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“Identities Mediated, Worlds Calculated The Sociotechnical Imaginary of ‘Precision Warfare’ and Case Study Analysis”

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Introduction

The usage and proliferation of "drones" is now a dominant matter of interest in technological, political, moral and legal discourse in the United States. Drones, also referred to as Unmanned Aerial Systems (UAS) or Remotely Piloted Vehicles (RPV) have a long an uneven history of use and development[1]. In the first documented use of unmanned attack aircraft in the summer of 1849, Austrian forces attacking the city of Venice included the use of unmanned hot-air balloons equipped with explosives. Since their debut, unmanned aircraft have been a subject of varying amounts of interest and funding from their Austrian debut to their more recent "maturation" which has stretched from the Vietnam War time period to today. (Schwing 2007)

Within the last decade in particular, as a result of increased use in the recent and ongoing wars in Iraq and Afghanistan (formally labeled "Operation Iraqi Freedom" and "Operation Enduring Freedom", respectively), military consideration of drones seems to have shifted from underappreciated to "indispensable". (Schanz 2010) Policy papers, research reports, funding commitments, supportive infrastructure, as well as evolving military doctrine and practices and dramatic increases in flight hours all indicate that UAVs will no longer receive such uneven treatment.

As a topic of enthusiastic military and political discourse, drones have been enlisted as a symbol of innovation, precision, and the global superiority of the American military. Labeled a "game changer" by the highest levels of political and military command, UAVs or "drones" and their associated weaponry have been promised to usher in a "new era of warfare" composed of persistent robotic eyes in the sky capable of responding in real-time to developments "on the ground and delivering surgical strikes with bombs designed to avoid civilian casualties. (Connetta 2004)

President Barack Obama, in his first public admission of covert drone operations, defended drone use during an "online town hall"[2] sponsored by Youtube

[1] 1. Unmanned Aerial Vehicles or Unmanned Aerial Systems is actually the industry term for the technology, which was initially adopted by the military community. Since the emergence of controversy over the hazards posed by increasingly autonomous weaponry, and the acceptance of the informal name "drones" into the popular lexicon, (which is seen by some in the military as suggesting the lack of a pilot) the military now uses and promotes the label "remotely piloted vehicles" (RPVs). (Bumiller 2012 NYT "A day Job Waiting for...")

[2] A digital re-make of traditional town hall meetings, the "online town hall" is a platform in which political actors interact through an online forum with an internet audience. This performance is normally broadcast in through channels such as YouTube and selected online audience members are given an opportunity

2 Although channels such as YouTube and selected, online audience members are given an opportunity. A digital re-make of traditional town hall meetings, the "online town hall" is a platform in which political actors interact through an online forum with an internet audience. This performance is normally broadcast in through channels such as YouTube and selected online audience members are given an opportunity

and Google-Plus on January 30th 2012, saying:

"I want to make sure that people understand: actually, drones have not caused a huge number of civilian casualties... For the most part they have been very precise precision strikes against Al Qaeda and their affiliates." (Shane 2012)

Enthusiasm for the new technology, though still strong, is being increasingly contested. Politicians have expressed their concerns over the legality of drone bombing runs being carried out in nations in which no official "war" is being waged. These extra-judicial attacks are straining the framework of what counts as assassination- a practice prohibited by international law, re-igniting theoretical considerations of assassination and prompting lawsuits (e.g. the Al-Aulaqi v. Panetta suit filed by the American Civil Liberties Union which specifically challenges the legality of extra-judicial drone bombings). Stanley Mcchrystal, the former leader of ISAF (International Security Assistance Force) in Afghanistan now questions the efficacy of drone" strikes, which have resulted in scores of civilian casualties - attacks which serve as potent motivating tools for Taliban and other associated forces which the strikes are meant to undermine. A former security advisor on U.S. president Barack Obama's counter-terrorism group, Michael Boyle, has penned a study which claims that the use of drones is "encouraging a new arms race that will empower current and future rivals and lay the foundations for an international system that is increasingly violent". (Hopkins 2013) Roboticists and engineers involved in the development of UAVs have themselves expressed the importance of considering the long-term effects posed by the war machines. (Karlsson 2011)

Academic interest in UAVs has also boomed in response to their increasing popularity and controversy in the last ten years. Sociological treatments have focused on the "politics of verticality" expressed by drone warfare (Adey et al. 2011), the emphasis of visuality (Gregory 2011), the "precision strike" and "militant" discourse that permeates popular conversation around drones (Zehfuss 2010), as well as critiques of the morality of drone warfare (Kreps & Kagg 2011). Research within the robotics community, such as Arkin's, have worked on developing artificial intelligence programs for UAVs with the aim of creating fully autonomous "moral" UAV bombing planes that are pre-programmed with relevant and applicable Laws of War that guide their internal targeting systems, while at the same time questioning the wisdom and safety of such

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to present questions to the political host.

endeavors (Arkin 2010). Some NGO research efforts have focused on uncovering those who represent the "receiving end" of drone warfare, attempting to catalog and record the nature and extent of innocent deaths caused by drone strikes as well as criticizing the "militant" discourse for obfuscating the identities of those living and dying in the midst of wars and conflict characterized by such drone attacks. (e.g. Benjamin 2013, CIVIC 2012) Derek Gregory's (2011) geopolitical treatment of drone warfare has explored how drone attacks have had to navigate within the legal landscape offered by disputed borderlands and contested locales. Ethical treatments of drone warfare and their associated targeting practice (eg. Zehfuss 2010) have identified and critiqued the ethical motivations that underlay support for drone systems. Legal treatments such as Kreps and Kaag have claimed that UAV defenders rely on overstated technological abilities to answer the non-technical legal and political questions posed by the principles of distinction and proportionality that determine the validity of drone attacks. Concerns over domestic use of drones have led organizations including the Electric Privacy Information Center to petition the U.S. Federal Aviation Administration to respond to the privacy and civil liberty implications of opening up U.S. airspace to increased use UAVs. Early in 2012, the Electronic Frontier Foundation filed a FOIA (Freedom of Information Act) lawsuit demanding documents that detail current domestic UAV use, and successfully obtained and made public thousands of pages of information revealing already widespread use of drones within U.S. airspace (EFF 2012). Specific controversial practices attributed to drone use, such as the purposeful targeting of rescue teams and funeral gatherings were reported by the Bureau of Investigative Journalism, and expanded upon by a Stanford Law School report titled "Living Under Drones". (Stanford 2012)

Though the discourse that dominates journalist treatments of drone activity has been criticized, journalistic efforts have nevertheless revealed significant information about the drone program. Especially controversial was the New York Time's May 2012 revelation of drone targeting practices headed by the CIA that reach all the way to the desk of U.S. President Obama in the form of reviewable "kill lists", with the president offering the final decision. (Becker & Shane 2012) Of particular importance to this thesis is the LA Times' (petitioned by David Cloud) FOIA (Freedom of Information Act) request that made public a controversial drone attack's internal military investigation which was detailed in a subsequent article by David Cloud and which serves as the primary document for the case study addressed here.

