vehicles, the location, direction of travel and the likely course of action of the vehicles. The lack of understanding resulted from poorly functioning command posts at SOTF [redacted] and CJSOTF-A which failed to provide the ground force commander with the evidence and analysis that the vehicles were not a hostile threat and the inaccurate and unprofessional reporting of the Predator crew operating out of Creech AFB Nevada which deprived the ground force commander of vital information. (USAF 2011a: 10-0218 000074)

What is lacking, according to this assessment, is effective communication, oversight and adherence to established protocols. The incident clearly demonstrates the overlapping, sometimes contradictory, and always multiple perspectives implicated in the command and control of an extremely opaque and distributed global network.[37] For instance, various individuals whom the Major General interviewed voiced the inability of each component to fully grasp what was occurring. One colonel, in a leadership position for the Regional Command South (in Afghanistan) tried to explain, while discussing how the "flow" of information might have been better, the difficulty of the situation when things "are just so damn hard to see as the GFC [Ground Force Commander] on the ground, with everything being painted for you" (10-218 000935). Visual data and military

[37] Mair et al. (2012) note that there are limitations to interpreting an incident through a linear transcript because any such analysis does not take into account the dynamic temporal aspect of military action, including multiple communication channels not represented but still coinciding with the transcript.

intelligence can never offer the clarifying and objective lens they propose to possess. The assessment of a situation is always dependent on someone else's interpretation, and a "common operating picture" or COP, as it is referred to by Air Force commanders, is something that must be created, not something that is self-evident.

Even the conversation among the Predator crew, so zealous to fire their weapons, demonstrates the instability of their vision. When discussing the make and model of one of the trucks, it appears as banter to fill the time. But they can have this dispute only because *they cannot see*. The transcript of the Predator crew is filled with exclamations about trying to use the sensors to see better and being frustrated by the results. "Come on, focus, get better," the sensor coaxes. The crew often exclaims their confusion. They reassure each other about what they want to see, even as they express the limitations of what they see:

> *[MC]:* See if you can zoom in on that guy, 'cos he's like…
>
> *[Pilot]:* What did he just leave there? Is that a fucking rifle?
>
> *[Sensor]:* Maybe just a warm spot from where he's been sitting.
>
> *[Pilot]:* I was hoping we could make out a rifle. Never mind.
>
> *[Sensor]:* The only way I've been able to see a rifle is if they move them around, when they're holding them, with muzzle flashes out or slinging them across their shoulders. (10-0218 0002022)

Drone strikes claim precision by promising an all-encompassing sight. One barely needs to scratch the surface in order to understand the extent to which this sight is riddled with blind spots.

Moreover, what is not reflected in the report is the extent to which what can be seen through aerial surveillance is always already partial and incomplete. As others have observed about this incident (Allinson 2015; Suchman 2015; Wilcox 2016), the process of "target identification" can only be understood within the contexts of racialized and gendered distinctions as well as colonial encounter. For instance, cultural geographer Derek Gregory's concept of a "military scopic regime," referred to in the introduction, aims to theorize the contours of the "sight" that drones provide. Building on the concept of "scopic regimes," developed by film theorist Christian Metz (1982), to articulate the differences between theatrical and cinematic ways of representing the world, Gregory extends the idea of a scopic regime to argue for the ways in which the visual representation of the world afforded by drones is always already a militarized gaze, not a transparent view of the battlefield. Gregory's argument emphasizes the ways in which the view provided by the drone is "always a view from somewhere" (Haraway 1998), socially situated within U.S. military organizations and organizational logics.

Such work calls attention to how the particular interpretive frameworks available to pilots, operators, and commanders limit what can be seen in ways that are embedded within social and political colonial contexts. For instance, the areas over which drone operations occur, including Iraq, Afghanistan and Pakistan, have been the object of aerial surveillance and policing since the birth of air power in the early 20th century (Satia 2008; 2009). Historian Priya Satia argues that a powerful and enduring "tactical imagination" informs the conditions of interpretation at stake in drone operations, pointing out that justifications currently used to argue for the efficacy of drone operations echo many of those justifications for colonial aerial policing in the 1920s (Satia 2014). Additionally,

just as aerial surveillance "promised omniscience in a land of mystery" for the British (Satia 2014: 2), current Pentagon discourses allude to the region as uniquely suited to drone operations, precisely because of its inscrutability. As one *Air Force Magazine* feature states, at the Central Command's Combined Air and Space Operations Center (CAOC) on a secret base in the Middle East, "scores of analysts pore over real-time intelligence… trying to piece together the facts into an accurate view of reality *'out there'*" (Mulrine 2008: 44, emphasis added).

However, to understand the kinds of vision at stake in drone operations as only structured by such "militarized scopic regimes" misses another important dimension that structures what can be seen and interpreted, that of professional practice. If we consider the practices of vision and circulating information as professionalized practices, we can more precisely understand the ways in which specific ideologies and politics are rendered as natural and seemingly neutral. Military officer-ship reflects many of the characteristics of a profession, as articulated in the classic sociology of the professions (Abbott 1988), such as setting high barriers to entry, requiring extensive training and certifications, exercising abstract knowledge within an effectively monopolized area of expertise (war and national defense), and struggling with other professions over jurisdiction (for example, each force might be considered a distinct profession (Thie et al. 1994), or one might also take into consideration private contractors).

For instance, as a class of professionals, pilots, sensors, and analysts exercise a kind of "professional vision" (Goodwin 1994). In his classic study, linguistic anthropologist Charles Goodwin argues that particular discursive practices, including "coding," "highlighting," and "materially representing," constitute a particular kind of

vision, which both comes to define a particular profession as well as implicitly and essentially legitimizing the interpretative frameworks that structure that vision. Goodwin demonstrates how "central to the social and cognitive organization of a profession is its ability to shape events in the domain of its scrutiny into the phenomenal objects around which the discourse of the profession is organized" (Goodwin 1994: 626); for instance, "coding" categorizes the world, "highlighting" draws attention to particular aspects of the world, foregrounding some things at the expense of others, and materially "representing" creates particular objects in the world that can be called upon and used. In Goodwin's terms the "complex visual field" is carved up into particular units that become "subject to their professional scrutiny" (606).[38]

As an example, Goodwin analyzes the "professional vision" brought to bear in the California court case involving Rodney King and the videotapes that recorded his being beaten by police. During the trial, defense lawyers successfully convinced a jury that King, handcuffed and on the ground, was a threat, and that a black man being beaten by a crowd of police was a justified use of force against a violent criminal. Goodwin argues that the "professional vision" exercised by the expert testimony of police officers facilitated a specific interpretation of the visual field represented on the videotape. In assessing the implications of the case, Goodwin argues that the expertise at stake in the exercise of "professional vision" is also leads to an implicit legitimation of the interpretive frameworks that structure that vision. His argument demonstrates that specific visual practices and modes of representing are not only about creating particular

[38] I wish to echo Goodwin in his important observation that the same practices being analyzed in his article are being employed by him (and me) as a form of professional discourse in creating the argument being presented.

knowledge domains (Latour and Woolgar 1979; Latour 1986), but also about enabling particular expertise and claims to truth that can circulate in domains beyond specialized knowledge.

Moreover, analyses of military incidents involving "friendly fire" by Snook (2000) and Mair et al (2012) demonstrate the constitutive dimension of professionalized practices when examining how military information is analyzed and acted upon. In his study of an incident when two U.S. Air Force F-15 pilots accidentally shot down two U.S. Army Black Hawk helicopters in northern Iraq in 1994—an incident for which an official explanation had never been provided—Snook argues that it was precisely a break down in organizational practices that led to the incident. To describe the nature of the break down, Snook offers the concept of "practical drift," which he describes as "the slow, steady uncoupling of practice from written procedure," and where "locally efficient procedures acquired through practice gain legitimacy through unremarkable repetition" (Snook 2000: 184). For instance, Snook elaborates how the expectations established during pre-mission briefings *construct*, and not merely inform, expectations for future action. "The explicit purpose" Snook writes, "of the briefing is to build a shared set of expectations, to construct a base framework of beliefs about the predicted events" (Snook 2000: 83). Throughout his analysis, Snook emphasizes the particular Air Force practices, both informal and codified, through which mission information is shared and distributed.

Mair et al. in their analysis of a "friendly fire" incident between U.S. and British forces in Iraq in 2003 also demonstrate that the use of acronyms and professional talk expedite and enforce "getting on the same page" (Mair et al. 2012: 82-83). However, they also emphasize that they can be the source of misinterpretation. In the incident they

examine, two U.S. pilots flying an A-10 on a Close Air Support (CAS) mission misidentified a line of vehicles on the road below as Iraqi insurgents transporting rocket launchers, rather than as British vehicles. The circumstances and series of events that led up to the misidentification were complex but typical of what Perrow (1984) describes as "normal" system accidents. As Mair et al. summarize, the cause of the accident was not a single misstep but rather that "the very practices through which individuals sought to ensure coherence of action in actual circumstances could give rise to incompatible, unstable and indeed destabilizing versions of the real" (Mair at al. 2012: 91). That there was likely a similar set of coordinating and constructive practices occurring during the Uruzgan incident is demonstrated by the fact that several interviewees during the investigation referred to the importance of the "common operating picture" (COP), referenced above.

Gregory might argue that such briefings or the generation of "common operating pictures" are part of the "militarized scopic regime" he articulates. Nonetheless, drawing attention to the role of professionalized practices and "professional vision" in the context of the Uruzgan incident is intended to enrich our understanding of how that which can be seen and can be claimed as evidence in the context of drone operations emerges. Claims to certainty and justified military action are constituted by and through complex interpretive frameworks and professionalized practices.

Information skills: Creating the system

Perhaps unsurprisingly, the "militarized scopic regime" (Gregory 2011b) implicated in what can be seen and what can be claimed to be known in drone operations is rarely discussed or reflected upon within drone operations communities. However, the

constructed and contingent nature of what can be seen with drones is a central point of discussion in these communities in other ways. Such discussions explicitly emphasize the role of skill and expertise, and implicitly reveal the extent to which visual data received by a crew requires manipulation, transformation and representation, precisely the discursive professional practices that Goodwin analyzed.

Unfortunately, I was not able to observe any training sessions or review any training manuals or syllabi during my fieldwork.[39] However, USAF Major Tim Cullen's PhD thesis from MIT provides a detailed, albeit redacted, account of pilot and sensor operator training at Holloman Air Base, New Mexico in 2010. Compared with the Predator crew operating during the incident at Uruzgan in 2010, Cullen's ethnography introduces pilots and sensor operators of the MQ-9 Reaper, the newer model of the MQ-1 Predator, who are earnest, respectful and take their jobs very seriously.

Over the course of five chapters, Cullen argues that pilots and operators perform their jobs effectively along with, and sometimes in spite of, the technological systems that comprise remote split operations, embodying "military professionals who fight wars" (Cullen 2011: 233). An explicit goal of Cullen's research is to demonstrate how the view that "RPA operators are detached observers of automated machines and not active participants in war" (21) is a falsehood. To do so, Cullen introduces the reader to drone operations from three distinct but interrelated perspectives: the RPA pilot, the sensor operator, and the "cockpit crew." Cullen documents the processes by which each individual and team is taught to do their tasks well and effectively, because it is through

[39] Manuals and syllabi for classes, I was told, I "wasn't really allowed to see" because they were "official" documents, not classified, but not *un*classified. Moreover, they were proprietary, owned by the companies that the Air Force contracted to develop and train the syllabi, and they "probably wouldn't want you looking at those, for, you know, competition reasons," as I was told by an Air Force commander.

socialization and training within a particular organization or profession that common discursive practices are learned to be appropriately exercised (Goodwin 1994; Vertesi 2015).

For example, Cullen explains that pilots and operators learn to cultivate feelings of "remote presence" by learning to "build a picture" and become the "malleable and adjustable coordinating tissue of the system" (Hutchins 1995: 219, quoted in Cullen 2011: 119). His analysis emphasize the role of social team dynamics and human operator skill, especially in the face of poorly designed technological systems and inefficient bureaucracies.

Cullen emphasizes the workarounds that pilots and sensors develop, and the initiative and expertise that they embody. Cullen describes the extensive languages and techniques that crews develop during their training to master the poorly designed system of the "finicky" (215) ground control station (GCS) prone to systems failure (202). In fact, lacking standardized modes of transferring knowledge, such as manuals, learning how to most effectively use Predator drones and pass on that knowledge to new pilots and sensor operators was an inefficient and particularly embodied practice (214).[40] This circumstance echoes what Suchman, in non-military contexts, has articulated as the unique "enlivening" (Suchman 2007: 256) aspects of humans that support "autonomous" robotics. While the context is different, I would argue that the pattern that Suchman observes is relevant here: autonomous and automated systems, while imagined—and

[40] Aircraft manuals are significant documents that detail an aircraft's technical specifications and specific use and maintenance procedures. In the aviation industry, such manuals are critical parts of training and skill maintenance. In this sense, when General Atomics did not provide manuals to the early Predator crews, a predominant professional norm was violated.

presented—as operating independently and flawlessly, attain this status "through the camouflaging of the networks that support them" (Suchman 2007: 215).

In addition to operating the vehicle, itself, Cullen details how drone crews effectively integrate within the larger networks that constitute remote split operations, including ground operations in the area over which the drone is flying. Cullen describes how one commander (name redacted) established the practice of remaining in touch with troops on the ground through two-way voice and text chat. Because the designers of the system had not included this functionality, crews created their own ways to use the system most effectively, and a particularly "pioneering" commander in the "early days," according to Cullen, used his leadership position to change how the network of humans and machines operated by building relationships with specific commanders, and their troops, in Afghanistan. The establishment of this relationship profoundly shaped the understandings that pilots and operators had (and have) of what is occurring on the ground and why their actions are meaningful. It was the intimate connection with fellow service members that created a strong feeling of presence at and commitment to the battle.[41]

While potentially limited in his analysis given his own commitment to build a foundation of respect for drone crews, his analyses of human-machine interactions also support other arguments that have emerged from within social studies of technology and science about how working with technological systems entails particular knowledge sets and embodied skill (Hutchins 1995; Prentice 2012; Vertesi 2015)

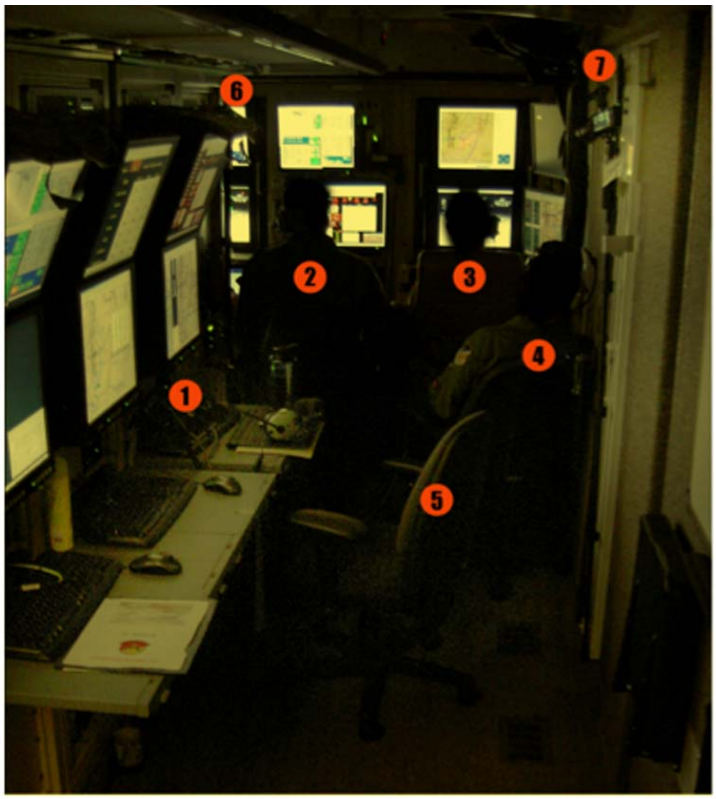
[41] Gregory (2011b) also points to the role of audio and text chat in enforcing the view from a drone as always already an American militaristic one, rather than the purported detached "God's eye view."

Implicit in Cullen's descriptions are the ways in which Predator crews piece together "information" and "evidence" out of sensory output. Repeating the terms used by the crews he trained with, he describes how operators talk about "building a picture." Cullen writes,

> Pilots, sensor operators, and mission coordinators repeatedly described the essence of any Reaper mission as 'building a picture of what was going on,' and the picture was more than images from the sensor ball. … To achieve mission objectives and to understand what was happening on their screens, Reaper crews needed to distinguish the civilian population, normal operations, and peaceful behavior from combatants, threats, and ominous behavior. … To build a picture with video from the sensor ball, Reaper crews needed additional information they could not get from the aircraft or from inside the ground control station alone. (Cullen 2011: 179-180)

This description echoes the kinds of terms repeated in the Uruzgan accident investigation, when officers spoke of a "picture being painted" for them. The "need for additional information" becomes a prime problem that drone crews must learn to overcome. The role of "negotiating" with the various commanders involved in any remote split operation is heavily emphasized by Cullen. "Building a picture" is presented as a form of consensus building, with careful attention to the hierarchal and organizational dynamics involved in a mission. Far from the purportedly neutral and comprehensive perspective gained from aerial surveillance, Cullen's descriptions emphasize the role of experience-based interpretation and negotiating team and organizational dynamics. Such interpersonal

dynamics are absent from the DoD and Air Force roadmaps, and contrary to the imaginaries of techno-autonomy.



1. Multi-Function Worksations
2. Instructor Pilot
3. Student Sensor Operator
4. Instructor Sensor Operator
5. Observation Seat
6. Camcorder on Monopod
7. Camcorder on Monopod

Fig. 1.3. Interior of ground control station from the rear door. The racks for the three multi-function workstations blocked the view of the student pilot to the left of the instructor pilot. As observer, I had a headset connected to the ground control station's intercom system and sat in a chair behind the students and instructors. From that position, I could observe the actions of the pilot and sensor operator, take notes, snap pictures from a handheld camera, and monitor two camcorders mounted on monopods. I taped one of the monopods to a computer rack just to the left of the instructor pilot. I taped the other monopod behind and to the right of the instructor sensor operator. (*Photograph taken by author on the third morning of observations in the 29th Attack Squadron*)

Figure 6: Annotated photograph of GCS, from Cullen (2011: 32)

Especially in the final section about the perspective of the drone crew as a unit within remote split operations, Cullen emphasizes how the crews end up compensating for the shortcomings of the system, which seems to have been designed and originally implemented as if they would function effectively on their own. For instance, early iterations of the Predator frequently crashed during flight because there were no signs of the vehicle's stability that were visible for the operators to interpret and adjust if there was a problem during flight (207). Also, General Atomics originally designed the Ground Control Station (GCS) as a stand-alone component of the system, without the potential for crews to communicate in two-way conversations with other teams involved in the mission (201). Cullen emphasizes that it was "RPA operators [who] built the network" (202) of distributed teams who enable information gathered from the drone to be meaningfully interpreted and analyzed, or in military terms, collected, processed and disseminated (233). Without this network, meaning and significance was impossible to articulate. Cullen writes,

> Even on scripted training missions, Reaper crews routinely looked at objects in the HUD and asked, 'What is that?' To resolve questions like these … Reaper crews had to negotiate solutions to questions regarding ground combat with ground commanders and their staffs, 'intelligence analysts,' 'operations directors,' and other war fighters spread throughout the Middle East and the United States. (179-180)

Cullen concludes,

> Predator's growing connection to networks outside the system and subsequent infusion of those networks and tools inside the ground control

> station transformed the Predator crew from a passive source of data to a team that actively participated in the support and defense of U.S. military personnel. (233)

While Cullen's aim is to demonstrate the skill and value of drone crews, his analysis also underscores the extensive human animation and translation that drone operations require in order to produce military intelligence.

Conclusion

Under the Obama administration, there was a "presidential policy guidance" known as the "near certainty" standard. This guidance stated that any direct lethal action occurring outside active hostilities would only be taken when there was "near certainty" that the terrorist target was present and that noncombatants would not be killed or injured. The unfortunate bottom-line is that, as one *New York Times* headline put it, "Drone Strikes Reveal Uncomfortable Truth: U.S. Often Unsure Who Will Die" (Shane 2015). This should come as no surprise, not only in the context of the persistent but illusory discourses of precision discussed in the previous chapter, but also in the analysis of the practices that constitute drone operations discussed in this chapter.

Even to many within the unmanned aerial systems community, it is natural to think about these systems as independent and unrelated to people. However, when drone operations are imagined as "unmanned," as being feats of techno-autonomy, with technological sophistication outstripping the weakness of humans and bestowing objectivity and accuracy against enemy targets, the central involvement of the people living and dying under drones, as well as the messy, incomplete, and always already partial human judgment that authorizes the actions of drone operations, is obfuscated.

This chapter began by drawing attention to the kinds of techno-autonomy that are envisioned to guide Air Force operations. However, the gaps between such visions and how drone operations are constituted in practice are substantial. This is significant for many reasons, including that policies guiding the use of force are likely to be based on the kinds of top-down strategy statements that the military forces produce. This means that the fallacies of techno-autonomy may easily continue to shape future policies, media coverage of such policies, and the public understandings of technology.

CHAPTER 3: KNIGHTS VS. EMPLOYEES: DRONE OPERATIONS AND THE LABOR OF WAR

We are sitting in Colonel Weston's sparse office in one of the low, grey buildings on the Starr Air National Guard Base. On the way to his office, we walked through a hallway lined with old, framed photographs and drawings of pilots, aircraft, and squadrons dating from the 1940s. The door remains open as we sit down. Pictures of his wife and four daughters are hung on the wall, alongside plaques, diplomas, and other honors from his thirty years in the Air Force. He is wearing an army green flight suit and speaks quietly and precisely, punctuating his sentences with the interjection, "no joke" when describing the mission his pilots perform. Weston is a squadron commander in the 92nd Attack Wing, which flies MQ-9 Reaper ISR (Intelligence, Surveillance and Reconnaissance) missions "with strike capability," meaning in military terms that the drone is armed and authorized to use Hellfire missiles over Afghanistan and Iraq, 24 hours a day seven days a week. A full time member of the Air National Guard, his command also involves overseeing the MQ-9 "schoolhouse," where pilots from the U.S. Air Force, as well as pilots from NATO partner countries such as Germany and Spain, train to become drone pilots. Weston is in his 50s and is a former fighter pilot with experience in combat missions in Iraq and Afghanistan. He grew up in the suburbs of Cleaveland and graduated from a top ranked public university, commissioned as an officer through ROTC (Reserve Officers Training Core). He insists that I can call him, as his friends and colleagues do, by his call sign, a unique nickname given to a pilot early in his or her training by fellow pilots. It never quite feels natural to me to address an older

man in an officer's uniform with the familiarity of a bird-like nickname, but he continues to insist.

Col. Weston has years of experience speaking to the press about MQ-9 operations, and while our first few conversations feel like ones the colonel has had dozens of times, we eventually exhaust the usual questions and the usual answers. Weston is most happy to talk about the past, the time before the "conversion," when the 92nd was a fighter wing, not the RPA (remotely piloted aircraft) mission. But, he explains to me, that was a different time in the Air Force altogether. It was ok to exist in "that macho culture," and "to play hard and work hard." He points out how there are "women now" and "political correctness." Though he understands why the old fighter pilot culture could be seen as problematic, he expresses nostalgia for what has been lost. Then again, he reflects, the mission is different. "This mission is 24/7, no end in sight." People's schedules are staggered, leaving a sense of a fractured community, and there isn't a social life on the base. "It [a close-knit pilot community] is not part of the culture anymore, at least on this base. Morale is very low."

"We call it making the donuts," Weston explains at one point:

> Do you remember that commercial from the 90s from Dunkin Donuts? There's this guy. He says, 'It's time to make the donuts.' He's waking up every morning, stumbling out of bed, saying 'It's time to make the donuts.' That's what we sometimes say, as a joke.

In the commercial, a middle-aged man with a mustachio is shown morning after morning waking, getting ready, and opening the door to a different version of himself returning home from work, a never-ending, tireless job of providing donuts for America's

workforce. The running joke at the wing is that RPA operations have taken on this same tempo, monotonous and never-ending. I laugh, but it is surely an unsettling joke, comparing pilots to Dunkin Donut employees, making donuts to fighting in a war. The joke is at once an expression and also a diffusion of a lingering anxiety around the "RPA mission," as it is known, and the new form of military service it entails.

In this chapter, I examine how drone operations, and the work of pilots in particular, are perceived and positioned as military service, both within the Air Force as well as within RPA communities, articulating how they are enmeshed within existing hierarchies of organizational status, constructions of personal identity, and the survival of regional economies. My interest is not in describing what *they really do* or *what it is really like to be a drone pilot.* Rather, I explore Air Force pilots' attempt to construct and position the value of drone operations as meaningful military service. If the first chapter examined a set of historical conditions of possibility for drone operations to take hold as a globally distributed network of actors and actions, and the second chapter attempted to understand how the communications and actions within that network are perceived to be effective and how they are enacted in everyday practice, this chapter turns specifically to one category of actor implicated in drone operations, the RPA pilot.[42] Keeping in mind that the pilot is only one of many involved personnel, I propose that my analysis here, focused on RPA pilots and commanders, reveals a set of consequential changes around new forms and valuations of military service within RPA communities. These changes

[42] As has been emphasized in the previous chapters, pilots represent only one role within dozens of other roles involved in drone operations. The pilot often becomes the emblem of all those people, and is most often the subject of media stories or popular imaginations about those involved in drone operations. As it currently stands, this chapter continues that limited focus, based on those to whom I had access during fieldwork, and how the research for this project was originally designed. Further research focusing on the different roles or categories of Air Force personnel involved in drone operations (articulated in the first chapter) would be valuable.

are significant not only for understanding how drone operations are implicated in the changing nature of American military service, but also what kinds of agencies and subjectivities are at stake in carrying out drone operations, and even how and to what extent drone operations become visible to those living within the United States.

The chapter begins by examining how drone operations have disrupted traditional and organizationally established modes of recognition and codification of status for Air Force officers. Disruptions and destabilizations of military status and honor have occurred before and often in the context of newly introduced technologies of war. Nonetheless, many within the RPA community have been devoted to repairing such disruptions, and I discuss a set of meaning-making discourses that circulate within Air Force communities that attempt to reposition and rearticulate the value of drone operations as military service.

In my analysis, I use the terms presented by officers themselves. These terms invoke a language of professional identity, expertise, and altruistic service, rather than the terms of explicitly political or ideological beliefs in the war itself. I argue that while these framings repair some of the destabilizing aspects of drone operations, they reveal other destabilizing contradictions, namely, that the military labor of drone operations bears increasing similarity to other forms of contemporary civilian work, characterized by the language of compensation, flexibility, and in/security, and indicating a reconfiguration of the dimensions and implications of military work.

Contingent heroism

In February 2013, then Defense Secretary Leon Panetta announced the creation of a new medal, the Distinguished Warfare Medal, which would recognize significant

contributions that "directly impact on combat operations, but that do not involve acts of valor or physical risk that combat entails." In his last press conference before stepping down, Panetta defended the decision against what had been an immediate backlash from veterans groups, saying,

> During my time as Director of the CIA and as Secretary of Defense, I've seen firsthand how modern tools, like remotely piloted platforms and cyber systems, have changed the way wars are fought. And they've given our men and women the ability to engage the enemy and change the course of battle, even from afar. I've always felt, having seen the great work that they do, day in and day out, that those who performed in an outstanding manner should be recognized.
>
> Unfortunately, medals that they otherwise might be eligible for simply did not recognize that kind of—of contribution. … And for that reason, recognizing these technological advances, I'm pleased to announce that I have formally approved the establishment of a new distinguished warfare medal. The medal provides distinct department-wide recognition for the extraordinary achievements that directly impact on combat operations, but that do not involve acts of valor or physical risk that combat entails.
>
> Our military reserves its highest decorations obviously for those who display gallantry and valor in actions where their lives are on the line, and we will continue to do so. But we should also have the ability to honor the extraordinary actions that make a true difference in combat

> operations. … So with the distinguished warfare medal the department now has that ability, and it will be reserved only for those who have met the highest standards. This award recognizes the reality of the kind of technological warfare that we are engaged in, in the 21st century. (Panetta 2013)

The Distinguished Warfare Medal—the first new medal to be created since World War II—came in response to the increasing strategic importance of and operational demand for drone operations during combat, alongside the inability for such contributions to be recognized with existing medals. For instance, in 2010, Col Eric Mathewson, who was the wing commander at Creech Air Force base, had nominated airmen in his wing for the Distinguished Flying Cross but the nomination had been rejected. In a *Washington Post* article later that year, Mathewson, an experienced fighter pilot who would go on to be a leader in the RPA USAF community, told a reporter, "Valor to me is not risking your life. Valor is doing what is right. Valor is about your motivations and the ends that you seek. It is doing what is right for the right reasons. That to me is valor" (Jaffe 2010). Valor, for Mathewson, should not be linked to physical risk or bravery.

The response to the Distinguished Warfare Medal was swift and pronounced. The Veterans of Foreign Wars (VFW) were among the most vocal, arguing that the new medal would diminish the significance of the existing awards for valor in combat because the Distinguished Warfare Medal would be "ahead of," that is ranked above in status, the Bronze Star, awarded for bravery under fire, and the Purple Heart, awarded for those wounded or killed in action. The argument was that no medal for *merit* should be ranked above that for *valor*, merit in this context referring to extraordinary performance and

valor referring to risk of life. The VFW's lobbying campaign was successful and members of the House of Representatives pressed for legislation that would lower the status of the medal. While the Air Force and the Department of Defense (DoD) supported the medal, most military and veteran communities ridiculed the idea. One article in the *Stars and Stripes* observed that the medal was being referred to as the "Nintendo medal" or the "Purple Buttocks" (Shane 2013). A widely circulated image that "went viral" on military blogs showed a digitally altered image of the proposed medal: a miniature gold Xbox video game controller hanging below the Bronze Star's red, white and blue ribbon (Ingersoll 2013).

Figure 7: "Viral" digitally rendered image of "Nintendo Medal" (Ingersoll 2013)

A few months after the announcement of its creation, the medal proposal was quietly withdrawn by the newly appointed Secretary of Defense Chuck Hagel. Rather than a new medal, drone pilots became eligible for existing medals, (including the Distinguished Flying Cross, earlier denied in 2010) with an attached newly designed ornament, known as a "device," similar to a small pin attached to a medal, indicating

merit in non-combat roles. According to Defense Secretary Hagel's statement, combat medals will remain reserved "for those service members who incur physical risk and hardship of combat, perform valorous acts, or are wounded in combat or as a result of combat" (Shinkman 2013). In January of 2015, the DoD announced the creation of the specific "R" device, which would represent "remote," and which could be awarded for RPA or cyber operations.

As Air Force officer Michael Kreuzer (2014) argues, the development of decorations for military service, first established in 1918, has been an evolving structure that has traditionally taken into account new modes of warfare and the unique needs of the services at different moments in time as techniques for improving morale. In the past decade, medals also conversely have emerged as empty placeholders, being devalued through "medal inflation." (Moran 2004; Kreuzer 2014: 193-194). This perception is supported by conversations I had in the field. During a conversation about the Distinguished Warfare Medal with two young Majors who had been test-pilots, a highly selective career path within the Air Force, I was told that the controversy was silly: "Medals don't mean anything anymore." They found the whole thing to be an empty show for the media. Nonetheless, they acknowledged that medals and other forms of commendation play an important role in career advancement within the military. Medals aren't linked to heroism, they implied, but they are linked to how far you will advance in your career as an officer.

The controversy over the new medal provides a starting point for unpacking the tensions around the perceptions and status of drone pilots as military service members. On one hand, the controversy demonstrates the existing dimensions of what is perceived

as the most honorable military service today—physically fighting in combat. On the other hand, the controversy is an example of how formal modes of recognition and responsibility, signs of agency when agency is understood as the capacity to act and be held accountable for that action, were made unavailable to drone pilots.

To analyze the conditions and implications of these observations, I find it helpful to consider how theoretically and historically new technologies have changed the conditions and perceptions of individual agency. Alfred Gell's theory of distributed agency offers a groundwork for articulating how humans emerge as meaningful agential units in particular socio-material arrangements that are necessarily heterogeneous configurations. Gell presents the example of soldiers and their weapons:

> The soldier's weapons are *parts* of him which make him what he is. We cannot speak of Pol Pot's soldiers without referring in the same breath, to their weaponry, and the social context and military tactics which the possession of such weaponry implies. … Their [Pol Pot's men] agency would be unthinkable except in conjunction with the spatio-temporally expanded capacity for violence which the possession of mines makes possible. (Gell 1998: 21)

New technologies introduce new kinds of agencies in the sense that they have the capacity to transform how actors act and also are perceived to act and be effective in the world. In this sense, drone operations transform not only the human actors implicated, but also their perceived agency, as actors, and the conditions under which they can be held responsible for these actions. Here, responsibility refers not just to the capacity to be blamed, but also to the capacity to be recognized as the responsible agent, for good or

bad, in the form of guilt, shame, praise, or pride. From this perspective, what kind of actor is the drone pilot and how might we understand the conditions within which her agency is transformed, amplified, or obscured? In asking this question, we are presented with valuable opportunities to think about how human agency can be transformed or masked in complex human-computer systems.

A foundation for considering how a new military technology establishes new conditions of individual agency and dimensions of responsibility can be found in historian David Mindell's (2000) study of the introduction of armored naval battleships during the American Civil War, and in particular a historic battle involving the *USS Monitor*. The *USS Monitor*, a Navy ship that provided unprecedented protection to its crew, with eight inches of armor plate between themselves and an enemy attack, represented a new way of fighting war from a distance. This new technology, Mindell demonstrates, destabilized and eventually reconfigured conceptions of American military service, and indeed bravery, honor, and valor. For instance, authors like Herman Melville and Nathaniel Hawthorne opined that the new protection provided by ironclads transformed the very nature of war into something unrecognizable. Writing in the *Atlantic Monthly,* Hawthorne asked:

> How can an admiral condescend to go to sea in an iron pot? … All the pomp and splendor of naval warfare are gone by. Henceforth there must come up a race of enginemen and smoke-blackened cannoneers, who will hammer away at their enemies under the direction of a single pair of eyes; and *even heroism—so deadly a gripe is Science laying on our noble possibilities—will become a quality of very minor importance when its*

> *possessor cannot break through the iron crust of his own armament and give the world a glimpse of it.* (emphasis added, Hawthorne 1862: 29-30)

Hawthorne articulates explicitly the problematic impossibility of heroic action when there is no visible actor, "when its possessor cannot break through… and give the world a glimpse of it."[43] For Hawthorne, it was not only because they were in less physical danger that meant there could be no heroism, but also because they could not act and be recognized as individual fighters.

It was not only observers of the war who sensed a profound shift. One of the ship's officers, the ship's paymaster, William Friedrich Keeler, wrote letters home to his wife in which he worried that "there is not danger enough to give us glory" (Mindell 2000: 85). As such, Mindell writes,

> The *Monitor* introduced the world to the specter of industrial warfare. … Fighting behind impregnable armor could strip victory of its glory. Utilitarian engineers might usurp the splendor of battle from the officers' experience. (131)

In his evocation of engineers, Mindell brings up the extent to which the utilization of complex technologies are implicated in complex forms of distributed agency that change everyday practices of warfare and the perceptions and experiences of those practices. Within the uncertainty that emerged around the *USS Monitor*, Mindell locates an

[43] In *The Human Condition* (1998) Hannah Arendt's theory of human action takes as a founding condition that action, as opposed to labor or work, can only be fully realized in human plurality, life lived among other humans. She writes, "Because of its inherent tendency to disclose the agent together with the act, action needs for its full appearance the shining brightness we once called glory, and which is possible only in the public realm" (180). For action to take on the elevated status of action, as Arendt articulates it, it must be bound to an actor whose agency is disclosed through the act.

underlying uncertainty about accountability when humans and machines fight war together, creating an unstable moral economy of actors.

Far from a technologically determined account, Mindell emphasizes the ways in which new economies of expertise, physical materials, and mass media representations were entwined with the technology and its perceived success in battle. Mindell's history draws attention to the new social and technical infrastructures that supported the creation and maintenance of these technologies, transforming not only the potential for protection and action at a distance, but also norms of military expertise and the conditions for honor and glory. The parallels between this historical period and contemporary discussions around drone operations are striking and underscore the historical and cultural specificity of ideals like heroism, valor, and glory.