This thesis builds upon the aforementioned research while analyzing how UAVs. their so-called "surgical strikes", and the related sociotechnical imaginary of "precision warfare" are actually "put to work" in the larger political context and operationally. The manner in which this sociotechnical imaginary has been expressed in broader political contexts is explored through a historical analysis that spans from the Persian Gulf War of the early 1990s through to present time. At the level of specific operations, the expression of this imaginary is approached through an extensive examination of the contents of the aforementioned NATO investigation's report - "21 February 2010 CIVCAS Incident in Uruzgan Province". This report offers a detailed account of Predator drones' sociotechnical network, which is opened up and analyzed here using STS theory – in particular, Bruno Latour's theory of "centers of calculation" and "cycle of accumulation." As a part of this center of calculation, the Predator drone is viewed as an "inscription device" that plays an important role in this network's processes of identification. Seen as a co-produced object of and form of politics, the Predator drone's reputation as an objective surveillance tool is approached critically and questioned. It is argued here that drones and their surveillance products are in fact embedded with a particular thought style and concept of observation that has been socially negotiated and a subject of historical controversy. Furthermore, drones and their surveillance work are understood as expressions of and supporters for particular concepts and standards of identity that have received criticism. The identification within this center of calculation is argued to contribute to a "regime of living" which impacts the way in which foreign populations are understood, and in doing so, influences the framing and evaluation of moral questions about how these populations ought to live.

i. Looking at These Issues Through an STS Lens

Though STS research has a history of research relevant to military technologies and the creation of "precision" in political and technological contexts (e.g. Stone 2007, Farrell, 2007, Mackenzie 1987), critical treatments of drones and drone warfare practices that embrace STS theory is scarce but appears to be growing. SCOT theory (social construction of technology) has so far been invoked by Michael Mosser (2010) as a way understanding the emergence of drone technology as a product of the "intertwined relationship between American society's embrace of technology and American military thinking". Gillespie's (2006) historical analysis of the emergence of precision-guided-munitions (PGMs) relies on a Co-Constructivist approach at least

conceptually, if not overtly.

Other investigations within the STS community, such as Mackenzie's (1987) work on the development of inter-continental ballistic missile-guidance systems, expose the political and strategic interactions with technical decisions regarding what constitutes accuracy in a system. (Rappert et al. 2007) In his research of the Fleet Ballistic Missile Program, Graham Spinardi points out:

"There are many instances of technical choices made in the Fleet Ballistic Missile Program, and good evidence of a range of political and institutional factors shaping these choices... Technology cannot, then be seen as simply an applied science, following a 'natural' pathway determined by the discovery of the real world. Even if the production of scientific knowledge were itself an unproblematic process (which it is not), it still could not be considered the sole, or probably even the most important, factor in technological change." (Spinardi 1994)

Spinardi concludes by saying that "the creation of technology and of scientific knowledge are related processes, but the relationship is by no means one-way or deterministic." (Spinardi 1994)

A "co-production" or "co-constructivist" approach has been adopted by many STS researchers observing military processes and developments. Rappert et. al. (2007) write in "Rethinking 'Secrecy' and 'Disclosure'" that:

"the STS literature eschews thinking about technologies as merely applied science or simply as artifacts... STS instead recognizes what would, ordinarily, be regarded as "social, cultural, economic, and political context' of the technology is usefully thought of as *constitutive* of technology." (2007)

STS researcher have shown that these potential futures and expectations arise in many contexts by many actors. In "The Limits of Security Governance", Theo Farrell points out that "what we expect from new military technologies is not down to science alone - political, organizational, and strategic imperatives also determine how technologies are designed, built, and used." (Farrell 2007) Referring to the development of security technologies, Bill Durodie echoes this statement, saying that "the ambition or imagination of those societies - or the lack of these - are essential influences." (Durodie 2007)

John Stone's (2006) case study of the British war tank demonstrates a scenario in which such technological ambitions and imaginaries did not hold up, in this case contributing to human casualties:

"Sometimes human aspiration exceeds the possibilities of the technology, as in the case of tank technology in the inter-war period. The ideas for tank warfare far exceeded the technological capabilities of tanks in the 1920s-1930s." (Farrell 2007)

In "Learning from Fukushima", Pfotenhauer et al. claim that "Efforts to explain what went wrong in Japan's nuclear disaster are doomed to fail if they seek to separate the social from the technological. Recognizing that all aspects of sociotechnical systems are intertwined is essential to developing wiser technology policies." (Pfotenhauer 2012) This thesis aims to contribute to the aforementioned body of STS work through a historical examination of "precision warfare" as a promoted and negotiated sociotechnical imaginary, and through an STS-informed case study analysis of an airstrike "incident" that occurred in the context of the Afghanistan War on February 21st, 2010.

ii. Structure of the Thesis:

Chapter 1, *Theories and Sensitizing Concepts,* is an introduction to important theoretical concepts that are used throughout the thesis. Sheila Jasanoff's (2009) theory of sociotechnical imaginaries is described and its relation to this research is explained. It is suggested that this theory can help to understand how the technology of Predator drones has been positioned by various actors throughout its development and use, and that these imaginaries have played an important role in the social negotiation of this technology. Lorraine Daston and Peter Galison's (2007, 2011) theoretical work on the scientific history of observation as an epistemic practice is explained as contributing an important historical and conceptual legacy to the way knowledge production processes are viewed and carried out within the sociotechnical network of drones. Ludwik Fleck's (1935) theory of thought styles is explained as offering a theoretical basis for understanding and analyzing the particular epistemic atmosphere of the military community, and that this "thought style" matters within this knowledge production process in framing how materials and transcriptions within this surveillance network are evaluated. Bruno Latour's (1987) theories of "centers of calculation" and "cycle of accumulation" are described as theoretical tools that help to understand the roles of human and nonhuman actors and how negotiation and confusion over transcribed materials and translation processes impacted the events of the case study.

Chapter 2, *Research Question and Methodology,* explains the research processes behind the writing of this thesis. The thesis is depicted as relying primarily on document analysis and grounded theory, with a particular focus on an airstrike that occurred in the

context of the Afghanistan War which serves as a case study. The primary document of analysis – a NATO investigation carried out in the wake of the case study "incident" – is described, as well as how it was eventually made available for public analysis. The nature of the document itself receives a detailed reflection, and the investigatory activities that led to its production are described. The method in which scholarly articles and media articles were obtained and analyzed is also outlined, and the extent to which these sources contribute to the thesis' analytic work is outlined.

Chapter 3, *Technology from a Social Science Perspective*, argues that technologies are a product of, and form of politics that are negotiated within broader social contexts. It is suggested that understanding this broader social environment is important to understanding the development and use of Predator drones in the American context. The theory of co-production is introduced and used to analyze the relationship between social and technological processes and products. The example of South Korean "video game politics" is first contrasted with the popular American concept of "pump politics" to show how techno-politics reflect and interact with national identities, regional concerns and broader social considerations.

Expanding on the co-productionist framework, Winner's theory of "political artifacts" is introduced and is used to understand the military aerospace industry and its products. The macro-scale actors of the aerospace space industry and the American military are then analyzed further under the co-production framework, and shown to be a part of broader "public" perceptions and social developments. This state of sociotechnical affairs is reflected upon, and literature calling for such analysis is mentioned.

In chapter 4, *Precision Warfare: A Sociotechnical History*, the current discursive landscape of "precision", "surgical strikes" is introduced. The origins of this discursive landscape is then shown to have evolved alongside the techno-political context in America during the Gulf War period of the early 1990s. The concept of socio-technical imaginaries is introduced to help understand the production of the discursive landscape that now surrounds Predator drones. The influence of the rise of televised media is presented as an actor and contributor to this discursive environment, sometimes serving as an official tool for propagating the sociotechnical imaginary of "precision strikes". The historical development and negotiation of this sociotechnical imaginary is followed from the Gulf War until the present. The technology of Predator drones is introduced and described as an embodiment of this sociotechnical legacy/imaginary.

Chapter 5, *Inventing Precision: Analysis and Origin of Precision Measurement*, opens up the blackbox of "precision". The understanding, definition, and use of "precision" in this context is described as a negotiated outcome between two epistemic communities – the American military, and the aerospace industry. The historical process of defining "precision" is shown to be uneven and internally contested, rather than following a clear or progressive trajectory. Critiques of the standards and definitions behind "precision" are presented, and the nature in which *practice* affects precision is also addressed. Finally, the importance of *perceptions* of precision, and how these perceptions might affect the reality of "precision strikes" is introduced.

In Chapter 6, *Case Study: "21 February 2010 CIVCAS Incident in Uruzgan Province*, the thesis' case study is presented and reconstructed. A brief background to the case study is offered to provide contextual understanding of the specific operation. Media and official military reactions to the event are depicted. The case study's primary source, an ISAF follow-up investigation, is explained and the process by which it was made publicly available is also addressed and reflected upon.

Chapter 7, *Reconstruction of the "21 February 2010 CIVCAS Incident" Narrative of Events,* is a reconstruction of the case study events using primary source material from the case study's own formal military investigation, including images and microphone transcripts as well as interviews, presented in narrative form. Throughout this narration, reflections and analysis is interjected using theories introduced in earlier chapters.

Chapter 8, *Analyzing the Visual*, addresses "observation" as a socially negotiated concept that is important in understanding the work of Predator drones, the perceived legitimacy of drones' activity, and their sociotechnical imaginaries. The social history of observation in the sciences is used to show how observation developed into an act of knowledge production that is deemed objective and impartial. Historical attempts to discipline or train "observers" within the sciences act as an analog to the "screeners" and other video analysts that are embedded in drone networks. The Predator drone is described as a product of a surveillance culture that is increasingly trying to make observation "mechanical" in order to remove the "human element". Drones are described as the mechanical outcome of American military attempts to organize and discipline certain "populations of concern", which are identified through measurable information units.

In Chapter 9, *Drones and the Cycle of Calculation*, drones are analyzed within Bruno Latour's concepts. The drone is understood as a "description" device that allows state

actors and interests to "act a distance" and expand the state's "embrace" of populations and render bodies "legible". This sociotechnical system represents a "center of calculation" in which inscriptions are accumulated, bodies are identified through visual standardization processes, legal judgments are made, and attacks are carried out. This "center of calculation", which is the highly touted "precision network" behind drone attacks, is shown to in fact be much more complicated. Details from the case study are used to show that this within this network there is a great deal of conflict, confusion, negotiation and cultural influences. The issues of communication, culture and observation which were pointed out in the investigation are then addressed within this framework.

In Chapter 10, *Autonomy as an Answer*, the current discursive and developmental landscape that surrounds the Predator drone is addressed. Much of the discursive activity regarding increased automation in the drone network is aimed at answering the "problems" of ethics, efficiency and emotions in the targeting process. How efficiency, ethics and emotions are framed and imagined along with the Predator drone is analyzed under previously introduced theories of co-production, sociotechnical imaginaries, and cycles of calculation.

In Chapter 11, *"Contested Imaginations and Sustained Narration"*, the author re-introduces drones as co-produced artifacts that find themselves and their attendant sociotechnical imaginations as a site of social negotiation. As a site of social negotiation, the ways in which Predator drones are the subject of social, organizational, and institutional norms and motivations is discussed. The advocacy struggle of non-governmental organizations that have attempted to influence the design and use of drones in the last two years is covered, and their methods of entering the discursive landscape of "drone policy" and their efforts to achieve legitimacy and maintain it is also analyzed. Contestations and reactions within military circles are also discussed. The official "management" of drones as a political object is analyzed by observing efforts by the State Department and governmental officials (including the current U.S. president). These "official" efforts to "stabilize" the sociotechnical imaginary and broader "narrative" of drones is seen as reflecting the significance and import of techno-politics and the deeply embedded institutional nature of Predator drones' co-production.