Moreover, Mindell's work is instructive because it draws attention to what he terms "contingent heroism" (146) in order to trace the ways in which new institutional discourses and practices repair or mask a fractured concept of heroism. The introduction of ironclads created a "contingent heroism," which required continual maintenance and institutional authorization, from the Navy to the popular press. Following this perspective, this chapter asks: how do the sociotechnical systems of drone operations destabilize or authorize certain kinds of actors and modes of responsibility? In particular, what kind of actor is the drone pilot, and what are the tensions and continuities that arise between "manned" fighter pilots and "unmanned" drone pilots?

While ironclad battleships brought into question the honor of battle, the introduction of airplanes created new perceived *opportunities* for honor in battle. Indeed, the introduction of aviation into war fighting in the early 20th century created a new kind

of mythic war hero (Fritzsche 1992). Flying was, and was perceived to be, exceedingly dangerous in and of itself.[44] Yet, accounts of "chivalry" between pilots began to circulate, with pilots dropping wreaths in honor of enemies they had shot down (Fritzche 1992: 87). These pilots, whose victories and deaths were covered widely in the press at the time, came to be known as "knights of the sky." David Lloyd George, a prominent British politician during and after World War I, gave a wartime speech emblematic of attitudes toward pilots,

> The heavens are their battlefield; they are the Cavalry of the clouds. High above the squalor and the mud, so high in the firmament that they are not visible from the earth, they fight out the eternal issues of right and wrong. ... Every flight is a romance; every report is an epic. They are the knighthood of the war, without fear and without reproach. They recall the old legends of chivalry, not merely the daring of their exploits, but by the nobility of their spirit, and amongst the multitudes of heroes, let us think of the chivalry of the air. (Pisano et al 1992: 29)

Popular narratives at the time, as well as popular military histories today, describe the use of aviation in Europe during World War I as a kind of antidote to the emerging techniques of mechanized warfare (c.f. Adas 1989; Fritzche 1992; Morrow 1993; Wohl 1996).[45] Above the so-termed mechanized battlefield, in which automation seemed to

[44] For a comprehensive history of early aviation in the United States and the role of safety and commercial feasibility, see Komons (1978), especially chapter 1, which provides popular perspectives on aviation in the 1920s derived from primary source documents.

[45] See Fino (2014) for a discussion of the figure of the fighter pilot in historical accounts of World War I, see also Mindell (2000): 142-148. The literature on the emergence and social perceptions of mechanized warfare in Europe in the early 20th century is extensive, including Fusell (2000) and Hynes (1997) which focus in particular on changing cultural perceptions of honor and experiences of risk.

destroy all individual humanity, pilots could exist as gallant, heroic individuals and airplanes could be held up as technologies of progress, not destruction (Morrow 1993).[46]

It is from within this context that the pilot, and particularly the fighter pilot, has become a kind of mythic hero within Anglo-American culture in the 20th century. The figure of the fighter pilot, presented as the epitome of individual autonomy and physical bravery, combines an elite skillset and rugged masculinity. From war heroes like Manfred Von Richthofen, the "Red Baron," and William "Billy" Mitchell, to classic accounts of pilots such as Tom Wolfe's (1979) *The Right Stuff* to iconic films and television like *Wings* (Saunders et al. 1929), *Twelve O'clock High* (Bartlett and Lay 1949), and *Top Gun* (Cash and Epps 1986), or even science-fiction like *Battlestar Galactica* (Larson 1978, 2004), the fighter pilot, like the cowboy, can be read as a quintessential warrior hero in American culture (Gibson 1994).

Yet, as Steve Fino, a student of Mindell's and an Air Force lieutenant colonel at the time who completed his PhD at MIT in 2014, argues, the image of the lone, gallant fighter pilot is a myth, defined by "contingent heroism," that requires ongoing maintenance and reformulation with each new generation of aviation technology. In his dissertation (2014) and a subsequent book (2017) published by Johns Hopkins University Press, Fino articulates that each new generation of military aviation challenged or undercut the narrative of the lone gallant knight, bringing the automation of certain tasks into conflict with professional norms and community-perceived expertise. For instance, since World War II, pilots rarely fly alone, but rather fly in formation, always with a

[46] While aviation ennobled European foes, it should be noted that the putative necessity and efficacy of aerial policing during this time in Colonial territories was based on racist beliefs that the populations in these territories were subhuman and uniquely suited to aerial surveillance (Satia 2008).

squadron that requires teamwork to complete a mission, standing in contrast to the image of the independent, autonomous pilot (Fino 2014: 28). While Fino's focus is on the transition between aircraft used during the Korean War and the more complex and highly automated aircraft of Vietnam, he cites a 1952 *Life* magazine article, which included an eight-page spread declaring that "Fighters are rapidly becoming planes flown by men like more like scientists than pilots" (cited in Fino 2014: 25), to demonstrate the long-standing and consistent tensions between automated flight controls and perceptions of fighter pilot skill. The question that haunted Hawthorne returns in new form: who becomes the hero of warfare – the fighter, the engineer or no one at all?

Still, the cultural imagination around the figure of the fighter pilot remains a powerful force, especially in the context of military recruitment (Brown 2012) and the fashioning of Air Force organizational identity (Builder 1989). Multiple pilots told me that as "ridiculous" and "inaccurate" as the movie *Top Gun* is in portraying what it's like to be a fighter pilot, that movie sparked the desire to be a pilot. One fighter pilot, who now commands a drone squadron told me, "Those first few minutes [of *Top Gun*]? It's not like that at all, and now we know that. But man, we're all like, 'Yeah!' I love that movie." Another former test pilot told me it was "the best movie on the planet. Nothing in it is real. But it's so much fun." Even though the reality of flying differs from the fantasy, the imagination of the fighter pilot contributes to the perceived mystique.

In contrast, "unmanned" drone pilots emerged as antithetical to traditional fighter pilots. Originally equated with playing video games, piloting a drone did not require the same demands of physical strength, bravery, or sacrifice, and moreover, were seen to be skill-less and anchored to the ground, subject to a clunky computer system. Officers who

were interested in the socio-cultural history of aviation, like Fino, attempted to frame drone operations as yet another iteration of pilot skill and expertise being rearticulated around a new set of technologies, attempting to recuperate the perceived aspects of expertise and individual autonomy. [47] Still, an irreconcilable difference remains: the physical displacement of the pilot. Is the drone pilot a pilot? Fino, whom I met at MIT in 2014, explained how consequential and yet perhaps not fully comprehended, was the decision to call drone pilots "pilots:"

> "[The Air Force's] hands were essentially tied. I don't fault the Air Force for calling them pilots. But I think by calling them pilots it probably obscured a lot of issues that otherwise could have been resolved if you would have called them something other than a pilot. Aviator even. They could be an aviator but sitting on the ground. It gets into a whole lot of professional identity... I mean, there's this notion that if I'm a pilot, I have pilot wings, that's my job. I am a pilot. And so this was the big issue when they started sending pilots to RPAs, because that they were like, 'I'm not a pilot anymore. This is crap. I'm supposed to be a pilot and a pilot does this. I'm supposed to fly.' And so it's this distinction between: am I a pilot that switches between my current job and what cultural identity do I assume?"

Fino is describing both an in-between-ness of the status of drone pilots as well as a rejection of what that new status might entail. The evocation of fighter pilot "culture," "cultural identity," and "professional identity," represents the kind of language that pilots use to talk about their own worth to themselves and to the Air Force. It is a language of service, as well as a language of prestige and elite status, values that drone technologies

[47] See also the work of Cullen (2011), Blair (2012, 2015), Kreuzer (2014), among others.

bring into question. For as much as the officers I spoke with may have dreamed of being macho fighter pilots, they took their current work very seriously and took on the responsibility of protecting their country, as well as their fellow service members. They did not view their jobs as just like any other civilian job, but rather, as an important duty or even a kind of calling to which they had responded (Janowitz 1974). I will return to these perspectives on the nature of military work below. In the following section, I further explore the conditions and implications of these disruptions, as well as describe the ways in which Air Force officers have attempted to repair and reconfigure the drone pilot as a valuable actor—if not as a hero, then as a professional.

Drone status

An apocryphal story I heard during fieldwork was about how the first Predator pilots in Nevada were treated by their fellow airmen. Apparently, there was once a prank that involved placing a banner announcing, "Leper Colony," over the trailer from which they operated. The joke made explicit the predominant perception of drone operations, that no one wanted to be near them and that it was where officer careers went to die, a professional leper colony. I never was able to confirm the truth of the story, but many stories of ignominy from "the early days" still circulate among RPA communities. Another story involved fighter pilots treating Predators like enemy aircraft. During these early days, Predators sometimes had to be shot down (by a fighter pilot) if a satellite link was lost, and in the tradition of tallying how many enemies a pilot had shot down on the side of their aircraft, fighter pilots would keep a public tally of how many Predators they had shot down by drawing Predator silhouettes on the sides of their fighter jets (Mindell

2015: 154). I was told repeatedly how Predator pilots were the butt of jokes and sometimes open hostility from fighter pilots.

Such informal attitudes were mirrored in the highest levels of Air Force administration. This is not surprising given that since its creation with the National Security Act of 1947, the United States Air Force has been an organization dominated by pilots in senior management positions, and also by fighter pilot culture, even though fighter pilots represent a very small fraction of the Air Force (Coonrad 2012; Fino 2014; Kreuzer 2014). Perhaps because of the dominant pilot perspective, the Air Force was originally resistant to even the use of what were then termed UAVs, unmanned aerial vehicles. Ironically, the Air Force has historically been derided by other services for being the "Chair Force," referring to the reliance on advanced technology and their physical remove from the field of battle. Still, very few fighter pilots wanted to make the switch from "manned" to "unmanned" platforms. As one reporter in *Star and Stripes* explained in an article about personnel controversies around drones, "The culture of the Air Force is in many ways like high school. Fighter pilots are the jocks, the cool kids who rule the campus. And drone pilots? They're the AV club" (McCloskey 2009). While drone operations were becoming increasingly central to military strategy in Iraq and Afghanistan, and drone hardware was demanding increasing budget lines, drone crews remained generally disregarded.

For instance, the Air Force did not officially recognize RPA pilots as a career track until 2011. Career tracks, and their particular paths of promotion, are the foundation of any officer's career, that is, employment from a minimum of several years to the maximum of thirty years. The management system is described as an "up or out" system

(Thie and et al. 1994), where an officer must be continually advancing; to stay put too long is usually "career suicide," as an officer once explained. "Up or out" was described to me by another officer as a way to ensure the best rise to the top quickly and a bad officer doesn't block "the pipeline" of others beneath her or him. Moreover, career tracks are both a way to ensure specific training and to specify how advancement will occur, including what certifications or experiences need to be gathered before moving on to another position. To not officially recognize RPA pilots as a career track was to codify what many fighter pilots and even "the top brass" informally conveyed: to be an RPA pilot was an utterly worthless assignment. Organizationally, the upper management of the Air Force did not think, or was unwilling to recognize, drone pilots internally as relevant actors with status worthy of formal recognition.

When I started fieldwork in 2010, this was a predominant point of internal discussion among the RPA community. Panels at conferences and articles in the "trade" press, like the *Air Force Times*, *Air Force Magazine* and *Air & Space Power Journal*, focused on the fact that being an RPA pilot was a dead-end job. Only in 2011, ten years after the first remote split Predator operation, did the Air Force create a unique career track for RPA pilots, known as 18X (Clark 2012).

Before 2011, there was no "pipeline" for new RPA pilots, through officer training programs or career assignments. Therefore, the early drone pilots of the mid- to late-2000s were transferred from other pilot assignments, such as with cargo planes. Some volunteered, but many were transferred unwillingly. Many of theses early drone pilots were often described to me as "the dregs" or "the bottom of the barrel" of the Air Force, those who were medically disqualified pilots or who were "not necessarily stellar

performers from other aviation communities" (Spinetta 2013) or those who did not have the "right attitude" or who were ineligible for promotion due to "below average airmanship" (Hoagland 2013).

From this perspective another contrast can be seen between traditional fighter pilots and drone pilots: to become a fighter pilot is to become part of an elite group, one to which nearly all aspire, but to become a drone pilot is to be placed in an outcast group. Only officers are eligible to become pilots, not enlisted personnel, and it is extremely competitive, with a required percentage of any class "washing out" or failing out of the class.[48] Many fighter pilots are also commissioned officers through the prestigious Air Force Academy, a recognized path to Air Force leadership (Thie et al. 1994). As one fighter pilot I interviewed explained, "it was the thing everyone wanted to be," and that made him want to do it even more.

While never explicitly discussed in conversations with or around me, or articulated in Air Force magazines or journals, the impact of drone operations on perceptions of masculinity likely contributes to an underlying anxiety around "drone pilot identity." Indeed, a common term for drones figuratively emasculates the concept of drones: "*unman*ned aerial vehicles." Piloting a drone does not require physical acts of bravery nor is it seen to require physical strength or skill, all attributes that have traditionally demarcated masculinity, especially in military contexts (Higate 2012). Alongside the overt absence of physical risk or sacrifice, which undercuts existing

[48] In October of 2016, the Air Force began training its first class of enlisted RPA pilots, the first time enlisted personnel have been eligible to be pilots since World War II (Swarts 2016). These RPA pilots will be trained to fly the RQ-4 Global Hawk system. The Global Hawk conducts only ISR (Intelligence, Surveillance, and Reconnaissance) missions, not lethal strike missions. This is likely to be a substantial change to the RPA field, and while research conducted for this dissertation occurred before this announcement could take effect, future research will examine this change.

conceptions of warrior masculinity, drone operations require intimately working with computer keyboards and screens. While allusions to "video game warriors" may present an infantilized image of drone pilots, more subtle and substantial is the complex legacy of gendered perceptions of computing. On one hand, weapons technology, as well as other technological systems like aircraft, are gendered masculine and evoke power, dominance, and mastery (Cohn 1987). In addition, technical computer expertise and the capacity to create, develop, and repair computer systems also are currently activities with masculine connotations and predominantly performed by men (Margolis and Fischer 2001; Crawford 2016). On the other hand, even as idealized hegemonic masculinities are shifting in the context of digital technologies and information work that change the nature of dangerous physical work (Ely and Meyerson 2010; Filteau 2014), sitting in front of a computer to work can be perceived as "geeky" or "nerdy," the opposite of a masculinity rooted in physical power and stamina. Again, the legacy of the Air Force, as the force that has always placed the role of advanced technology at the core of its self-image and recruitment techniques (Brown 2012: 54), makes the connections between technology and masculinity familiar, but perhaps all the more fragile.

One strategy to recuperate the prestige of drone pilots I observed was to invoke the "three generations of pilots" narrative. The first generation, pilots serving before 2007, tended to be elite officers, often serving with Air Force Special Operations Command, and had volunteered for the mission. These would have been officers like those in the camouflaged trailer at Langley described in the first chapter. The second generation, who joined as RPA pilots between 2007-2009, were often those forced to serve in RPA missions, "the dregs" described above. The third generation are those who

joined after 2010 and who were more likely to have volunteered for the mission and who were trained specifically to fly and operate drones. In this narrative, bad behavior by drone pilots could be relegated to a specific time period and be distanced from the present by time. Moreover, claiming three generations implicitly suggests the maturing and eventual longevity and stability of drone pilots as a career.

Another strategy was to focus on forging the conditions and visibility of drone pilot professionalism and competency. Freddy, an Air Force major I interviewed, had commanded a squadron at Creech during the first years of Predator operations, part of the first generation. He explained to me that he was very invested in creating a new "culture" and "identity" for these RPA pilots. This led him to locate a meaningful legacy from within the surveillance and tactical missions of Vietnam, rather than the more direct hardware lineage of drones, as discussed in the first chapter. He told me about an "identity" listserv he had created, through which a community of officers developed ideas and shared information over email. I met him during the time he had returned to graduate school at a prestigious university (an effective means to advance one's career within and outside of the military). He has since gone on to command a larger and more prestigious mission. I met many such young officers, who had been fighter pilots or equally (if not more) prestigious test pilots, and who had judged that the RPAs were the wave of the future. They wanted to be leaders in this new area, and were very keen to explicitly reposition and reassert the skill and dignity of RPA pilots.[49]

[49] I cite many of these officers, whom I met in academic settings, and many of whom have published not just dissertations but also books and public articles about these topics, including Dave Blair, Steven Fino, Tim Cullen and others. My thinking owes much to my discussions with them.

For those officers involved in RPA operations that I got to know, articulating and putting forward the operational value of drone operations was more central and explicit than particular ideals about heroism or valor. For instance, it was a common refrain among pilots and operators that the RPA mission offered airmen a way to "make a real difference" every day in the ongoing war. This phrase, "making a real difference," was one I heard repeated often during fieldwork. As Col Weston explained during one of our conversations,

> When I would patrol a no-fly zone [typical of post-Gulf War engagements], there wasn't much to do. No one has challenged our [U.S.] dominance in the air since World War II. Now my pilots are—no joke—saving lives on the ground every day.

RPA operations allow airmen to feel like they are playing decisive roles in battles on the ground, roles that, for pilots, have been few and far between since World War II. Their presence, though it is thousands of miles away, matters.

In his 1961 sociological study of military elites, Janowitz described how a recurring theme throughout his interviews was the comparison of serving in the military to choosing a career in the church. Both were a response to a "calling," to a greater good and the commitment to put service before self. While I did not hear anyone make this comparison, I often heard officers talk about their altruistic reasons for joining the Air Force—and for staying in. With college education, leadership skills, and technical expertise, officers face different challenges than enlisted personnel when looking for work after separation from the military.[50] Moreover, a point of pride becomes remaining

[50] I rarely if ever heard former officers, whom I generally met in drone business settings, refer to themselves as "veterans" but rather as "retired officers." During several months of volunteering at

in the Air Force, given the fact that contractors make more money by conducting drone operations or working in RPA "business development," referring to the work of cultivating commercial relationships and pursuing sales opportunities between defense contractors and the government. "Staying in" the Air Force shows you care about the mission, purpose, and service—not just about cold hard cash.