In the final chapter, *"Conclusions and Considerations"*, analysis from the previous chapters is presented as showcasing the Predator drone as a complex product of intertwined social and technological legacies. The prevailing sociotechnical imaginary of

drones as "clean", "objective" and "precise" is critiqued in consideration of the empirical evidence presented in earlier chapters and the events of the case study. The "black box" of the human network behind drone operations is again reviewed to show what is often hidden behind official statements of the nature of drone work. As a center of calculation, the drone is shown to reveal a social, historical, epistemic and institutional legacies that are concerned with objectivity, trained observation, the success and superiority of "acting at a distance", and the measurement and management of foreign bodies. It is then suggested that these combined legacies which find themselves expressed, renewed, and re-negotiated within the Predator drone act to support certain "forms of life" and "regimes of living" which are also hotly contested. Finally, the drone is understood as embodying methods of observation, action, and knowing – a fluid and evolving site of social negotiation. This site may act to continue already deeply embedded imaginations and forms of life normally attributed to surveillance and control technologies, or act as a social and technological catalyst in questioning and breaking down the techno-politic of surveillance from which it arose.

Chapter 1. Theories and Sensitizing Concepts

1.1 Sociotechnical Imaginaries

The theory of socio-technical imaginaries was developed in order to better analyze how non-scientific actors and institutions receive and promote certain scientific and technological projects and agendas. (Jasanoff & Kim 2009) One goal of this analytical approach is to achieve a better understanding of the relationship between political power and science and technology development. (Jasanoff & Kim 2009) In *Containing the Atom*, Jasanoff and Kim (2009) describe sociotechnical imaginaries as "collectively imagined forms of social life and social order reflected in the design and fulfilment of nation-specific scientific and/or technological projects". STS research has focused on how these imaginaries interact with research and development processes by influencing expectations, impact technological and scientific discourse, and find themselves "enacted in everyday practices." (McGrail 2010)

According to Sheila Jasanoff's Sociotechnical Imaginaries Project, these imaginaries can be observed in a number of policy contexts within the last several decades. (Harvard 2013) Examples offered by the STI Project include the imagination of

science and state in which science must be politically separate (Bush 1945), the emergence of the "free world" imaginary (Marshall 1947), nuclear power as a vision and source of peace (Eisenhower 1953), an imaginary of a more democratic engagement between 'science' and the 'public' (UK House of Lords 2000), and the United States as a nation of progress defined by science and technological progress. (Obama 2009)

This thesis explores how a specific imaginary can be witnessed in the popular discourse embedded in "precision" and "surgical" strikes and the abilities attributed to UAVs and the so-called "new warfare" that they are supposed to usher in. As the Sociotechnical Imaginaries Project points out, these "(sociotechnical) imaginaries help explain why, out of the universe of possibilities, some envisionings of scientific and social order tend to win support over others". (Harvard 2013)

Much of Jasanoff's work approaches socio-technical imaginaries as they are expressed and enacted at the national level. In a comparative analysis between the development of nuclear capacities between the United States and South Korea, Jasanoff and Kim (2009) explore how the United States encouraged an imaginary of nuclear power as a potentially risky technology requiring "containment" as opposed to the imaginary of "atoms for development" that developed in the South Korean context. The way the United States and South Korea framed their nuclear ambitions can be seen as betraying prominent social concerns and interests over risk analysis and economic development, respectively. In this thesis, the sociotechnical imaginary of "precision warfare" that develops within the United States is understood similarly through a historical analysis that follows the development of prominent social concerns over "civilian casualties" in the context of war.

In "A New Climate For Society", Jasanoff (2010) explores how the imaginary of impersonal and objective climate science is negotiated as it clashes with subjective and normative imaginations of the relationship between humans and nature. Jasanoff's research examines the consequent moral tensions that arise from this conflict. Analogically, this research uses the theory of sociotechnical imaginaries to understand and analyze a clash between an imaginary of "precision" as a technical, objective and apolitical construct and the normative imaginations of how innocent actors ought to be treated during times of armed conflict. Here, as in Jasanoff's work, the imaginary of "precision" as objective and apolitical is not taken for granted, but itself receives a thorough historical analysis that calls into question its own categorization. This research follows Jasanoff's claim that through a critique of such *a priori* categorizations, the moral

tensions that ensue from the clash of imaginaries can themselves be re-understood. (Jasanoff 2010)

In "Connecting Neuroscience and Law: Anticipatory Discourse and the Role of Sociotechnical Imaginaries", Martyn Pickersgill (2011) has analyzed how the neurolegal discourse has been influenced by particular sociotechnical imaginaries in ways that produce new conceptualizations of law, science and scientists. Through a historical analysis of the development of a "precision" discourse, this thesis offers a similar examination of the interplay between imaginaries and discourse. Rather than focusing on new visions of law, science and scientists, this thesis explores how new visions of warfare, surveillance, and bodies are produced through this interaction.

Through a historical and case study analysis, this thesis uses the theory to understand the interplay between the expectations and proclamations of the diverse interests entangled within UAV policy and development and how these imaginaries have played out in various contexts. As Jasanoff's Sociotechnical Imaginaries Project research platform points out:

"Case and controversy studies offer a potentially rich entry-point to sociotechnical imaginaries because they afford opportunities for documenting interactivity among diverse types of actors deploying varying strategies in struggles to imagine and control the future." (Harvard 2013)

In addition to analyzing sociotechnical imaginaries within a national framing, this thesis explores how the drone imaginary is created and elaborated within the military community, which has to date received little critical analysis along these lines. The question of how these imaginaries and their discourse influence actual targeting processes at the level of bombing operations seems to have so far received no explicit theoretical work. It is the aim of this thesis to explore this important gap.

In the context of this thesis, the theoretical prism of socio-technical imaginaries allows for a critical investigation of the co-evolution of UAV or "drone" technologies and the surrounding discourse that accounts for the relative expectations and social demands that are negotiated throughout the research, development, acceptance (or non-acceptance, as it may be), and the use of UAVs. Through a contextual understanding and analysis of these interconnected processes, this thesis uses the theory of sociotechnical imaginaries to understand what unfolded in the case study outlined here. This thesis seeks to understand elements of the case study "incident" as an expression of these sociotechnical imaginaries and an outcome of a peculiar sociotechnical system.

1.2 Thought Styles and Centers of Calculation

In "Imaginaries of Development: The Rockefeller Foundation and Rice Research", Elta Smith (2009) examines Rockefeller Foundation's involvement with rice research and how this research was guided by framings of problems and solutions influenced by "wider ideologies, epistemologies, and key actors and networks, with the RF at the center". In order to help understand how such wider ideologies and epistemologies influence imaginaries in the context of this thesis, Ludwik Fleck's (1935) theory of "thought styles" and the theoretical efforts of Lorraine Daston and Peter Galison (2007) are used to examine the imaginary of drones and "precision warfare" as objective and apolitical technical accomplishments.

It is important in the context of this thesis that an *a priori* assumption of drones as impersonal tools of objective observation is not taken for granted. As Ludwik Fleck (1935) argued in "Genesis and Development of a Scientific Fact", observation is always and unavoidably theory-laden. Fleck, whose own study was made in the context of medical research on syphilis, and argued that cognition within this is ultimately a social enterprise and the communal nature of knowledge production inevitably leaves its mark on the cognitive processes of all involved actor. As an aspect of cognition, observation is therefore imbued with the theoretical dispositions within its relevant community.

Fleck referred to these theoretical-observational dispositions as "thought styles". In this thesis, Ludwik Fleck's (1935) theory of "thought style" is used to understand the epistemic environment within military circles and how this knowledge-framing context impacts the sociotechnical network and imaginary of drones. The theoretical work of Lorraine Daston and Peter Galison (2007) is used to further open up the epistemic environment of this surveillance network by approaching "observation" as a socially negotiated concept that struggled for legitimacy throughout the history of the scientific tradition and now leaves its mark in the search for "trained observers." This longing for such "trained observers" and its historical background is used here to add analytic insight to the ways in which the case study investigation attempts to understand and frame conflicts within the airstrike's observational processes.

Elta Smith's (2009) research on the Rockefeller Foundation has also used the theory of sociotechnical imaginaries to understand the Rockefeller Foundation's activity as thoroughly sociopolitical. In particular, the foundation's efforts are seen as supporting and extending "particular modes of governance". (Smith 2009) In order to better

understand what is meant by "particular modes of governance" in this context, Andrew Lakoff's (2006) theory of "regimes of living" is drawn upon. Andrew Lakoff's theory of "regimes of living" is used to understand the impact of drones' sociotechnical imaginary within an already institutionalized form of global surveillance. In Lakoff's words, a "regime of living" is a "tentative and situated configuration of normative, technical, and political elements that are brought into alignment in situations that present ethical problems – that is, situations in which the question of how to live is at stake." (Lakoff 2006) By tying together political configurations and ethical concerns within the theoretical framework of sociotechnical imaginaries, the use of "regimes of living" within this thesis can be seen as a conceptual expansion upon Jasanoff's (2010) previous examining how imaginaries serve to renew moral considerations.

Lakoff's theory is used in tandem with Van der Ploeg's (2005) concept of "the informatization of the body", which she refers to as "the socio-technical production of social categories and identities through IT-mediated surveillance." (2005) These theories work together to understand the sociotechnical imaginary of drones and its attendant sociotechnical network as scaffolding a "regime of living" in which ethical questions relating to bodies are framed and dealt with through informationalized terms and standards.

It is an argument of this thesis that the sociotechnical network of drones serves as scaffolding for a "regime of living" in which bodies and their respective lives are to be mediated and manipulated through automated aerial surveillance. In order to better understand this situation, I use Latour's concept of "centers of calculation", with a special emphasis on the Predator drone as "inscription device." The support and expansion of new forms of governing that lead to these regimes of living are understood as the product of these centers of calculation. By using Bruno Latour's (1987) theory of "centers of calculation" in tandem with Lakoff's concept of "regimes of living", this thesis aims to add theoretical depth and support to the claim that sociotechnical imaginaries extend forms of governance.

Centers of calculation are "places where intermediaries holding information, VGI, data, maps, numbers, and inscriptions are brought together and organized." (Sui 2013) A center of calculation produces knowledge through the accumulation and processing of these resources. The form that these resources take, the methods in which they are accumulated/evaluated, and the actors and thought processes involved in the process are what define the center of calculation its knowledge production. In the

context of this thesis, the sociotechnical network of drones are understood as a center of calculation which is influenced by the visual nature of its representations, the epistemic atmosphere of the military community, the nature of their observational processes and particular sociotechnical imaginaries.

Theoretical work using Latour's theory of centers of calculation has so far linked the concept primarily with the rise of European imperialism and the spread of capitalism and western science. (Agnew & Livingstone 2011) Centers of calculation can be examined at various levels of scale, with existing research having used the theory to describe the knowledge work of corporations, museums, libraries, learned societies, government institutions, and more. (Agnew and Livingstone 2011) In the center of calculation observed in this thesis, the knowledge work can indeed be seen as an outcome of the legacy of European imperialism, capitalism and western science.

Chapter 2. Research Question and Methodology

What are the broader socio-technical imaginaries related to UAVs, and how do they matter in how targeting processes are understood at the level of specific attacks?

In order to approach the research question of this thesis, an analytic approach is adopted which primarily focuses on historical analysis and a detailed case study of a specific airstrike that occurred within the context of the Afghanistan War. To this end, this thesis relies primarily on document analysis. This previously classified and inaccessible account of the case study event qualifies it as a *revelatory case*. A revelatory case has been defined as one in which "an investigator has an opportunity to observe and analyze a phenomenon previously inaccessible to scientific analysis." (Yin 2003)

As a case study analysis, this thesis also treads in the analytic footsteps of Peter Galison's (2000) *An Accident of History*. As in Galison's (2000) work, this thesis takes a deeper look into an investigation that struggles to understand a tragic event through sociological and technological explanations. The primary document analyzed in this thesis is an official NATO report that came out of a military investigation conducted in the wake of the case study airstrike.

The report's title is itself noteworthy in the light of Galison's aforementioned work - "AR15-6 Investigation, 21 February 2010 CIVCAS *Incident* in Uruzgan Province." (emphasis added) The word "accident" is in fact never used to describe the attack by the investigators within the document. Aside from the accountability-diffusing nature of the

word "incident" in its title, the second most noteworthy aspect of the document that is immediately apparent is its classification - SECRET/REL FVEY[3]. Before having been made public via a FOIA request, the document itself was therefore its own "black box". The fact that it is classified as FVEY suggests that the document not only aimed to block the eyes of the "public", but also the eyes of most NATO member nations – despite all of them contributing troops to ISAF forces. As a result of journalist David Cloud's FOIA request, the investigation was unclassified and made available for public access via government-sponsored internet channels on May 28th, 2010.