These observations differ from those described by Zoë Wool (2015), who found that the wounded Army veterans whom she got to know at Walter Reed embraced their work as soldiers as equivalent to any other type of civilian work, such as carpentry (108). In theorizing what Wool calls "the economy of patriotism," she describes how wounded soldiers resisted the impositions of debt and gratitude that oblivious civilians painted over their military lives and wounded bodies. These soldiers, Wool's account suggests, struggled to regain the sense of the ordinary, even as it weighed upon them. The lives and experiences of these primarily enlisted soldiers were markedly different than the Air Force officers with whom I interacted. Not only might such differences be understood along terms of class, including background and education, but also of age. Most of the soldiers whom Wool met were young adults, in their late-teens or early twenties, while the officers with whom I spoke, who are only commissioned upon graduating college, ranged from their late 20s to their late 50s. And in stark contrast to the soldiers Wool spoke with, most, if not all, all of the officers I got to know emphasized the meaning of their work as special and unique service in which they got "the opportunity to make a real difference." Such different but also representative perspectives underscore the dulling generalizations that referring to "the military" as one coherent community can produce.

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the VA Hospital near Starr AFB, I got the impression that many "retired officers" who lived in the area chose to use the private health insurance through their spouse or employer if they had a civilian job.

As I have emphasized throughout this dissertation the perspective I offer is specific to Air Force officers. The orientations and motivations of the officers described here are not necessarily relevant to all Air Force individuals involved in drone operations. For instance, the career tensions that I describe are not relevant in the same ways to Air Force enlisted personnel, such as the sensor operator. Recall that in any team that controls a drone there are two people seated in front of the screens and controls, a pilot and a sensor operator. The pilot must be an officer. The sensor operator, known as the sensor, is enlisted personnel. While pilots tended to think of drone operations as a dead-end career, many sensors have been reported to think of the assignment as a positive career placement (Cullen 2011; Mindell 2015: 142).

In this context, it seems pertinent that all of the former Air Force personnel who have publicly condemned their time as drone operators were enlisted sensor operators, not pilots (ie: Linebaugh 2013; Power 2013).[51] This would make sense given the structural differences that would encourage pilots to find professional identity and justification for practices in ways that are distinct from enlisted operators, and that develop in the context of a career committed to the Air Force.

The preceding sections have focused on the destabilizations and reconfigurations that the increasing deployment of drone operations has brought about for Air Force pilots. I have shown how officers have attempted to reposition their value and demonstrate how flying drone operations is more than mindless, low-status work. Put another way, drone operations communities have struggled to make their presence visible and recognized as

[51] Perhaps most well known, Airman First Class Brandon Bryant provided interviews to *Der Spiegel* (Abé 2012), *GQ* (Power 2013) and *The Intercept* (Scahill and Greenwald 2014) in which he denounced his time as a drone operator, expressing profound guilt and shame over killing individuals, which also had manifested as PTSD. He has been featured in several television shows, plays and documentaries around the world.

consequential within broader Air Force and military communities. In this sense, I would argue such struggles over visibility and recognition are consequential to understanding not only how forms of military service are changing, but also how and to whom the ongoing war is made visible to Americans outside military communities. While heroes glorify war, they also make it visible, and while structures of formal recognition may serve to normalize war conduct, they also call attention to who is conducting it and how it is being conducted.

The conversion

While the legitimating discourses of professionalism and altruistic service operate on one level, the imperative of the bottom-line is never out of sight: serving as an officer in the Air Force is a means of providing financially for oneself and one's family. It may be an all-volunteer force, but services are not rendered for free. Drone operations, as technologies that displace humans, as well as replace existing technologies, potentially threaten not only professional identity or status, but also the very economic livelihoods of officers, as well as their surrounding communities.

Such was the case for one of the bases where I conducted fieldwork, Davis Air Force Base (AFB), which had been a "fighter" or "attack" wing with fighter pilots and fighter jets, since its creation in the years following World War II. For air bases the size of Davis, potential closure through BRAC is seen as a continuous and imminent threat. BRAC, which stands for Base Realignment And Closure, is the formalized process through which military bases within the United States that are judged unnecessary are closed and ideally repurposed for civilian use. There have been four rounds of BRAC, in 1991, 1993, 1995 and 2005. Each round involves a nine-person independent commission,

appointed by the President, that reviews and assesses a list of potential base closures or realignments presented by the Department of Defense (DoD). This list is then confirmed with a vote in Congress. The process, unsurprisingly, is highly contentious, involving both internal politics within the DoD and Congress, as well as regional politics in which members of Congress avoid base closures in their districts at all costs. [52]

With an impending BRAC in 2005, leaders at Davis AFB, with support of local state government, had been strategically positioning Davis as an invaluable military asset. They had raised state funds in order to update its physical infrastructure and had forged formal cooperation with other forces, including other Army and Air Force bases in the area. However, housing a fighter wing with aging fighter jets, the Wing Commander at the time, Col Armstrong, told me that everyone "saw the writing on the wall." Col Luke Armstrong, who became one of my main interlocutors and was the Wing Commander who oversaw the transition from fighter to RPA wing, told me that taking on the then-unpopular mission of RPAs came to be seen as a matter of survival. He explained,

> We had the foresight. Our leadership here had the foresight many years in advance to put things into place to make sure we have a secure future out here. And in this case it was with unmanned aircraft, and that may have saved a good future out here.

Existing, as many bases do, in rural and suburban regions with otherwise depressed post-industrial economies, taking on drone operations at Davis represented the potential for a brighter future. Even though the fighter pilot mission had come to define Davis, the

[52] As of 2016, another round of BRAC is currently being called for, but has yet to pass through Congress, despite the requests from the Department of Defense.

feeling was that the base was better off existing with RPAs than not existing at all. In this light, discourses of national security and economic security seamlessly merge.

Davis was safe from the BRAC chopping block in 2005, and in the years following "converted" to be an MQ-9 RPA wing. By preemptively choosing an RPA mission, rather than waiting for it be assigned, the leaders of the base felt they were able to have more choice in the kind of mission they wanted. Col Armstrong and his commanders in the state National Air Guard office saw this as an innovative way to stay relevant, both as a local driver of employment and as a fighter wing. "I wanted to keep the doors open, keep a mission going. That's how that decision was made. We set out to do this," explained Armstrong.

Figure 8: USAF base with RPA wing, photo taken by the author

In addition to economic motivations, leaders at Davis were particularly interested in the MQ-9 mission, as opposed to the MQ-1 (Predator) mission, because of its "lethal capability." Col Armstrong explained,

> It's kind of the same mentality [as a fighter mission], you're going in and you're going to wreak havoc on somebody because our country deems that they need to have havoc wreaked on them. We looked at the change from F-16s to MQ-9s as maintaining that mission because the MQ-9 does the same thing. It drops weapons. It starts off with a reconnaissance but there are weapons hanging on the wings, and we don't have to call in fighters because the aircraft is right there with weapons. That's how we looked at this.
>
> The mission didn't really change for us. How we do the mission changed for us. The dude or dudette isn't riding in the aircraft anymore but they're still part of the 'kill chain,' they call it. The decision matrix from an Army commander on the ground who talks to the Air Force liaison that's talking to the fighters, the Army commander decides, "I need help here," and then our intel folks are all looking at all the different stuff, and then there's an air crew who at the end of the kill chain presses the button, and the bomb falls off. We're still part of the kill chain, where we would not be in tankers or cargo.

When I asked a long-time enlisted administrator, Brenda, what was different after the conversion from fighter to MQ-9, Brenda remained irrepressibly cheerful, politely declining to answer when I asked about anything that might be construed as negative

about the base or drone operations. But she did admit that there wasn't the same kind of camaraderie after the MQ-9 conversion, because no one was outside; they were "behind the wall." She explained,

> I would say it's more invisible to us, because the F-16 was so obvious. It was loud and it was out there, and now it's more out of sight, out of mind, except if you're involved right with that mission. … We know it's happening. But it's more, I guess, invisible to us who aren't working in that area. So that's a difference. That's just obvious, you know, hard metal versus tucked away being done. So it's just so, so incredible what we're doing without us being able to hear it or see it… But that's the biggest difference, is that we know it's happening, but we can't see it or hear it.

Because there are no planes that take off or land, it is unlikely for the same kinds of interactions to occur, let alone out in the open of the airfield. A retired Air Guard enlisted mechanic who had worked for over two decades at Davis explained to me how every pilot had a mechanic and engineering crew for the fighter jet. There was a kind of serious and loving hand-off that would occur, after a pilot landed, or before a pilot took off, a kind of custody exchange between two loving parents. These kinds of interactions no longer occur at Davis; the MQ-9 aircraft are located on bases in the Middle East. I was told that while some Air Force or Air Guard personnel go overseas with the RPAs, most of those who deploy are contractors.

Those with whom I spoke to at Starr AFB, another base that had gone through a change in mission, also returned again and again to the differences between "fighter culture" and the new RPA mission. When I asked Lewis, a former pilot and a training

instructor for MQ-9 pilots at Starr, to explain how a drone pilot's day might differ from that of a fighter pilot, his first caveat was that it was difficult to compare directly, because for fighter pilots there were different kinds of routines: one involved training periods, which were on the base, and the other involved deployed periods overseas, which were totally different. Another pilot I interviewed, Bobby, didn't really talk about deployed time for fighter pilots, but compared the schedule of a drone pilot more to training on the base. One thing that was the same was the importance of flight briefs and debriefs. He said, "people have this image that's really wrong about pilots, that they're just guys in leather jackets, high-fiving each other, who go fly and then spend the rest of the day at the bar." A lot of work, most of the work, goes on outside the cockpit, he explained. This recalls the central role of mission briefs that came up in the last chapter. Similarly, a common misperception of drone operators is that they drive onto a base, go into a trailer for ten hours, walk out and drive home. This is incorrect in the sense that even remotely flying a mission involves more than switching on a computer. Both formal and informal rituals structure an operator's time and are intended to be set apart from everyday civilian life.

Bobby explained that the daily schedule for a drone operator involves "flying" time, as well as mission briefings, debriefings, and a series of administrative tasks now typical of most military positions. Everyday, an Air Tasking Order is published by the U.S. Air Force's Central Command (AFCENT), which authorizes a given mission. Each shift begins with a briefing of this mission, including weather conditions (forecast weather as well as observed weather), intelligence pertinent to the mission, emergency procedures, and all other operational notes such as existing ground troops in the area and

current rules of engagement (ROE), which may change for every mission. There are checklists that must be followed for nearly every procedure. The pilot-sensor team will typically operate the drone in two three-to-four hour shifts, separated by a several hour break. Nearly everyone characterized the schedule and tempo of operations as exhausting and unsustainable. A typical schedule will involve four ten-hour days, with three off days, although sometimes six straight days of work will be required. With operations running 24/7, there will be at least four different shifts. When possible, pilots and sensors stay together as teams, although this is not always possible, especially on bases with high operational demand or turnover.

If one of the flying shifts involves the use of lethal force, significant time is devoted to debriefings, documentation and writing reports. Time on each ten-hour shift is also allotted to taking care of active-duty administrative requirements, ranging from renewing a military ID to keeping up to date on the testing requirements to prove proficiency in current regulations and rules of engagement (ROE). The interactions with bureaucracy and paperwork are extensive. When I asked Col. Weston about the everyday routine of a drone pilot, that's when he answered by telling me the donuts story. "We call it making the donuts."

Rumor had it that "morale was very low" at Starr. "Yeah, I've heard that," said Bobby when I asked him about it once. Col. Weston would not answer me directly when I asked, but would vaguely allude to morale problems at the base. No one said explicitly why morale was so low. Implicitly, it seemed, people were unhappy with "the management." Several other people I spoke with who were "alumni" of the base, who had worked as pilots or mechanics before the conversion, confirmed that "morale was

low" but didn't say more. Bobby's theory was that the wing was being run without explicit attention to morale and community building. This had to do both with the mission and with the current Wing Commander. He pointed out that the MQ-9 mission, being 24/7, meant that there wasn't the same common downtimes where the base could unwind together. Maybe it's different elsewhere, people would say, or maybe it's the nature of the mission? Pilots and commanders expressed a range of ambivalence toward the everyday reality of their service. Are RPA pilots serving a pivotal role in completing a mission, in serving a calling greater than themselves, doing what they signed up to do? No one was certain one hundred percent of the time.

The On-demand Force

Col Weston and Bobby both gave me the sense that the Air Guard, as a labor pool, was being taken advantage of. Bobby explained,

> When the Iraqis invaded Kuwait [in 1991], we went to war. It was a big huge ground war and the reserve component was brought up. We only had 6 months to get ready. We had to quickly become this big machine ready to go, and it was a huge success story. The problem is, we never really left. We never drew back down and we stayed there. And then we stayed there and stayed there and stayed there. We have gone from being a reserve component to more of an operational reserve.

While the reliance on the Army National Guard and Reservists became visible during the most intense years of the wars in Iraq and Afghanistan, less attention has been paid to the increasing role of the Air Guard in Air Force operations.

In fact, since the mid-1970s and the end of the draft, the Air Force has officially followed the doctrine of "total force integration," relying on overseas deployment by the Guard. This trend intensified during the "Defense Transformation" agenda of Defense Secretary Donald Rumsfeld, discussed in the first chapter. In the ten years following 2001, National Guard personnel have been mobilized more than 700,000 times in support of the overseas missions in Iraq and Afghanistan and domestic missions, some more than once" (CSIC 2011: 4). Operating drones has been a growing mission for the Guard, whose inventory of drones grew from one aircraft in early 2009 to 48 as of the beginning of 2015, with more to be added in the coming few years (Guerra and McNerney 2015: x) In the coming years, Air Guard forces will have the capability to fly 20 to 25 percent of all the RPA combat air patrols for the Air Force (Matthews 2015: 26).

While sometimes Weston would passionately articulate this new role as a benefit of the job, as "no joke—saving lives on the ground every day," sometimes he would equally passionately articulate what he often felt were the perverse economics of employing Air Guard personnel. By law, every state, as well as the District of Columbia, Puerto Rico, Guam and the U.S. Virgin Islands, have an Air and Army National Guard that are under the jurisdiction of the state governor as the state's militia, but which are also available as a federal military reserve force. Every guard member is required to serve one weekend a month and go through two weeks of training a year. However, many will serve more than this. According to the Veterans Authority (VA) website, "National Guards and Reserves generally spend two years of their six-year enlistment performing full-time active duty" (VA 2017). There are three possible statuses for an Air Guard member: State Active Duty, Title 32, and Title 10. Under State Active Duty a Guard

member is under the command and control of the governor, and all salaries and benefits are paid by the state. Under Title 32, referring to the federal statute, a Guard member is under the command and control of the governor, but the majority of the funds that pay for salaries and benefits come from the federal government. The Air Guard works under Title 32 when it responds to a natural disaster like a flood or earthquake. Finally, under Title 10, a Guard member is "federalized," and is under the command and control of the President. Being under Title 10 is the equivalent to being on active-duty, and all salaries and benefits are paid by the federal government. Under Title 10, a Guard member is paid a base salary for the hours worked equivalent to that received by those on active-duty.[53] However, additional benefits, such flight bonuses, or housing allowances (Basic Allowance for Housing, BAH) and cost of living allowances only accrue after thirty days of active-duty service (Curtis 2007).[54] The calculus is similar to that of part-time employees who can only receive full-time benefits after a certain number of hours. Air Guard personnel fall under Title 10 when operating drones, but if their service is kept just under thirty days, they become cheaper, piecemeal workers.

Leaders and strategists at the Pentagon, including the National Guard Bureau, view the increasing reliance on the Guard as appropriate and desirable. In a public

[53] All the compensation for members of the military is based on pay grade and years of service and is updated yearly as part of the national defense budget. To provide a sense of the range of salaries in 2016: a mid-ranking officer (Major, pay grade O-4) with over six years of service could earn a basic pay of $71,604; a mid-to-high ranking officer (Colonel, pay grade O-6) with over twelve years of service could earn $92,668; a high-ranking officer (General, pay grade O-8) with over sixteen years of service could earn a basic pay of $142,992. For comparison: a mid-ranking enlisted (Senior Airmen, pay grade E-4) with over six years of serve could earn $36,403.
[54] Due to shortages of drone pilots, in 2016 the Air Force offered retention bonuses to drone pilots for committing to four years of service of $35,000 a year, ($175,000 over four years) (Losey 2016). Air Guard and Air Reserve members are not eligible.

Military Strategy Forum held by the Center for Strategic and International Studies in 2011, General Craig McKinley, chief of the National Guard Bureau, stated,

> We stand at the confluence of a new fiscal environment and the transition from combat to stability operations. … This convergence is leading to new defense-wide budgetary realities… challenging our decision-makers as they formulate difficult spending choices that are both sustainable and capable of keeping the American people safe and secure. (CSIC 2011:14)

Representing the official position of the National Guard Bureau, McKinley emphasized the role that the Guard could play in "responding to our country's budgetary crisis and to help[ing] maintain our national security." He also called attention to the unique aspects of the National Guard as a labor-pool, emphasizing the benefits of an on-demand, part-time work force,

> An as-needed force, nearly 85 percent of the National Guard is part-time. National Guard members cost approximately one-third that of their active duty counterparts, especially when we're not mobilized. … National Guardsmen and -women serve longer and retire later than their active duty counterparts and that retirement costs one-tenth of the active duty. (CSIC 2011: 15)

In times of budgetary insecurity, according to the Pentagon, as well as global insecurity, the National Guard represents the ideal on-demand, "flexible" (Martin 1997) low-cost labor force. Moreover, in the context of these insecurities, the *certainty of demand* seems to present itself. It appears to be a sure thing that "the demand for the RPA mission is not going to go away. All of the combatant commanders around the globe are asking for this

mission," the Wing Commander of a National Guard RPA unit stated, "This mission is going to be around for a long time" (Matthews 2015: 27).

"This mission is 24/7," was a refrain I heard often, sometimes describing the crucial role that drone operations play in contemporary military strategy, but equally often describing the pace and stress of drone operations as daily work. Being over-worked, as well as stressed or "burned out" was not only the register at Starr, but also among commanders at other bases with whom I spoke or who gave presentations or briefings at public conferences. One major, Simon, who has about to start a new position in command of a "surveillance-only" drone wing emphasized how the Air Force regulations around drone crews had gotten it all wrong. The Air Force treated RPA crews as if they were not deployed in the sense that crews were required to keep up on training. When pilots are deployed in combat positions, they do not have different requirements for additional training. The bottom-line was that drone pilots had even more responsibilities and time commitments to keep up, even though they were being deployed full-time, suggesting that Command didn't see their deployment *as deployment*. "The tempo is impossible," he explained.