The document contains the written report of an investigation led by General P. McHale along with several other interviewers. The report includes dozens of interviews with those involved in the attack on the military end of operations as well as the survivors themselves. The investigation also contains a number of timelines, pictures and graphs that aim to make as clear as possible the nature of the attack. Most names within the investigation remain blacked out, as well as a handful of references to specific technologies, procedures, and locations. In spite of some material remaining classified, the document is nevertheless a thorough account of the Feb 21st attack – incorporating the perspectives of troops "in the fight" on the ground in Uruzgan and in bases nearby in Afghanistan, as well as those actively participating from Creech Air Force Base in Nevada and Hurlburt Field in Florida, and the accounts of the survivors themselves speaking from beds in a Dutch hospital in Afghanistan.

Grounded Theory

Case studies can be understood as both theory generating and theory testing. (Bryman 2008) Accordingly, this thesis' case study investigation was analyzed and coded using grounded theory method as a means of both seeking to test relevant STS theory and generate a theoretical unerstanding from the material itself.

A qualitative research methodology developed by sociologists Glaser and Strauss (1965) through their research on patient death in hospitals, grounded theory's primary components are listed in Kathy Charmaz' (2006) *Constructing Grounded Theory*, the most important of which related to this work are the following:

- Simultaneous involvement in data collection and analysis
- Constructing analytic codes and categories from data, not from preconceived logically deduced hypotheses

[3] The acronym FVEY stands for "Five Eyes" and refers to an international intelligence sharing arrangement that exists between the United States, the United Kingdom, Australia, Canada and New Zealand.

- Using the constant comparative method, which involves making comparisons during each stage of analysis
- Sampling aimed toward theory construction, not for population representativeness (Charmaz 2006)

Within the framework of grounded theory, the case study document was coded and analyzed using the three-step process consisting of initial coding, focused coding, and axial coding. First, the investigation was coded line by line in order to obtain a provisional set of notes, reflections and initial codes from which analytic directions could be developed and for later use as a basis reflection and comparison. From the analytic guidance of these initial codes, core conceptual categories were developed during the focused stage which consisted of identifying the most frequent or significant codes that arose out of the initial stage and using them to categorize and analyze the content further. For example, interview remarks and investigator assessments focused heavily on explanations of "what went wrong" and issues of accountability, observation, target-making, and identity. These themes emerged from the focused coding process and were used to guide later literature research. In the axial coding phase, specific properties and dimensions of codes are developed. (Charmaz 2006) During this stage of coding, comments and evaluations in the investigation related to how actors viewed their relationship to targeting processes, their interaction within the sociotechnological network as well as identity determinations were coded to reflective the interactive properties of the focused codes.

Relevant scholarly research on the topic was then sought out primarily through the use of the JSTOR and SagePub academic databases, initially using the keywords "drone", "UAV", "targeting", "autonomy", "visuality", and "observation" in response to the coding work done on the case study document. Relevant scholarly articles that were found in this manner were then used as springboards to additional research vie their respective citations and bibliographies. Other scholarly articles were obtained through requesting the assistance of professors working within my research program as well as University colleagues. Some scholarly articles presented through relevant University courses were also put to use in this thesis. As a result, several articles related techno-scientific discourse of "precision weapons" and "surgical strikes" are drawn upon. Scholarly research that deal with controversies over combatants- noncombatant status determination also appears here.

Three years of New York Times articles related to drones (2010-2012) were analyzed in order to understand the broader context. The New York Times articles were accessed by obtaining a subscription and searching the newspaper's online database using the search terms "drone", "drone strike", "predator", "UAV" and "airstrike". This search process resulted in 252 New York Times' articles, which were categorized according to month of publication, printed out, and coded for emergent themes. Dozens of articles from other prominent newspapers such as TheGuardian, LATimes, Reuters, and BBC News were accessed using Google search as well as using their own archival search tools. These additional newspaper articles were used to keep track of potential developments related to the growing controversy that now surrounds drones, and to observe additional perspectives within the broader context.

Numerous policy documents related to drone development, research, budgeting, and planned operations were also reviewed for the extent to which they present or encourage specific socio-technical imaginaries related to drones. These policy documents were primarily accessed via the Google search engine using the terms "drone pdf", "drone policy pdf", "UAV pdf", "UAV policy pdf", "drone policy paper", and "UAV policy paper", and then checking the first ten pages of the corresponding Google results.

2.1 Case Study Relevance and Background:

The case study detailed in this thesis is a NATO airstrike that occurred on February 21st, 2010 in what is called the Uruzgan province of Afghanistan. At least that is one way to describe it. The "21 February 2010 CIVCAS Incident in Uruzgan Province", as it is referred to in NATO's own investigation, actually took place all over the world, to a diverse cast of characters - military and civilian characters spilled across time zones, all under the pressure of time, and all tasked to carry out this war-event: "Drone" aircraft pilots flying over Afghanistan while sitting steel boxes in Nevada, civilian "Screeners" working for a private company in Florida, military officers in multiple command centers throughout Afghanistan, and finally a group of troops on the ground.

The war in Afghanistan is regularly understood as a "counterinsurgency"[4] war. A

[4] In the 2009 *Counterinsurgency Guide*, the U.S. Government's Bureau of Political-Military Affairs describes counterinsurgency in the following manner: "Counterinsurgency (COIN) is the blend of comprehensive civilian and military efforts designed to simultaneously contain insurgency and address its root causes. Unlike conventional warfare, non-military means are often the most effective elements, with military forces playing an enabling role. COIN is an extremely complex undertaking, which demands of policy makers a detailed understanding of their own specialist field, but also a broad knowledge of a wide variety of related disciplines. COIN approaches must be adaptable and agile. Strategies will usually be

strategic paper titled "Air Power in the New Counterinsurgency Era", by Vick et al. (2011) opens by stating flatly, "often treated by Americans as an exceptional form of warfare, insurgency is anything but." In fact, "the United States was itself founded by insurgents-British colonists who rebelled against the abuses and neglect of British rule." More recently, throughout the last hundred years, U.S. forces have actively fought insurgents in Nicaragua; Haiti; the Dominican Republic; the Philippines; Vietnam; and most recently, Afghanistan and Iraq. (Vick et al 2011) This list has come to now actively include Pakistan, Somalia, Yemen, and the area known as the FATA (which includes North and South Waziristan), Georgia, and the Philippines. (Vick et al 2011). Counterinsurgency may be exceptional by way of method and materials to regular "traditional" war, but it is not exceptional in terms of its frequency. Counterinsurgency wars are the most common variety historically and they are likely to retain their popularity due to large imbalances in military power that are expected to continue.

The case study analyzed here is also especially relevant because it opens up the how discourse and terminology relate to perception and handling of the technology. It may seem banal to mention that every experience regularly affirms that what we say and hear influences what we do. In the follow-up investigation to the Feb. 21st "civilian casualty incident", the leading officer bluntly reminds an interviewee that "what we say is what we do" (AR15-6 Investigation), and indeed many interviewed officers respond with the feedback that the military lexicon is problematic and that targeting practices are hampered by the discourse and communication systems in which they are embedded.

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focused primarily on the population rather than the enemy and will seek to reinforce the legitimacy of the affected government while reducing insurgent influence.“ (2009)

Chapter 3. Technology from a Social Science Perspective

"Science and technology operate, in short, as *political* agents."
Shiela Jasanoff, 2004

This chapter argues that technologies are a product and form of politics. Furthermore, it is argued that technologies often bear traces of their political legacy and as such they become contributors to the political environment as they act upon this environment. Technologies do this by serving to sustain certain political modes of expression through their own materiality and latent or overt political agency. This materiality and political agency of technologies is expressed through their incorporation and use, which is negotiated in social environments. In this way, technologies are themselves sociopolitical actors that shape and are shaped by the broader social worlds in which they exist. The theory of co-production is introduced and used to analyze the relationship between social and technological processes and products, drawing examples from commercial and military spheres.

Technology is political. "Artifacts have politics", as STS scholar Langdon Winner puts it. What does it mean for technology to be "political"? Consider the humble automobile. All cars are built to drive within certain agreed-upon speed limits, bear specific dimensions and weight distributions to address social worries about safety and risk, physical requirements to meet pollution or energy standards - many of which are legally required in response to a number of sometimes opposing societal concerns and considerations. An automobile, though a thing and not a person, nevertheless has a apparent politic and lives its own sort of life in that environment. The political life of a car involves emissions tests, product recalls, repairs, and more to keep it "in line" with the social demands that inform a car's life-network. Automobiles are "kept in line" in ways that are a reflection of broad and specific demands arising from societies and users - laws, standards, regulations and behavior requirements (e.g. laws that prohibit cell phone use by drivers). The attitudes and interests behind SUVs and SMART cars are built-in to their experience, design, and functionality. Part of what supposedly makes a SMART car so smart is that it aims for an expression of political intelligence in an apparently "dumb" political environment.

It may have been barely imaginable in the internet-free world of 30 years ago that

in the year 2013, South Korean politicians would introduce legislation aiming to place "online video gaming" within the same regulatory category of alcohol, gambling, and drugs. The explosive growth of internet infrastructure, online service providers, and desktop computers have all contributed to a video game industry that has long surpassed Hollywood in terms of revenue. However, the story of the "rise of online video gaming" (in South Korea and elsewhere) is more than a tale of emerging and expanding markets generated in response to innovations being thrusted upon bored and unsuspecting populations.

In a nation like South Korea, video games provide not only an economic powerhouse but also "threaten" socio-cultural impact of the historically dominant sources of art, music, literature, and (more recently) film. Social conceptions of interactivity, learning, and even "play" itself have undergone vigorous contention alongside the advent and rise of games presented on video screens. In South Korea, there is an open politic of gaming, with administrations labeled as being more or less friendly to the immensely popular and diverse pastimes that collectively fall under the mundane category of "video" games.

The phrase "Politics at the pump" is popular in the American context, and is an expansion on the concept that artifacts have politics. "Politics at the pump" is a phrase that captures the connection between certain products (in this example, gasoline) and the political networks they are embedded in.

A co-production approach towards the development of politics and technology is expressed in some military literature related to "airpower" and its products. A report from the Air Force Research Institute makes the claim that "Airpower has never been driven forward by a strategic and militarily mindless technological momentum. Ideas, theory, and doctrine have always been in the cockpit (whether or not the aerial vehicle was ready to fly)" (Gray 2009) In other words, planes are equipped with politics long before they are equipped with a pilot. Planes and politics are *co*-produced.

The legendary Prussian strategist Carl von Clausewitz famously remarked that war is "politics by other means." A co-production framework helps us recognize that technology is also "politics by other means". For the analyst this means that a thorough story of the history and use of a technology is necessarily a political one. As co-production theory points out, the development of technologies occurs alongside the development and management of social networks, ideologies, and institutions.

This connection between the "political" or the "social" and the "technological" is

can be witnessed through the activities of the actors involved. As Rappert et al.'s research points out, "weapons systems developers often have to spend as much time constructing and maintaining their relationship to human actors (politicians, industrialists, senior officers, the multifarious forms of 'bureaucratic politics') as they do forging physical artifacts." (cited in Rappert et. al. 2007)

The entanglement of the "social" and the "technological" is evident beyond research and development processes - the same can be said of the technology that is bought and rules the day. Military strategist Colin Gray describes the relationship between "the social" on "the technological":

> "The airpower that we buy is the result of ongoing negotiation among many stakeholders, civilian and military. It expresses the balance of political power within the policy-budgetary process, the public political mood vis-á-vis security, the state of the art in weapons and other technologies relevant to airpower, and, last but not always least, systems of belief about air tactics, operations, and strategy" (Gray 2009)

3.1 Aerospace and the American Military context

"The dynamics of politics and power, like those of culture seem impossible to tease apart from the broad currents of scientific and technological change."
Shiela Jasanoff, 2004

"New weapons, it would seem, are less the product of technological forces than they are of institutional and socio-political factors."
Sapolsky, 1977

In "The Promise and the Peril: The Social Construction of American Military Technology", political scientist Michael Mosser reminds us to look at social contexts and societal perceptions behind military technology when trying to understand why the U.S. is currently "enamored with conducting counterinsurgency campaigns with technology" (Mosser 2010).

Mosser suggests we take a co-productionist approach. The first step in this framing is to see ourselves reflected in the technology around us. After all, it isn't there by accident. It surrounds us because we, for various reasons, collectively decided in one way or another to develop it, buy it, and put it to use. Technologies arise out of unique social networks that have a broad array of desires and concerns. "Technology cannot be separated from the society that employs it," as Mosser says. The American military it itself one such society, and that the "social meaning" of the technology employed by the military has consequences. This "social meaning", according to Mosser, "is as important as its tactical, operational or strategic function." (Mosser 2010)

It is a topic of much scholarship that technological "advances" may entail

significant social change. It appears to be universally accepted that global economies have been forever changed by networked computers and internet commerce. Social relations have also evolved dramatically alongside new forms of social networking presented by popular internet communication systems like Facebook, Skype, Twitter, and e-mail. The simple and enduring concept behind "free time" seems to have been altered radically by the invention and absorption of cell phones and hasn't meant the same thing since.