This same type of language is central to the publicly available reports on the health and mental health of drone pilots. Several reports from the early 2010s described not the existence of PTSD, but rather the existence of "occupational burnout," which led to an increased susceptibility to PTSD (Ouma, Chappelle, and Salinas 2011; Chappelle et al. 2013, 2014c). Media reports emphasized the role of PTSD, but the reports themselves were written from the perspective of "occupational stressors." To date, all the studies of mental health in RPA communities have been conducted under the auspices of the Air

Force. By and large, the studies concluded that there were significant mental health issues, described as occupational stress and occupational burnout, which shared some symptoms of a PTSD diagnosis, but these were due to constant shift changes and operational tempo. The one study that did state that drone *pilots* (not including sensor operators) suffered as high rates of PTSD as manned pilots relied on electronic medical records from the VA over a long period of time (2003-2011) and included a relatively small and unrepresentative sample size (Otto and Webber 2013). The rates of PTSD for the pilots, most of whom had been deployed previously, was slightly higher than the national adjusted average for American adults. Media reports of PTSD from drone operations (only as voiced by sensor operators, not pilots) have been described by operators who have left the Air Force and who have stated they are under great pressure not to speak (Power 2013). In sum, information, whether individual anecdote or officially sanctioned results conducted by the Air Force itself, seem inconclusive.

In my interactions with operators and commanders within the RPA community, no one disclosed any PTSD diagnoses or told me about anyone who had experienced trauma. A defense contractor, who had been involved in a study with operators, once told me that Creech Air Force Base "had been a fucked up bunch," referencing that there had been a lot of substance abuse and domestic violence. But his explanation, and many others I spoke with, was that for many years (approximately between 2003-2011), the people involved in drone operations were "the bottom of the barrel," and may have already had mental health issues or been "bad seeds," a version of the "three generations" narrative described above.

Philosopher Peter Asaro (2013) has articulated how these Air Force psychology reports reveal more about the kinds of drone operator subjectivities the Air Force wishes to produce, rather than those that actually exist. The studies, some implicitly, but others explicitly, operate under a kind of Taylorist drive toward worker efficiency. The research questions that guide the studies demonstrate the concerns of the Air Force, which are first and foremost interested in making individuals efficient and effective warfighters. The studies focus on questions such as what are the rates of occupational burnout among RPA crews (Ouma, Chappelle, and Salinas 2011; Langley 2012), and what are the effects of shiftwork on these crews (Thompson et al. 2006), what is the prevalence of fatigue among RPA crew (Tvaryanas et al. 2008) and what are the psychological attributes critical to the performance of RPA pilots and operators (Chappelle, McDonald, and King 2010; Chappelle, McDonald, and McMillan 2011; Howse 2011; Paullin et al. 2011; Chappelle et al. 2014b). The studies are concerned with warriors only in so far as they are effective and efficient workers.

Only in recent years has there been more research into PTSD symptoms and "mental health screenings" (Chappelle, Salinas and McDonald 2011; Chappelle et al. 2013, 2014a; 2014c). Asaro argues that the lack of evidence for PTSD and mental health diagnoses for drone crews is misleading because one must consider the extent to which there is a taboo against acknowledging the stress of combat and that crews were simply "failing to report" PTSD to researchers (Asaro 2013: 22). However, such explanations overlook the specificity of the diagnosis of PTSD itself, which cannot be understood apart from its origins in the political and psychological communities in the years following the Vietnam War (Young 1995). As a category of pathological illness outlined

in the DSM (Diagnostic and Statistical Manual of Mental Disorders), until recently, it was impossible for drone crews to receive the diagnosis because they did not meet the specific criteria of the DSM IV: "an extreme traumatic stressor involving direct personal experience of an event that involves actual or threatened death or serious injury or other threat to one's physical integrity.

Indeed, during my fieldwork, the language of PTSD was a foreign imposition. Whether because of the stigma associated with PTSD diagnoses and its detrimental effects on military careers or whether because it was relatively rare among the communities I visited, such trauma or what one Air Force psychologist described to me as "existential trauma," was not brought up. While some officers expressed doubts over American foreign policy decisions, all believed that they were part of protecting the United States from terrorists who wanted to harm Americans. As such, they believed that they were doing the right thing to make the world a better place. More salient was the language of ordinary, contemporary work life: financial compensation, flexible scheduling, in/security, stress, and burnout. Such mundane and generalized complaints stood in stark contrast to the ideals and idealism expressed at other times.

Conclusion

This chapter has examined in detail how drone operations are implicated in the changing nature of military service for Air Force pilots. By examining how military technologies change the conditions of military actors, specifically in the context of the Air Force, I demonstrated how drone operations have destabilized and brought into question traditional hierarchies of valuable and honorable service. I have also attempted to show how drone pilots and commanders have responded to these destabilizations and

attempted to reposition drone operations, as expert, professional, and altruistic service. Still, I have also emphasized how drone operations have surfaced tensions that cannot be completely resolved, that military service has become just another form of work similar in tempo and similarly exploitable, and not necessarily extraordinary or valorous. Such tensions raise the questions: What is civilian work? What is military work? How are the contours between these spaces defined? In the following chapter, I take up this tension directly to explore the distinctions between "military" and "civilian."

CHAPTER 4: SIGNS, GATES, AND BUFFER ZONES: CONSTITUTING THE WARZONE

In the week following the September 11th 2011 terrorist attacks in the United States, President George W. Bush declared a global war on terrorism. His rally to war was far-reaching in space and time, declaring the enemy "a radical network of terrorists and every government that supports them," and declaring that the war "will not end until every terrorist group of global reach has been found, stopped and defeated" (Bush 2001: 5-6). Promising to commit the full extent of every resource, Bush warned:

> Now, this war will not be like the war against Iraq a decade ago, with a decisive liberation of territory and a swift conclusion. It will not look like the air war above Kosovo two years ago, where no ground troops were used and not a single American was lost in combat. Our response involves far more than instant retaliation and isolated strikes. *Americans should not expect one battle, but a lengthy campaign unlike any other we have ever seen.* It may include dramatic strikes visible on TV and covert operations secret even in success. (emphasis added, Bush 2001: 7)

Indeed, the war declared over fifteen years ago has yet to end.

Formally referred to as the Global War on Terror (GWOT) from 2001 to 2009, under the administration of President Barack Obama this name was replaced with the descriptor "overseas contingency operations" (Wilson and Kamen 2009). Since then, the wars in Afghanistan, Iraq, and Syria have been referred to under a range of purportedly discreet operations: Operation Enduring Freedom (OEF) in Afghanistan 2001-2014; Operation Iraqi Freedom (OIF) in Iraq 2003-2010; Operation New Dawn (2010-2011);

and Operation Inherent Resolve (OIR) in Iraq and Syria 2014-present.[55] While the rhetoric of the Obama administration may have suggested a more specific and bounded mode of American military action, the strategy since 2009 when President Obama took office has remained that of effectively engaging in wars that assume the entire globe as a battlefield. Scholars and journalists alike have recognized that this particular mode of military action has uniquely reconfigured the geographies of identifying enemies and waging war, taking on the characteristics of both war and global policing (Gregory 2011a; Akhter and Shaw 2012; Kahn 2002; Wall and Monahan 2011; Chamayou 2015).

The work of articulating the specific distinctions between the military operations of the Bush and Obama administrations I leave to others. However, a fundamental observation is that despite the new rhetorical parsing, the wars conducted over the span of the Bush and Obama administrations are similar in their mode of engagement, disregarding traditionally received conceptions of battles paces and warzones (Gregory 2011a; Greenberg 2015). Central to this new mode of engagement has been the reliance on covert operations conducted by the CIA (including the use of drones), the increasing reliance on Special Forces Operations (Shamir and Ben-Ari 2016), and the steadily rising number of drone operations (Gregory 2011b; Niva 2013).

From news articles to movies and even games (Campbell 2016), much attention has been focused on how drone operations appear to reconfigure the spaces and places of war, what Derek Gregory (2011a) has termed the "everywhere war." While the ways in which a range of traditionally received categories are destabilized by drone operations

[55] The Department of Defense website hosts webpages that detail each operation, including maps, operation patches, press releases, and cost of operations figures. For example, see the webpage covering Operation Inherent Resolve: https://www.defense.gov/News/Special-Reports/0814_Inherent-Resolve (accessed 3/10/2017).

has been a constant thread throughout this dissertation, in this chapter I examine these destabilizations in the context of the processes through which the boundaries of warzones and the divisions between military and civilian are constructed. Here, the term military is meant to stand in for war or soldiers or to invoke a war frame; meanwhile civilian stands in contrast, as its unmarked pair (Lutz 2001: 236), not-war.

In public discourses as well as most academic literature, there is a presumption of an oppositional divide between the categories of military and civilian. Within anthropology and other social sciences, this dichotomy between military and civilian is commonly engaged through the analytic of *militarization*. The process of militarization, defined by historian Michael Geyer, is the "the contradictory and tense social process in which civil society organizes itself for the production of violence" (Geyer 1989: 79). In recent decades, scholars have examined "the militarization of" a range of social institutions and practices, from women's lives (Enloe 1993, 2000) to urban planning (Markusen et al. 1991; Lutz 2001) to individual pyscho-social worlds (Orr 2004), in order to draw attention to what these scholars view as a pervasive and often camouflaged normalization of the primary ordering effects of military priorities, what C.W. Mills termed "a military definition of the situation" (quoted in Lutz 2001: 3). Such critiques have established an important basis from which to analyze the means and extent to which military objectives and world-views have reorganized what these scholars might term "civilian" American society. Without discounting this work, this chapter is meant to offer an intervention into the analytic of "militarization" as it has been used in recent critiques of American society on the grounds that the concept itself takes for granted a meaningful distinction between military and civilian. That is, recent formulations of militarization

have implied that one pole is overtaking the other, and that what was once civilian has now become militarized. Although the opposition between military and civilian is useful in some contexts, I would suggest that such a dichotomy leads our attention away from the complex ways in which civilian and military, whether people, places, institutions, or even concepts, are inextricably intertwined. Overlooking this mutual and overlapping constitution fails to adequately comprehend how war and its concomitant economies are embedded, naturalized, and normalized within the United States. Rather than attempting to parse what are necessarily shifting and unstable categories, I argue for an analytic reframing of the opposition: When a boundary is constructed or conjured into being, what work is being done?

From foundational work in the anthropological study of ethnic group boundaries (Barth 1969) to the range of ways in which the social sciences have taken up the study of boundaries more recently (Lamont and Virág 2002), it has been established that rather than given or "natural," boundaries are best understood as dynamically emerging through social processes and requiring continuous maintenance. Moreover, as Susan Gal and Judith Irvine (1995) have argued in the context of the creation of linguistic and disciplinary boundaries, examining how, when, and in what context particular boundaries emerge can become a means to identify how interpretations of difference are mapped onto "people, events, and activities that are significant to them" (Gal and Irvine 1995: 971), with particular political implications. In this chapter, analyzing the processes through which boundaries emerge offers insight into the norms, values, and priorities of specific communities. From these variable positions and constitutions, what do we learn about the current war and how it is rendered visible?

In the first half of the chapter, I articulate a set of traditionally conceived boundaries regarding war, the military, and civilians. I begin with a broad discussion of how drone operations have been understood to destabilize existing categories and definitional boundaries of warzones and those who fight war. Following this overview, I present the range of concepts invoked in a military/civilian distinction, articulating the dichotomy's particular formation in the context of post-World War II America. In the second half of the chapter, I provide a series of ethnographic vignettes that call attention to specific boundary configurations that I, as the ethnographer, encountered when I attempted to transgress them. From the figurative gatekeepers of studying "the military" to the literal gatekeepers of an Air Force base to the so-termed "Wild West" of drone industry defense contracting, I argue that the distinctions between military and civilian are neither obvious nor clear, but rather contingently constructed. I conclude with a discussion of the significance of these boundaries, and the potential implications of their absence.

Boundless war

Drone operations appear to radically blur the boundaries between military and civilian subject positions, which historically have been conceived of as distinct—citizen and soldier—in spaces that historically have been clearly demarcated—home and battlefield. I will focus more closely on the distinctions between military and civilian subject positions in the following section. Here, I call attention to the ways in which drone operations are implicated in changing conceptions of where a warzone can be thought to exist.

As emerging from and constituting a primary tool of the Global War on Terror, drones follow the logic of what Gregory has described as the "everywhere war," in which "the conventional ties between war and geography have come undone" (Gregory 2011a: 239). Rather than a conflict zone circumscribed in time and space, with a beginning and an end, an interior and exterior, the mode of war at stake in drone operations fuses the principles of the Revolution in Military Affairs (RMA), including "network-centric warfare," and the logic of continuous policing. One primary dimension of this logic is that a target is conceived not as a place, but rather, as an individual enemy body (Chamayou 2015; Cockburn 2015a). In a law review article, Michael W. Lewis writes that "the boundaries of the battlefield [for drones] are not determined by geopolitical lines but rather by the location of participants in an armed conflict" (Lewis 2010: 312 quoted in Chamayou 2015: 57). Grégoire Chamayou (2015) argues that this is in fact one of the central features of the drone; rather than the Clausewitzian conception of warfare as a duel between two enemies, drone warfare, particularly its use for "targeted killings" by the CIA, follows the paradigm of the hunt (32-33). However, as Madiha Tahir (2017) points out in forthcoming work, such a perspective implicitly orients around the drone operator and takes as its center the subjectivity of the perpetrator of violence, and therefore misses a larger—but equally constitutive—network of actors and actions at stake. For instance, in Pakistan, where Tahir's research is based, attacks on targets from the air are not only enabled by, but also entangled with, practices on the ground, from unwitting NGO activities and sources of intelligence to modes of *sousveillance*, tracking drones from the ground or capturing satellite signals.

Even as we decenter the perspective of the drone pilot, the imagined reach of the Global War on Terror, as its name suggests, spans the globe. Everywhere and anyone is a potential target site. Threat of action is omnipresent. One result for those over whom drones conduct surveillance and attacks is that the possibility for a civilian categorization of a physical location is null and void. Such a reconfiguration is not necessarily new; the advent of aerial warfare was considered to begin a new kind of warfare in which civilian spaces, from streets to homes, became present as military targets in new and constant ways (Grayzel 2012). Still, the 24/7 nature of drone operations has intensified the omnipresent threat of aerial bombing.

Additionally, the geographies of risk from warfare are reconfigured when drones are operated through remote split operations, and Americans do not risk their lives in battle. As Chamayou points out, "The paradox is that hyperprotection of military personnel tends to compromise the traditional social division of danger, in which soldiers are at risk and civilians are protected" (Chamayou 2015: 77). While soldiers are removed from the battlefield, civilians are not.

With radically different effects, war is also respatialized for those who conduct it, especially for those who conduct operations from within the United States. As described in the previous chapters, drone pilots, operators, intelligence analysts, and the other personnel necessary for a drone to operate have the unique experience of deploying within the United States as shiftwork. While the rise of information analysts located away from the battlefield during World War II can be viewed as a kind of precedent for domestic drone work, the scale of war-making enabled through the deployment of military on continental U.S. bases conducting real-time operations overseas is

unprecedented (Cortright 2012). Not since the American Indian wars of the late 19th and early 20th century have American soldiers fought and killed within the United States, although most accounts date the absence of fighting on U.S. soil since the American Civil War.[56] In this sense, drone operations disrupt what has been a constant narrative of American military service in the 20th century: wars take place overseas, and there is a clear distinction between the battlefield and "returning home" to peace. Such a clear demarcation is absent in the deployment of drone operations.

Indeed, the constitution of what a battlefield is becomes slippery. For example, the zones of carrying out war and the zones of being killed are traditionally thought to coincide, demarcating the battlefield. In the case of drone operations, the battlefield, the place in which wounding and dying occurs, is made distinct from the place where the execution of combat occurs. To where does the battlefield extend? In order to specify the places, the relations between those places, and the types of actions occurring, I propose a series of analytic distinctions that pull apart the kinds of warfare at stake. The battlefield we might continue to understand as the place where wounding and dying occurs, but which does not necessarily include where the execution of combat occurs. I use the term warzone to encompass all the places in which war occurs, both its execution and its consequences on the battlefield. An overarching term like warzone assists in the important analytic work of knitting together the range of people, places, and practices that are implicated in the ongoing conduct of war.

[56] The Regular Army, largely ignored and neglected by Americans living in the eastern United States, continued to fight wars against American Indian nations in the southwest states and territories, killing or forcing Nations onto Indian Reservations, until the early 1920s (Weigley 2001: 231-233). The last two continental states to join the U.S., Arizona and New Mexico, were ratified in 1912.

In an effort to emphasize the ways in which a warzone is present when personnel are operating drones, commanders at Creech Air Force Base in Nevada have been reported to put signs outside the doors of Ground Control Stations (GCS) which state, "Entering CENTCOM AOR," that is, entering the Area Of Responsibility of Central Command, which encompasses most of the Middle East. However, as a former drone pilot wrote in his memoir, "[The sign] could just as easily have read '*You are now entering C.S. Lewis's Narnia*' for all that my two worlds intersected'" (Martin and Sasser 2010: 45). This pilot and others quoted in the press have emphasized the experiences of "whiplash" (Lindlaw 2008) that can come from operating drones within the United States, shifting back and forth between a military base and home life. Such media stories emphasize the cognitive dissonance that comes from going to war as a "9-5" job. Yet, it is also worth considering the extent to which the transitions between "civilian life" and "military work" are not as binary as these articles might imply. As one pilot, quoted in the last chapter, explained to me, "You never really leave that [war] mindset." Another officer who studies human factors in RPA pilots reported a pilot saying, "There was no point at which we were ever in peacetime. We were just permanently somewhere between war and peace" (Ortega 2012).

My interest is not in pathologizing or articulating the interior mental states of drone pilots. It seems reasonable and clear to assume that the experiences of individuals will vary greatly. Moreover, the nature of individual experiences of presence when flying and operating a drone will also vary greatly, even within the specific interpretive and techno-legal frameworks that structure the conditions of perception and interpretation at stake in drone operations, and which I brought out in previous chapters. For the purposes

of the argument in this chapter, my goal is to emphasize the diffusion of boundaries with respect to where war fighting occurs.

For instance, military spaces of war are emerging within what were once considered the realm of the civilian, the not-war—from creating warzones within the United States to creating part-time war work. Moreover, the warzone is increasingly populated and maintained by civilians. Compounding the rise in "domestic deployment," the military, as an institution, has moved to increasingly privatize services and roles that were previously carried out by military personnel (Fontaine and Nagl 2010). This includes defense contractors taking on active security roles and information analysis (Singer 2009; Schwartz 2011; Crampton et al. 2014), as well as support and logistics services on bases both within and outside the continental United States (Erbel and Kinsey 2016; Moore 2017). Even some basic services offered by the military to its employees have been privatized. For example, the Department of Defense began the process of privatizing military housing in 1996, which has resulted in greater numbers of military families living in civilian housing off-base (Else 2001). These examples call attention to the numerous ways in which the terrain of distinctions between military and civilian life and work are being reconfigured.

Moreover, in the case of drone operations, it is interesting to consider that many of the individuals who take part in deployed operations overseas, those who would be located in traditional conceptions of the battlefield "over there," are, in fact, civilian contractors. Based on both reports from my interlocutors in the field, as well as publicly available Air Force contracts and contactor websites, Launch and Recovery Elements (LRE, those deployed near the area over which a drone will fly, who launch and recover

the drone via a line-of-sight datalink) are usually civilians, employed by defense contractors. In addition, the maintenance of drones is often carried out by civilian contractors (Battlespace LLC 2010; Lockheed Martin n.d.; Merlin n.d.). Does this mean that, while not military personnel, these civilians are combatants, defined as persons engaged in fighting during a war? Are drone crews within the United States combatants? One perspective that presents a formalized answer is the U.S. Internal Revenue Service (IRS). According to the IRS, only individuals located in "combat zones" are eligible for wartime Combat Zone tax credits. However, while civilian contractors are located in "zones of combat," they are not military personnel and therefore not eligible for Combat Zone tax benefits.[57]

Moreover, the technical infrastructures that support drone operations cannot be considered as strictly military. From the commercial satellites to the undersea fiber optic cables that relay data, technologies of contemporary war and commerce are intricately intertwined. This is, of course, far from a new phenomenon. The antecedents of these technologies, from computers to radar systems to advanced materials science, were developed as military technologies and quickly implemented beyond war contexts.

[57] The list of "Combat Zones Approved for Tax Benefits," which is based on Combat Zones as defined by Executive Orders, can be found on the IRS website: https://www.irs.gov/individuals/military/combat-zones. However, only military personnel, *not* civilian contractors, are eligible for claiming these benefits. "Current Recognized Combat Zones" include countries in the "Afghanistan Area," the "Kosovo Area," the "Arabian Peninsula Area." More specifically: Afghanistan, Philippines (1/9/2002-9/30/2015), Djibouti (as of 8/1/2002), Yemen (as of 4/10/2002), Somalia and Syria (as of 1/1/2004), Federal Republic of Yugoslavia, Albania, Kosovo, Adriatic Sea, Lonian Sea-north of the 29th parallel, Jordan (as of 3/19/2003), Lebanon (as of 2/12/2015), and (since 1/17/1991) the Persian Gulf, the Red Sea, the Gulf of Oman, "the part of the Arabian Sea that is north of 10 degrees of north latitude and west of 68 degrees east longitude," the Gulf of Aden, "the total land areas of Iraq, Kuwait, Saudi Arabia, Oman Bahrain, Qatar, and United Arab Emirates" (IRS 2016).

Technologies of logistics, such as railroads or interstate highways, are a clear instance in which infrastructures of war and civilian commerce emerged as inseparable.

While many technologies may be exclusively designed and used for the military, and the regulations contained within ITAR (the International Traffic in Arms Regulations, which governs the export and import of defense-related products and services) ensure that cutting edge technologies cannot be produced for commercial use, just as many technologies are not exclusive to military use. Leasing satellite bandwidth from commercial satellite companies in order to conduct remote split operations is one example. Another example might be the use of commercial "off the shelf" technologies to supplement ground missions by soldiers in Iraq (Davis 2003). Leaders at the Pentagon applaud this "entrepreneurial" and "innovative" use of technology in "tight fiscal environments." As I brought out in the first chapter with my discussion of the Revolution in Military Affairs (RMA), the military has explicitly embraced the purported efficiency and innovation of the commercial sector as an ideal toward which to strive.

Caren Kaplan argues that GPS technology, developed as a military technology and present in nearly every mobile phone and "smart device," is just one instance of the ways in which "war … is deeply imbricated in everyday life" (Kaplan 2006: 694). In the case of technology, whether something is considered military or civilian might depend on whether its use or origins were being considered. Still, even as users of technology transform and rearticulate the meanings and potentials of those technologies in unanticipated ways (Cowan 1987), the legacy of military goals and values which informed their conception and development cannot be easily divorced from the technologies themselves. Long after their original development, technologies reflect the

values and orientations of their designers in expected and unexpected ways. With such confounding configurations, what does it mean to call something discretely civilian or discretely military?

Spaces of distinction

The concept of civilian, in its current sense as opposite of military, is a relatively recent phenomenon. The term *civilian* used as an adjective to describe a category of person not in the military was first used in the context of colonial governance, originally referring to a British member of the East Indian Trading Company located in India, as opposed to a member of the British military (Kinsella 2011: 4). Only with the Geneva Conventions of 1949 did "the civilian" formally become the subject of international treaty law, and it was only in 1977, as an amended protocol to the Geneva Conventions, that "civilian" was formally defined as one who is *not* a member of the armed forces (Kinsella 2011: 6).

In her genealogy of the term, historian Helen Kinsella (2011) argues that while traceable to the idea of "civil," and the constitution of politics in ancient Rome, the modern sense of the term is more directly indebted to Christian ideals of mercy, particularly those that developed in the context of knights in the European Middle Ages. Her history focuses on how civilians are defined in opposition to combatants, with a particular focus on law and codes of warfare throughout Western history. Central to her argument is how the idea of the civilian has been articulated and compounded by the particular politics surrounding particular conflicts, reflecting historically specific beliefs about gender and "civilized" societies.

The implications of the genealogy that Kinsella traces are multiple. Her work demonstrates the extent to which the category of civilian is not predetermined, but rather fragile and fragmentary. Kinsella's argument underscores the work of other scholars who have argued that gender and race are marshaled to define only certain kinds of persons as civilian (Enloe 1990; Khalili 2010; Mikadashi 2014; Gordon and Perugini 2014). While the Geneva Conventions may establish a legal basis for "civilian persons" to be protected populations, material and discursive practices shape the grounds upon which certain bodies and certain populations may even be considered "civilian." In the context of current conflicts, such as the Global War on Terror, the potential to be categorized as civilian is a deeply gendered practice in which the male (usually brown) body is rendered as "always already dangerous" (Mikadashi 2014). In the context of international law and the construction of military doctrine, the distinction between military and civilian is one of utility and not essence; the designation of civilian is a function of particular political beliefs and the perceived capacities for individuals to be enemies.

When the term civilian is used in the context of American populations and American institutions, the set of connotations and implications shifts. This might be understood by considering the history of civilian-military distinctions within the United States, specifically as embedded within American laws and perceptions of institutional power and governance since the American Colonial period. For instance, direct limits on military power, essentially prohibiting the military to take control of the government, were key commitments of the framers of the American Constitution, contributing to the

division of control over the military across the branches of government (Weigley 2001).[58] This has been explicitly expressed in the principle of civilian control (non-military governance) over the military that has been established as American law since the drafting of the Constitution.

However, the particular current connotation of civilian as a kind of space or institution standing in contrast to the military within the United States can be seen to emerge following World War II (Holsti 2001: 16).[59] During this time, national discussions turned to a period of intense reflection on how the immense military buildup and power of the preceding war years should be reckoned with. What control should the military have over the future of the United States? How should the powers of the military be managed? Such were the salient questions of the time; President Eisenhower, himself a General during World War II, made them the key questions facing the nation during his Farewell Address when he warned,

> This conjunction of an immense military establishment and a large arms industry is new in the American experience. The total influence – economic, political, even spiritual – is felt in every city, every Statehouse, every office of the Federal government. We recognize the imperative need for this development. Yet we must not fail to comprehend its grave implications. Our toil, resources and livelihood are all involved; so is the very structure of our society.

[58] See Weigley (2001) for a more comprehensive discussion of the history of civilian-military relations during periods of American conflict, including the American Revolution, the American Civil War, the American-Indian Wars and the First and Second World Wars.
[59] The Oxford English dictionary lists the first use of "civilian" in this sense within a reference to "civilian-military board of inquiry" by President Roosevelt in 1941.

> In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist.
>
> We must never let the weight of this combination endanger our liberties or democratic processes. We should take nothing for granted. Only an alert and knowledgeable citizenry can compel the proper meshing of the huge industrial and military machinery of defense with our peaceful methods and goals, so that security and liberty may prosper together. (Eisenhower 1961)

In academic and policy circles, two primary voices to emerge from this debate were Samuel P. Huntington and Morris Janowitz. A primary claim of both was that a gap existed between "the military" and "civilians," a gap primarily in world-view that could threaten American democracy. Should this gap grow too large, they worried, the principle of civilian control over the military would become problematic and potentially ineffective. Huntington (1957) located an ideological divide between the officer corps and civilian society, with the former conservative and the latter liberal and individualistic. A recovery of appropriate American values and ideals necessitated, for Huntington, that civil society turn toward military culture and values. In contrast, Janowitz (1974) found evidence that military culture had and should effectively adopt a more civilian orientation, employing both the technologies and critical reasoning of civilian society.

Both of these positions, and the various iterations of these arguments that have developed throughout the last decades, are grounded in the disciplines of political science

and international relations.[60] They essentially interrogate the nature of the relationship between military and civilian leaders in order to assess its impact on producing and passing American policy and undertaking military action. The questions such studies ask are important, but in many senses restrict the grounds upon which to assess the dynamics of military/civilian relations. They examine these relations only on the grounds of political power, jurisdictional reach, and government processes and policies. Moreover, such literature takes for granted the juxtaposition of military/civilian. Who or what are the militaries and civilians in question? How are the boundaries of such categories configured and recognized?

Anthropologist Catherine Lutz's (2001) study of the town of Fayetteville, North Carolina takes up the question of military/civilian relations through a distinctly different lens than that represented by the possibility of effective civilian control over the military. Based on historical research and interviews, Lutz problematizes a stable boundary between military and civilian worlds by documenting how Fayetteville's history has been profoundly shaped by its location next to an Army base, Fort Bragg. In her account, local economies and civilian social norms bend toward, and are ultimately subsumed by, military interests and orientations. From migration patterns throughout the 20th century to the politics of racial integration to the availability of public goods and services, Lutz documents how life in Fayetteville became orientated around military goals and objectives, what C.W. Mills termed a "military definition of the situation" (quoted in Lutz 2001: 36).

[60] See Feaver (1996) for a comprehensive discussion of the legacy of these debates in defining the field of civil-military relations.

Lutz offers insight into the complex ways in which the categories of civilian and soldier are articulated. For instance, she points out the contradiction in perceptions of soliders as both "super-citizens" and dangerous, violent dupes (Lutz 2001: 235-236). On one hand, she argues that soldiers are seen as exceptional models of citizenship and held up as the rightful protectors of the United States. Consequently, civilians become a kind of "sub-citizen," effectively disempowering other forms of citizenship or persons excluded from the military from having the potential to be an ideal citizen.

On the other hand, the soldier takes on a kind of marked and degraded status. Lutz points out that the civilian often emerges as a kind of unmarked category in that everything is seen as civilian unless it is explicitly marked as military; one category is taken to be a dominant, "unproblematic" norm, such as "white" in the case of race or "male" in the case of gender (Lutz 2001: 235). While the civilian is "civilized," the soldier is seen as dangerous and tainted. To illustrate the point, Lutz recounts how signs posted in store windows when soldiers were returning from World War II warned, "Soldiers and Dogs Not Allowed" (230).

While Lutz is careful to complicate categories of both "soldier" and "civilian" and all the ways in which they are intertwined, her argument implicitly suggests a movement, or rather an encroachment, of the military sphere into the "civilian" one. Absent from Lutz's account is a reverse perspective; that is, what is the pull of the civilian world on its nearby military neighbors? How are discourses of privatization and the ideal neoliberal subject implicated in changing military cultures? Recall then-Defense Secretary Donald H. Rumsfeld's injunction in a 2002 *Foreign Affairs* article that the Department of Defense strive to be "more like venture capitalists" (Rumsfeld 2002: 29). Considering the

national trends toward privatization of military services—from health and housing to battlefield operations—it seems likely that a more complexly constituted boundary exists between civilian and military distinctions.

Such a critique also takes for granted that there is or could be a civilian world that can be understood as discrete and apart from "the military." I would argue that such a formulation misses the ways in which civilian/military distinctions are mutually constituted, and more so, enforced only through the maintenance of social (and physical) boundaries which are not given but continually constructed and maintained.[61] To speak of "militarization" misses all the ways in which the traffic between "military" and "civilian" goes both ways, or rather, all the ways in which the topographies of difference between military and civilian are not binary and only variously visible. In this sense, Lutz's focus on the analytic of militarism also narrows the grounds upon which to analyze and account for the conditions and consequences of military/civilian relations.

In the remainder of this chapter I explore the topographies of military/civilian places and spaces within the United States by narrating a series of ethnographic encounters with communities involved in Air Force drone operations. My encounters occur at both metaphorical and literal boundaries. While that which divides military and civilian is carefully guarded at some times, at many other times, the worlds flow seamlessly and to characterize one place or world-view as "military" is precisely to misunderstand its constitution.

[61] Indeed, Charles Tilly argues, in the context of the emergence of modern European states, for foregrounding the constituent "interdependence of war making and state making" (Tilly 1985: 170). For Tilly, "war makes states" (170).

Taking sides

After nearly a year and half attending drone industry conferences, meeting in Starbucks across the country, and countless "telecons," I had finally found an active-duty U.S. military commander who seemed to trust me. This colonel, Col Quinlin, had been convinced to sit down with me by his former commander (now retired), one of my main interlocutors. I met with Quinlin, a top ranking commander in his 50s, at the base in his office, and we talked for over an hour, much longer than I had originally anticipated. He was guarded, and I expected nothing less, but he gave me his time and his word to keep the "dialogue open." That evening, he emailed me a link to an article he had just read about the controversy of awarding medals to drone operators from his official USAF email address. I emailed him back, sharing some other articles I thought he might find interesting. I felt like, slowly, I was forging a path inward.

The following day I returned to the base, this time remaining outside the barb-wired fence that surrounded the base. I was attending the bi-weekly anti-drone protests organized by a local peace organization. In front of the base is a two lane suburban highway, one lane in each direction. Protesters are allowed to stand on the shoulder of the road opposite the base. Their cars are parked further down the shoulder, and they stand with signs, quietly talking amongst themselves. They do not yell, although as cars drive past some drivers yell in anger, and some honk in solidarity. There are generally between five and ten people there, who come from all over the region, and are generally of retirement age. The action is held between 4-5pm because this is when the shift change at the base occurs and a significant volume of people drive on and off the base. The protests have been going on since drone operations began at the base, and the actions have gone

through periods of being more and less antagonistic. In the past few months, no one had been arrested. However, in the previous year, a dozen or more people had been arrested, many jailed, and some convicted of trespassing. The trials for these protesters continue to drag on and fan the flames of anger and resentment on all sides.

When I arrived Rosemary, the woman I had been in touch with at the Peace Council, offered me a sign to hold. I politely declined, saying I was trying to keep a neutral position in the interest of my research. She shrugged, and we talked for a bit about the history of the protests. I decided to pull out my notebook and hold a pencil and pad in my hand in order to telegraph that my involvement in the protest was closer to reporter than participant.

As five o'clock and the end of the protest neared, I decided to walk over to a smaller group consisting of four people, two men and two women, who held signs in support of the base. At first they were outwardly angry toward me. The interactions between the protesters and the anti-protesters had been strained lately, resulting sometimes in bouts of physical pushing for space. I explained who I was, a graduate student from Columbia University researching perceptions of drones. The terms "graduate student' and "Columbia" seemed to equate liberal hippie in their minds – i.e. like the protesters. One of the men, a bearded man in his 60s, made angry passive aggressive remarks. I stayed, confident that I was not who they thought I was. I smiled and asked their histories and stories. They quickly warmed up to me. We got to talking about antiquing, and we made loose plans to meet up at that week's regional flea market.

Around 5pm the protesters dispersed, and the anti-protesters and I stayed talking. A young USAF lieutenant at that point walked out of the guard booth and across the road

toward us. He smiled and thanked the group for being there and showing their support. He hung around awkwardly for a moment, looking at me a few times. Then he asked me, "Weren't you here at the base yesterday?"

"Oh yes!" I said. See—I was one of the gang, I thought to myself—I'm here with the pro-base group, and I'm perhaps on my way to becoming to a fixture around here. But something in his look worried me, "I was here yesterday meeting with Col Quinlin. We had a really great meeting," and I continued on, dropping the name of the former commander of the base. In retrospect, I realize that not quite consciously I was trying to establish the fact that I could be trusted, that I was not any kind of threat, because I knew the right people.

The next day I bumped into Quinlin at a local Panera. "You got me in a lot of trouble yesterday!" he told me. I must have turned ten shades paler. He continued, "You set off a whole security procedure!" I apologized and got even more nervous. Quinlin said he was "just teasing," and that if I wanted to hang out with fighter pilots I needed to get tougher skin. He explained that "the boys" (the lieutenants, low-level officers, at the guard house) were just doing their job. And in fact, he was extremely proud that they were keeping such a good eye. Their job was to watch and be on guard. He told me that my presence, having been on the base and then with protesters, did in fact trigger a specific security protocol. An NCIS background check was initiated he told me, and reported, "probably no surprise to you, you don't have a criminal background." The only thing, he said, is that now "they" know about our talk earlier this week. But that's probably a good thing, he said, adding that there might come a time when I'd need to show identification documents in person, or sign a Memo of Agreement, though for now

everything was fine. I asked, "So, this won't effect my research with the base?" "Probably not," he said. The next time I drove onto base, I was not able to drive freely to the offices, but had to be escorted. And I never was able to observe a training mission, which Quinlin had tentatively promised during our first conversation.

In my attempt to quite literally transgress the spaces of opposing communities, I was deemed to be suspect and untrustworthy. A presence on "both sides" was potentially dangerous. And it was not a distinction between military or civilian person that mattered most, but rather what *kind* of civilian I was. Indeed, a few weeks later I encountered a similar sentiment from Rosemary, the member of the Peace Council I had in touch with, who found me untrustworthy given my ongoing involvement with the base.

I met Rosemary, a woman in her 60s and who leads the anti-drone actions, in the Peace Council's offices, which are located in a rundown but beautiful purple pastel ranch house, nestled behind overgrown succulents and flowering bushes. There was original art on the walls, lots of books on shelves, and newspapers piled on tables. Rosemary offered me herbal tea, and we sat down facing each other on a pair of old couches. I asked Rosemary about her history and how she got involved in the Peace Council. Her first question to me was, "so what do you think about the use of drones?" I explained that I tried to reserve as much judgment as I could, because I was interested in the complexity of the situation and that meant exploring and respecting multiple perspectives. I think she thought I would express a position closer to the one held by the Peace Council; I was after all a Columbia University graduate student in Anthropology with a nose ring. We kept talking, having a really nice and thoughtful conversation when at one point, as Rosemary was about to tell me a story of a recent organizing meeting, which they keep

very small and only communicate about face to face or sometimes over the phone, she paused and stopped speaking. I asked what she was thinking and she replied that she was thinking maybe she shouldn't keep going with the story. I asked if she'd be willing to tell me why and what went through her head. She said that she had this thought for a moment that maybe I was with the FBI. It felt ridiculous and yet plausible at the same time, she confessed. Many at the council were sure that their phones were tapped. A few also thought that maybe there had at one time been an undercover FBI agent in the group, because during a few of their early actions, which were intended to be surprises, the local police seemed ready for them. I said I understood, and thanked her for sharing. Wherever I go, I thought, I am a potential threat, a potential enemy, because I cannot be clearly pronounced as an ally. The boundaries of the Peace Council, as well as the military base, had been enforced not only to protect "security" concerns, but also as a means to enforce and maintain each group's norms and values, including, in this case, choosing a side.

The war-keeping economy

In a 2004 article, M.L. Cummings, a leader in the field of aviation human factors and a former Navy fighter pilot, wrote a short article that put forward the possibility that the design of a graphical user interface (GUI), such as the one through which pilots and operators conduct surveillance and lethal strikes with unmanned vehicles, provides the potential to become a "moral buffer." She pointed out that "when designing human-computer interfaces that control weapons in real time, the concept of user-friendly can be a dual-edged sword" (Cummings 2004: 29). In other words, the principles of good design, such as "seamless" and "easy use," or "helpful popup tips," could result in overuse, misuse, and the conditions for an abdication of individual responsibility. Critical

of any such development, Cummings carefully but clearly argued that when a GUI design mirrors graphical conventions of video games or common word processing and spreadsheet applications (such as Microsoft Excel or Microsoft Word), the potential for a computer interface to become a "moral buffer" arises. She advocated for engineers who design weapons systems to be "aware of the potential to create a moral buffer… and be very careful when adding elements that make a computer interface more like a form of entertainment than an interface that will be responsible for lost lives" (33).

While Cummings was concerned with computer interfaces and user experience design, we can easily imagine other modes of "moral buffering," in which the instantiation of commercial standard norms and ways of organizing experience in military contexts obscures the unique stakes of war. For instance, the conferences and tradeshows that are part of the military-defense contracting market, such as AUVSI, the Association of Unmanned Aerial Vehicle Systems International, can be considered as one such kind of "moral buffer." AUVSI is the largest and longest running conference and tradeshow in the "unmanned systems" industry. Held over the course of a week in the conference center of a different American city every year, AUVSI hosts between 8,000-10,000 people every year, with 500-600 official exhibitors. According to AUVSI publicity materials, the conference is "the largest trade show dedicated to unmanned systems and robotics technologies, showcasing newly released products and services from the leaders in unmanned systems and components" (AUVSI 2012: 2). The exhibitors range from small, independently owned component manufacturers (such as circuit boards, screws, nylon rope, 3D injection molding) to companies that provide services (such as pilot training or image-processing) to the multi-national corporations

who act as prime contractors for manufacturing drone systems (such as General Atomics, Raytheon, and Lockheed Martin).

The first AUVSI I attended was the 2012 edition and was held at the Mandalay Bay conference center on the Las Vegas strip. The attendees were a mix of industry, government, and academia, although the majority were white, middle-aged men. With very few exceptions, everyone was remarkably warm and friendly. The expansive exhibit floor, packed with individual booths, was organized into pavilions, by either country or type of product offered. Carpeted aisles divided the floor into a neat grid. Individual booths resembled what one might find at CES (Consumer Electronics Show) or any of the other numerous electronic hardware and software tradeshows in the United States, including some kind of table or surface behind which people, mostly men in this case, "working" the booth stand and wait to engage attendees.[62] Tables ringed with chairs and low couches offered space for impromptu meetings. Some booths built two story structures, where the second floor became a location for extended, semi-private meetings. Those working the booths ranged from full-time marketing staff to technology department heads, depending on the size of the company and the time of day. Marketers wore identifiable clothing and eagerly gave bullet-pointed information handouts.

Smaller companies tended to have simple booths, with 3x6 printed posters, and a table with information about the company, examples of products, and conference "swag," typical of tradeshows, such as keychains, LED flashlights, mouse pads, or snap bracelets. Larger companies were able to rent bigger spaces, and in addition to an information table

[62] During the first two years I attended, when the conference remained defense and security focused, most of those working the booths were men; the female body was not relied upon as sexualized spectacle as it is at many other tradeshows, including CES. See Cornfield (2017) for an extended analysis of "booth babes" and the dynamics of gendered work at CES.

and conference "swag," they staged interactive demonstrations or showcased their hardware. The booth of iRobot, which makes the Roomba, the most popular consumer-robot vacuum cleaner, had a spinning banner lofted above their space. They hosted a collection of ground robots in a kind of robot sandbox, including their famous Packbot, which can be used to disarm and dispose IEDs, and to which the fictional robot-character Wall-e bears a striking resemblance. In other areas of the conference floor, several large drones were hung from the high ceiling, and occasionally a little robot on wheels swerved into the aisle, controlled by a bored booth attendant who wanted to attract visitors to his space.

Hardware is always eye-catching. "Boys and their toys, what can you do?" as one woman who worked for Lockheed Martin shrugged during a conversation at the end of a conference day. But many of the booths advertised services. One company, CAE, offered "training solutions" for pilot and operator training to military as well as law enforcement customers. Insitu, a subsidiary of Boeing and which provides one of the most sophisticated imaging platforms, advertised their vision of straight-forward and complete information awareness: "See. Assess. Plan. Repeat. One launch. 24+ hours of persistent data." Numerous smaller companies offered "information solutions," such as the company 4DSP, which promised to usher in "A New Era of Sensing."

In addition to spending time walking the aisles of the tradeshow, the conference provided multiple opportunities for networking. For the first two days of the trade show, an adjoining multi-track conference provided researchers, analysts, and policy specialists (including representatives from NASA and the military forces) to give presentations and hold panel discussions. Only a fraction of the attendees at the tradeshow attend these

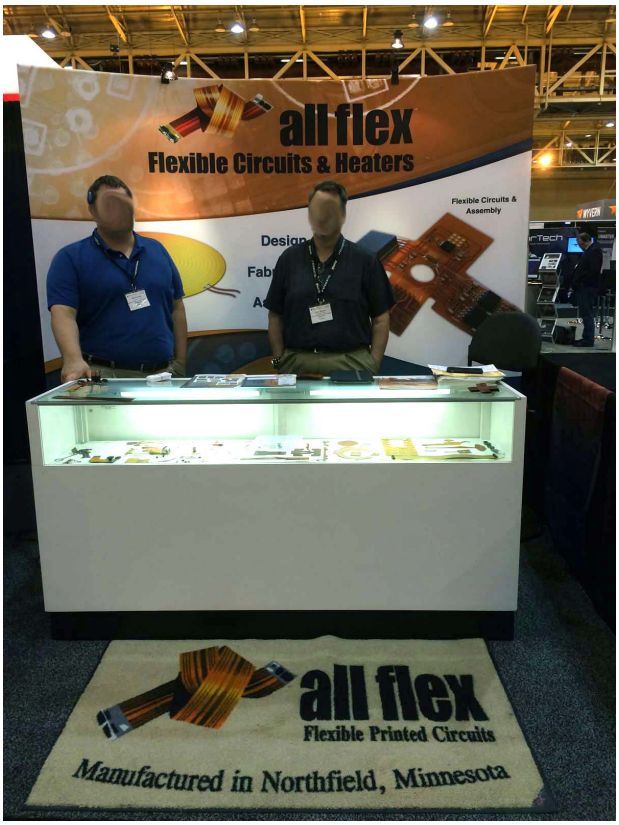

Figure 9: AUVSI 2013 booth, photo by author

Figure 10: AUVSI 2012 sign, photo by author

Figure 11: AUVSI 2013, Lockheed Martin booth, photo by author

more “academic” portions of the conference, which also costs more to attend. These sessions provided for more specialized networking, information sharing, and projections of status within the UAS community. The most highly attended panels were those in which generals from the different forces (Army, Navy, Air Force, and Marines) communicated their expected program “requirements” in broad terms, with other notable speakers from the DoD, and well-known analysts, presenting future market projections. Other panels ranged from case studies of product uses presented by contractors, to open-ended question-and-answer sessions with the Federal Aviation Administration (FAA), to the presentations of the Office of Naval Research or Air Force Research Lab research projects.

On every day of the conference, formal networking events directed attention from the content of the conference itself to the people in attendance. Every afternoon at five, numerous small bars would be setup on the exhibition floor, serving beer and wine for the final hour that the exhibit hall was open. A handful of companies used this “happy hour” as an additional way to bring attendees to their booths and provided much sought after hors d’oeuvres to hungry attendees. More exclusive gatherings were held in hotel rooms or nearby restaurants following these networking hours. On the second day of the tradeshow, an off-site “party and mixer” open to all who were registered for the conference was sponsored by AUVSI and Northrup Gruman and held at a well-known local venue. For the 2012 conference, the “Mixer” was held at a fancy night club on the Las Vegas strip. In other years, the location of the “Mixer” ranged from the Harry Potter section of Disney World in Orlando to Generations Hall in New Orleans. It was during

these networking times, when conversations veered into the more casual and personal, that the conference felt like it might as well have been a fly-fishing conference.

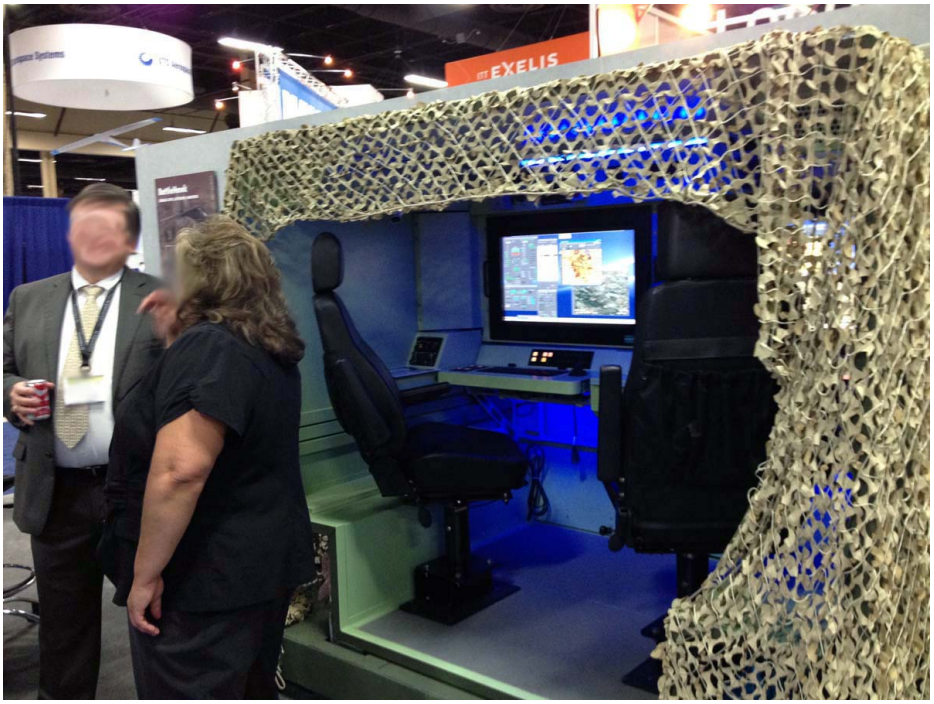

Figure 12: AUVSI "happy hour," photo by author

Figure 13: AUVSI "Mixer," sponsored by Northrup Gruman, photo by author

In one sense, these kinds of conferences make visible the military contracting market, to itself and to those who would wish to join. Such convenings and their associated exhibitions have become recognized as playing key roles in consumer technology markets, from advertising products to developing networks of distributors and subcontractors (Aspers and Darr 2011). The event functions as a way to build and maintain relationships between people working in the industry, as well as a way to advertise new products or lay the informal groundwork for what may eventually turn into business contracts. The event is a way to see and be seen, as an individual or as a company, within the drone industry.

In another sense, these conferences obscure the actors at stake. Nowhere are the victims of drone attacks and surveillance brought into view. Images of empty desert landscapes stand in for where the war is taking place. Drones hang in the air, suspended as objects of contemplation. Those who conduct day-to-day operations, from maintenance engineers to data analysts to operators or even pilots, are also largely absent. Technologies are presented as unmanned, autonomous, and discreet products, symbols of triumphant techno-autonomy. Above all, this is a space of business deals. In fact, small side rooms are rented by the largest and wealthiest corporations such as Northrup Gruman, Boeing, and SAIC to conduct business deals. These rooms operationalize secrecy and exclusivity to reinforce sites and relationships of power. They announce their secrecy with blank, minimally signed, and entirely walled-off temporary rooms. Although the tradeshow floor seemed open and transparent, I was told that all the real deals occurred in these private meeting.

Taking place within the familiar frame of an industry trade show, the military-defense industry becomes normalized as just another type of industry. The ultimate purposes of military technologies are redirected and obscured through the lens of corporate relations and profits. Conferences, in this sense, become a "moral buffer." In fact, one of the things I was most struck by when I attended my first AUVSI conference was the explicit acknowledgement that the UAV industry is market driven. In retrospect, this seems obvious. I suppose what I had imagined was that there would be some kind of obfuscation that the bottom line was profit. Rather, almost every discussion of advancement and innovation in unmanned systems was explicitly contextualized through the pragmatic profit-driven prism of a market economy. This mode of seemingly self-evident free market logic reinforces a kind of "moral buffer" where attention is tuned to profit, spectacle, and social capital, rather than the actual purpose of making war and killing people.

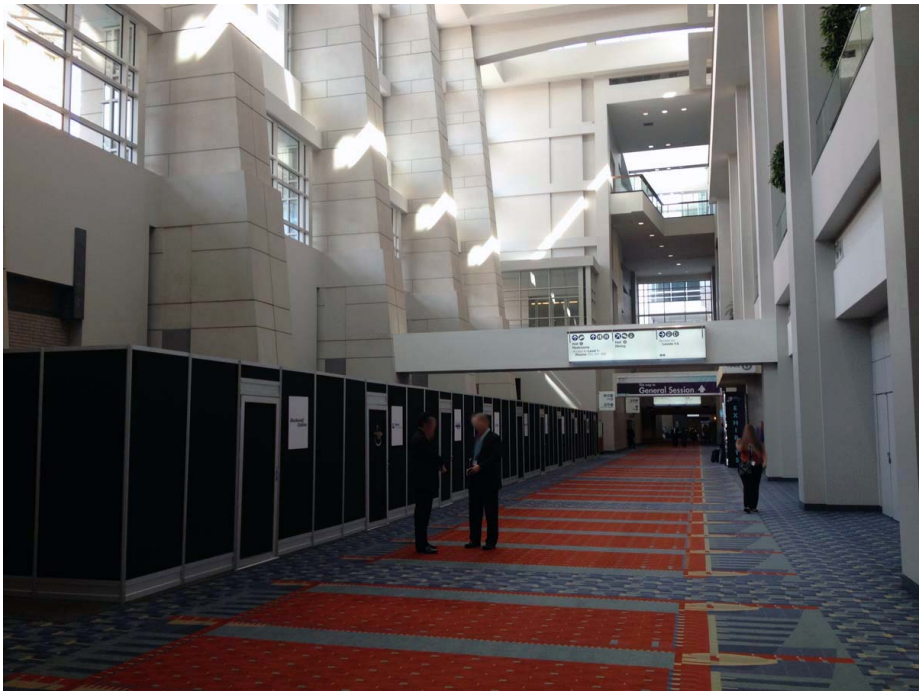

Figure 14: Hallway at AUVSI 2014, photo by author

AUVSI conferences for the last several years have also served as a site for forging the transition of technologies developed for military use to "civilian" use, available to all outside the military. Numerous attendees of the AUVSI conferences characterized the UAV industry as being like "the wild wild west," where everything is "up for grabs," a kind of lawless frontier with possibilities for profit in every direction. When I attended AUVSI in 2016, the association itself was under new leadership and had renamed itself Exponential in a push to distinguish the conference's new phase as a consumer "more than defense" facing organization. According to a presentation given by an analyst at Forrester Research that year, the commercial (non-military) drone industry was expected to reach $15 billion within 10 years. A more tempered assessment from the Congressional Research Service observes that commercial forecasters vary widely in their future market predictions, but that Deloitte estimated that 300,000 nonmilitary UAVs were in use world-wide in 2015 (Canis 2015: 6-7). The hype around this potential technology market is intoxicating to those within the industry, even without a certain future.

It was, in fact, the existence of this market *in potentia* that provided me the clearest points of access to the military drone operations community. In this sense, my experiences at AUVSI were less about encountering enforced boundaries and more about learning how others navigated such boundaries in the space of commerce. Many of my initial connections to bases and research groups came from meeting people at AUVSI, a space in which the intermixing of military and non-military communities around drones was not fraught but rather embraced for the potential to capitalize on a growing network. Job offers were made to me several times during each conference I attended because as

someone who seemed "to study culture and people," I would have the skills to help make the adoption of UAVs smoother and faster.

The conference was also a place for retiring military officers to network and make in-roads with potential employers or customers in the civilian drone or, more likely, defense-contracting industry. I was soon able to tell who would be leaving the military because those who *weren't* leaving would have official military business cards, while those who *were* leaving had personally printed cards with non-government contact information.

Figure 15: Velodyn AUVSI sign 2014, photo by author

Figure 16: Business card, photo by author

Moreover, I was able to obtain access to individuals involved with two of the air bases where I conducted fieldwork because I had been in close touch with a regional civilian drone development organization. For instance, I spent several months with one organization, which was charged with (economically) developing the civilian drone industry in the region where five of the seven principle employees were retired military officers who had been involved in RPA operations. The distinctions between military and civilian in these cases were rarely emphasized; in the end, it was all business. Here, new boundaries were drawn, excising any differences that would impede the explicit profit and business goals of the community.

Covert action

Secrecy, a classic concern of anthropology, has been shown to have a kind of paradoxical logic (Jones 2014). In the words of Michael Herzfeld, secrecy "must itself be performed in a public fashion in order to be understood to exist" (Herzfeld 2009: 135). It is in the revelation of concealment that the secret obtains and becomes generative as a social force. If there is no revelation, what is the nature of concealed knowledge?

The U.S. government has attempted to address this question through its pragmatic categorization of concealed operations. There are two types: Secret or Clandestine operations, and then there are Covert operations. Secret or Clandestine operations are concealed, hidden from view and access, but U.S. sponsorship of and responsibility for these actions can be acknowledged if discovered. In contrast, Covert operations are meant to be concealed and hidden at all costs. They are carried out in a way that the U.S. can maintain plausible deniability for their operation; there is never meant to be any revelation at any time. According to U.S. law, military operations (as opposed to those of

the CIA) are never supposed to be covert (Priest and Arkin 2011: 6). If and when the U.S. government carries out covert actions, there is no potential for public accountability or recourse.

Masco (2006) observes that since World War II, the potential to manage "the public/secret divide" has become central to the activities and perceptions of the U.S. government. In his most recent work, Masco (2014) expands this observation and traces the transition from a counter-communist to what he terms a "counterterror state." Central to the counterterror state, a particular kind of security state, is the management of state secrets as a generative form of governance in which "perception control becomes as important as information management" (Masco 2014: 136). While Masco compellingly theorizes the role of state secrets in influencing and managing the "affective, imaginative, and material" (9) infrastructures of the counterterror state, the infrastructures of covert actions remain under-theorized. As a step in this direction, I conclude not with a theory but with an observation.

In the vignettes described above, the boundaries of war appeared when I bumped up against them or was prohibited from moving across them. In these cases, the friction was productive in the sense that these boundaries operated to maintain power, community identity, or control over information or jurisdictions. Boundaries, however porous or temporary, can be recognized and analyzed. What of the boundaries that can never be analyzed because they remain invisible?

Once I asked a commander I was friendly with where I might find off-duty pilots. He responded, "They'd know better than to ever *ever* tell you who they were. They know that if word got round, they'd get chewed out by me big time." Similarly, a reporter

recounted an exchange between a friend and a drone pilot in which the friend asked if the pilot had made any strikes that day, "If I did," she replied "I couldn't tell you" (Maurer 2015). Like the first Air Force officers operating a Predator from CIA headquarters, camouflaged in civilian clothing, the personnel involved in drone operations working from within the continental United States are often hidden in plain sight.

This kind of invisibility represents a particularly insidious mode of waging war for, like covert actions, the potential for revelation or exposure as well as accountability to the public are limited. As Derek Gregory observes in the context of the use of drones by the CIA, "Accountability is limited enough in the case of a declared war; in an undeclared war it all but disappears" (Gregory 2011a: 241).

Conclusion

The elaboration of boundaries between military and civilian spaces can be important. The erection of these boundaries can serve significant pragmatic purposes, for instance, for safety or for community identity formation. What I have argued in this chapter, however, is that the conception of boundaries between "military" and "civilian" as clear or stable is misleading. In fact, the conjuring of these boundaries serves particular purposes at particular times, but the boundaries take shape from within an intrinsically entwined state. If any spatial metaphor is apt, it is one not of civilian and military "worlds" but rather of layers that are variously visible in different moments in time and space. Moreover, in the conception of "militarization," central to many contemporary critiques, a natural state of separation is assumed that I would argue is misleading if our

goal is to understand the forms of power and knowledge production at stake in a state of permanent, "everywhere" war.

This chapter began by arguing that the language of spaces of distinction or worlds that are separate does not adequately capture the relations that connect military and civilian spaces, practices, and worldviews. Claiming something as military *over there* and civilian *over here* masks the ways in which both are implicated in all modes simultaneously. Through the examination of the ways in which drone operations bring into question traditionally conceived spaces and subject positions of waging war, the historical contextualization of military/civilian distinctions, and my ethnographic encounters, I hope to have brought into focus the kinds of warzones that are implicated in the conceptions and visibilities of the ongoing war within the continental United States.

Conclusion

A war story

"So how did you join the Air Force? Were you a pilot?" I asked Rory, as we sat in a chartered bus going to a networking event in Las Vegas. We were both attending the largest annual drone industry conference known as AUVSI, Association for Unmanned Vehicle Systems International.

"No, no. I wanted to be," he replied. "I have bad eyesight—a wandering eye. I started out as a medic. Yeah, isn't that funny? I went from being a medic to selling bombs." Although Rory began his Air Force career as a medic, he now worked in ammunitions procurement for the Air Force.

On the bus, every seat filled by other conference attendees, Rory and I had a lovely conversation. Right before telling me his background, we'd started out with small talk. He told me he goes to these conferences all the time. He'd been to Vegas several times, and when he learned I was a graduate student, he told me about a place to find rare books near the Vegas strip. He had held a first edition *Tom Sawyer* in his hands last time he stopped by. "No gloves!" he told me, smiling like a little boy. Rory, who works for the Air Force Research Lab in Florida, travels around the country at least a half dozen times during the year attending conferences related to ammunitions research and development. AUVSI was one of his favorites. "They always have the most amazing events," he explained. That evening, we were headed to a well-known nightclub. Although Rory was in the Air Force, the vast majority of people at the conference, and at the event that evening, were military contractors.

That night, very early on in my fieldwork, stands out in my memory. I had had no idea that conferences such as AUVSI existed, let alone in such plenitude, or with such conspicuous consumption. In addition, I had no idea how unsettling it would feel to be standing in a fancy night club (complete with fake beach on the roof) in Las Vegas, looking out over a sea of people whose work was ultimately aimed at making war and developing new ways to kill human beings. It felt unsettling deep down, especially because on the surface, no one else seemed unsettled at all.

This story also stands out in my mind as a clear example of the ways in which the work of war can be normalized and in turn, rendered mundane. It exemplifies for me the ways in which perpetual war can seep into the everyday, and in which it can become unremarkable that someone might say, "Yeah, isn't it funny, I went from being a medic to selling bombs" and not skip a beat.

The distributed work of war

In each chapter of this dissertation, I have attempted to articulate how the configurations at stake in drone operations help us to understand the contemporary nature of military service, the deployment of state violence, and the various ways in which war is rendered visible or invisible to different communities within the United States. However, this dissertation offers no answers to the pressing political problems of perpetual war. Anthropology is not a discipline that lends itself to conclusions of policy prescriptions or recommendations. In addition, while I have attempted to focus on the ways in which the work of war is normalized and rendered invisible, I do not mean to imply that if it were simply *visible* or *more fully recognized* that all the infrastructures of perpetual war would melt away.

Moreover, I have only examined some of the faces of war, primarily those who are involved in USAF drone operations. Though partial, I hope that I have illuminated a set of practices and discourses through which war is executed, normalized, and rendered only variously visible here, in the United States. For this reason, while drone warfare is typically referred to as "remote warfare," I have aimed to bring into view the very real ways in which what I have studied is not "warfare at distance," but rather, warfare distributed.

To analyze the conditions and implications of this distribution, I have chosen to attend to the *work* of war and the distributions of labor implicated. By focusing on the *drone operation,* rather than the drone, as the focus of my inquiry, I opened up different avenues through which to frame and analyze drone operations, maintaining focus on the ways in which "unmanned aerial systems" are far from unmanned.

I began by drawing attention to the remote split paradigm that characterizes drone operations, which establishes the distributed system of command and control around the globe, allowing analysts, operators, and pilots to conduct surveillance and lethal attacks from thousands of miles away. Such a configuration is neither obvious nor necessary, although it is often presented as such. Rather, in the first chapter I examined a set of particular sociotechnical and historical conditions of possibility for the remote split paradigm to take hold. In contrast to accounts that focus on an evolution of increasingly autonomous hardware, I reframe how the history of drones should be considered and argue that a history of drone operations requires investigating how particular arrangements of humans and machines emerge as effective sociotechnical systems for waging war. Through analyses of the "electronic battlefield" of Vietnam, the Revolution

in Military Affairs (RMA), including the emergence of precision munitions in the Gulf War and Intelligence, Reconnaissance, and Surveillance (ISR) missions in the Balkans, and a series of events that led up to the first remote split Predator operation, I argue that drone operations rely on specific material, epistemological, and semiotic infrastructures. These range from global information networks and digital sensors, to theories of command and control and "lawfare," to discourses of bombing precision and comprehensive digital data, all of which constitute the conditions of possibility for remote split to have taken hold as the primary paradigm of drone operations.

In the following chapter, I turned my attention to a more fine-grained analysis of the circulations of information and rationales for action implicated in drone operations. While aspirations of techno-autonomy and perfectible war-making characterize official military discourses and shape media coverage of many military technologies, I problematized these discourses by drawing attention to how the sociotechnical systems of drone operations are constituted in practice. My discussions of the Uruzgan incident drew attention to the ways in which the visual and sensory data offered by drones is not only incomplete and unstable, but also always already structured through specific social and political interpretative frameworks. To understand how these frameworks are enacted and legitimized, rendering certain interpretations as stable and unproblematic fact, I turned to the concept of professionalized practice. This included an examination of USAF Major Tim Cullen's dissertation, which provided a window into how professionalized practices and discourses have shaped drone operations, as well as revealed the ways in which information is rendered as evidence for action only through processes of interpretation and manipulation.

The second half of the dissertation, more directly ethnographic, examined how a series of traditional categories, hierarchies, and boundaries have been destabilized and reconfigured in the context of drone operations. In the third chapter, I returned to an underlying theme in the previous chapters, that of the ways in which drone operations are implicated in new divisions of war work. Specifically, I examined the case of Air Force pilots and commanders involved in drone operations, analyzing the ways in which officers construct and position the value of drone operations as meaningful and honorable military service. Through an examination of the tensions and controversies that have arisen around drone pilots, I showed how officers explicitly worked to reposition and put forward the value of their work as professional and altruistic service. However, I also emphasized a set of irreconcilable destabilizing contradictions—namely, that the military labor of drone operations bears increasing similarity to other forms of contemporary civilian work, characterized by the language of compensation, flexibility, and in/security.

In the final chapter, I explored a set of continuously reconfigured boundaries between military and civilian distinctions. I began with a discussion of how drone operations have destabilized traditionally perceived distinctions between categories like home and battlefield, and civilian and soldier. I argued that current theorizations of "militarization" do not adequately account for the ways in which military and civilian infrastructures and economies are consistently and continuously intertwined. In turn, I articulated the concept of the warzone to encompass all the places in which war occurs, both its execution and its consequences on the battlefield. My aim in articulating the term warzone was to analytically knit together the range of people, places, and practices that are implicated in the ongoing conduct of war. Within the expanded concept of the

warzone, I then analyzed a series of ethnographic encounters, including with military police at the gate of an Air National Guard Base, a group of anti-drone protesters, and defense contractors at the largest professional conference of drone manufacturers, in order to call attention to how the boundaries of war are conjured and rendered only variously visible.

The future

The "future of warfare," as presented by the American news media, is usually imagined as one of sleek, metal machines with perfectly accurate, and perfectly justified, aim. In a recent article for *The New York Times*, two well-known tech journalists reported:

> Mr. Work believes a lesson learned in chess can be applied to the battlefield, and he envisions a military supercharged by artificial intelligence. Brilliant computers would transform ordinary commanders into master tacticians. American soldiers would effectively become superhuman, fighting alongside—or even inside—robots. …
>
> The new weapons would offer speed and precision unmatched by any human while reducing the number—and cost—of soldiers and pilots exposed to potential death and dismemberment in battle. (Rosenberg and Markoff 2016)

Fueled by the evergreen visions of techno-autonomy, the dreams of perfectible and perfect war remain intact. This, despite the obvious historical failures of past attempts, some of which I explored in the first and second chapters like the "electronic battlefield" and "precision guided munitions." As Gibson (2000) argued in the context of the

Vietnam war, it is a fallacy to believe that technological solutions will resolve complex social and political problems. Humans are, and will continue to be, intimately implicated in the conduct of war—most clearly for those against whom war is waged. But also, as I have attempted to show, because robotic, "unmanned," and "autonomous" technologies are shaped by humans and must be continually maintained, operated, and authorized as legitimate and effective actors.

In his historical sociology of nuclear missile guidance, Donald MacKenzie (1993) suggests the possibility that the accuracy of nuclear missile guidance might be uninvented, in the sense that the social conditions that authorize and maintain this particular idea of accuracy are socially contingent. MacKenzie writes, "To see the mundane social processes that form the nuclear world is to see simultaneously the possibility of intervening in them, of reshaping that world" (MacKenzie 1993: 4). In this spirit, this dissertation has contributed an analysis of USAF drone operations and the range of material, epistemological, and semiotic infrastructures that both constitute and enable this kind of military action. In response to the media focus on "unmanned drones," techno-autonomy, and the emergence of "autonomous" and "robotic warfare," I hope to have drawn attention to the significant social logics, practices, and arrangements of humans (and machines) that maintain and authorize drone operations, thereby opening new possibilities for critique and intervention in the context of military engagements.

Moreover, as I have argued, advances in automated and "autonomous" technologies do not so much do away with the human, but rather obscure the ways in which human labor and social relations are reconfigured. While this dissertation is an ethnography of U.S. war-making, it is also an ethnography of the disruptions and

reconfigurations that result from automation and the rapid introduction of complex technological systems within an institution. The disruptions, tensions, and obfuscations that have been explored in the context of drone operations likely have parallels in other domains in which automation and so termed "intelligent" systems are being deployed. Examining related institutional or occupational disruptions, from healthcare professionals to law enforcement officials to government social service workers, would provide rich sites in which to examine the consequences of new distributions of labor and conditions of agency and responsibility.

Part-time service

Listening to the radio a few weeks ago, I heard a commercial spot for the National Guard. Coming on after the latest Selena Gomez pop hit, the narrator promised a wealth of benefits for what would be part-time work; you could advance your career and develop new skills while still continuing your professional career—and a few weekends a year, you could also find a greater purpose, and be part of making a difference in your community and in the world. I came home that evening and searched for the commercial. While I didn't find the exact radio spot, I found a very similar commercial on the Army National Guard's YouTube channel. With upbeat music playing in the background, the commercial explained:

> *[Narrator]:* There are various ways to become an officer in the Army National Guard. For those professionals or college students working in a specialized field, there's the option of direct commission.

[Officer 1]: Direct commission offered me a way to go into doing exactly what I wanted to do.

[Narrator]: As a Guard officer you'll have the opportunity to improve your development as a professional in your field, while earning extra income and benefits for your part-time service.

[Officer 2]: The National Guard provides me with that opportunity to serve. It gives me the opportunities to practice law in a setting and at a level I wanted to practice, while simultaneously still being able to have a career.

[Officer 3]: Becoming a direct commission in the National Guard is (1) easier than you think, (2) very beneficial, and (3) gives the opportunity to serve. (National Guard 2017)

These commercials underscore another implication of increasing drone operations that I have explored in this dissertation: the increasing division of war work not only across the globe, but also among different kinds of workers, from civilian contractors to the military Reserve forces. These divisions of labor are implicated in new configurations of American military service, configurations that have profound consequences for the potential visibilities and modes of accountability that are possible in the ongoing wars.

This is an area of potential future investigation and theorization. In this dissertation I have begun to explore some of the ways in which new divisions of war work are reconfiguring military service. These reconfigurations could be further explored across many dimensions, for instance, tracing distinctions within officer and enlisted experiences and expectations. In addition, how is the reconfiguration of military service

related to changing American conceptions not only of work, but also of citizenship, financial security, risk, and obligations to the state or other traditional social institutions? How might this line of inquiry better equip us to answer a wide-range of questions about the consequences of ongoing military engagements?

24/7

The epigraph to this dissertation, drawn from Viet Thanh Nguyen's (2016) study of war, memory, and identity in the context of the war between the United States and Vietnam, includes a meditation on what "a true war story" consists of. He calls us to look away from typically "good" war stories, which explicitly or implicitly affirm war as an unstoppable necessity. "Good war stories," tend to focus on the soldier and the hero or anti-heroes of war, but war reaches farther than the soldier and with much broader implications. Rather, Nguyen proposes:

> A true war story should also tell of the civilian, the refugee, the enemy, and most importantly, the war machine that encompasses them all. But when war stories deal with the mundane aspects of war, some may see them as 'boring' or simply not even about 'war.' These conventional perceptions divide the heroic soldiers who seem to be the primary agents of war from the citizens who actually make war happen and who suffer its consequences. (Nguyen 2016: 224)

In one sense, this dissertation has told stories that focus on the soldier—or more correctly, the Air Force officer—who might be part of the "good war stories" that Nguyen warns against. However, I have attempted, as much as possible, to look for all

that the "war machine" encompasses and to face the everyday infrastructures of war at stake in drone operations.

There are many kinds of war stories that need to be told in order to comprehend the consequences of war. In this dissertation, I have offered some of the stories I heard and attempted to think through their conditions and implications. There is a great deal—too much—I do not cover. There is more work to de done; as one commander of a drone operations squadron admitted to me wearily, "This mission is 24/7. No end in sight."

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