In the words of STS scholar Donald Mackenzie (1998), technologies "are not neutral servants of whatever social or political order chooses to adopt them. Their adoption and operation often involves changes to that order." (pg. 14) These changes are not necessarily inevitable or an automatic consequence of new technology - these changes are a product of social and technological interplay and negotiation that often involves a degree of conflict and resistance. (Mackenzie, 1998)

Changes in the order of war, brought out by technology and its' commercial and military embrace - especially the technologies associated with networking, precision guidance, and unmanned aerial vehicles - has been exciting the military community for the last twenty years. A sea of literature refers to our recent past and present era as undergoing a "revolution" in the affairs of the military alongside these technologies. Increasingly, they are expressing concerns that specific contemporary technologies carry unique risks or demand changes to the military hierarchy that may not necessarily be an improvement (Beier 2003,. The emerging controversy over the use of "drones" in international conflict and their sudden proliferation seems to be attracting more and more popular interest and media coverage.

Some researchers within the robotics community working on the now - controversial "drone" technologies have explicitly called out for a reflexive examination of the implications of their work. Some have recommended that the American "public" ought to take a step back and look at the 'big picture' behind remote-control warfare. The University of Virginia roboticist Ronald Arkin advises against "rush(ing) headlong into the design, development, and deployment of these systems without thoroughly examining their consequences on all parties: friendly forces, enemy combatants, civilians, and society in general." (Arkin 2011)

Chapter 4. "Precision" Warfare: A Sociotechnical History

"We should always be skeptical when so-called experts suggest that all a particular crisis calls for is a little surgical bombing or a limited attack. When the "surgery" is over and the desired result is not obtained, a new set of experts then comes forward with talk of just a little escalation – more bombs, more men and women, more force. History has not been kind to this kind of war-making."
- General Colin Powell, 1992 (cited in Moses 2007)

"What we basically say is that if worse comes to worst, there should be a readiness and an ability to launch a surgical operation… the Pentagon prepared quite sophisticated, fine, extremely fine, scalpels,"
Israeli Defense Minister Ehud Barak, January 2013 (speaking about a possible attack against Iranian nuclear plants)

Technologies entail change, and the "social meaning" of technologies are part of this process. This section explores the "social meaning" of PGMs and UAVs - their emergence, maintenance and socio-political effect. This chapter argues that a PGMS (precision guided missiles) offer a valuable example of technological and social interplay in recent history. Furthermore, it is argued that social and historical associations with specific technologies have an impact, and that perceptions about technology - accurate or not - have lasting currency. These social associations and perceptions are detailed through a historical analysis that follows the institutional and media portrayal of PGMs from the Gulf War onwards to the development of the Predator drone. In doing so, this chapter aims to track the emergence of a sociotechnical imaginary of "precision warfare", pointing out the actors who played an active part in its formation, and how this imaginary impacted the foreign policy politics and the development of unmanned aerial vehicles.

Imminent death by explosive attack - a living reality for some - is difficult to imagine; let alone write or talk about it. Nevertheless, we do. The ways we talk about bombs and the "nature" of war are a window into our imaginations about them. What we think bombs accomplish is largely influenced by what is said about them and the "technical" qualities they appear to possess. Consider the quotations above - what are we to think after hearing such claims? How do we come to picture what war and bombings "look" like? What's going on here?

4.1 The Birth of "Precision Politics": The 1991 Persian Gulf War

"As a general proposition…I want to make sure that people understand that actually, drones have not

caused a huge number of civilian casualties. For the most part they have been precise, precision strikes against al-Qaeda and their affiliates and we are very careful in terms of how it's been applied."
U.S. President Barack Obama, January 2012

According to historian Paul Gillespie, "nothing has revolutionized modern warfare in quite the same way as precision guidance". The Persian Gulf War in particular is seen as a turning point in the nature of modern warfare in two important regards - the way it was carried out abroad, and the way it was presented, witnessed and talked about domestically in the United States (Dunlap 1999). The Persian Gulf War is attributed with bringing both "smart bombs" and "collateral damage" into the popular lexicon - developments that have had lasting political consequences. (Beier 2003) This shift in discussing war occurred alongside a shift in how the war was covered:

"So thorough was the control of media access to the 'battlefield' that, to the extent that any glimpses of combat operations could be had, there was a near-total reliance on the release of video by the US military. The result was that the West's perspective on the war was largely the perspective of the weapons themselves: 'bomb's-eye views' made possible by cameras built into precision guided munitions (PGMs). From this unprecedented vantage point, we watched as Tomahawk cruise missiles launched from ships and submarines in the Gulf slammed into targets hundreds of miles away; we became accustomed to seeing Iraqi forces behind the dim green crosshairs of night-vision gun sights; we marveled at the demonstrated ability to deliver laser-guided bombs through vulnerable openings in bunkers and, perhaps most famously, down the open ventilation shaft of the headquarters of the Iraqi Air Force.. *(Beier 2003)*

Many techno-scientific nations are marked by the fact that media networks (for the first time, through their speed and pervasiveness) provide an initial and coordinated response to political crises rather than family, community, or government. (Der Derian 2004) The apparent power of the global media's capacity to inflame popular sensitivity to the casualties of war (the so-called "CNN Effect") has been the subject of thorough discussion and research in the defense community. (Conetta 2004) Consider a commonly referenced consequence of this context:

"Ironically, Iraqi—not American—casualties came closest to halting the war. Even though the Al Firdos command and control bunker seemed a justifiable military target, media revelations that its bombing on February 13, 1991 resulted in four hundred civilian deaths generated a strong international reaction that shut down the bombing campaign against Baghdad for ten days." (Gillespie 2001)

The Gulf War historian goes on to suggest that the American public "had become so accustomed to the pinpoint accuracy made possible by precision guided weapons that they balked at the first hint of civilian casualties."(Gillespie 2001)

It seems the present day discourse is largely the product of an increasingly "casualty-conscious" social atmosphere that has come to rely on "technical" solutions to social problems. According to Beier, the result is a social and technological expectation in which warfare ought to consist of "surgical strikes" that would exclusively target and destroy enemy targets and installations while leaving civilians and civilian structures unharmed. (Beier 2003)

4.2 "Politics of Precision" Following the Gulf War

"A disproportionate emphasis on the astounding capabilities of new military hardware has come at the expense of the socio-political consequences of the transformation of warfare presently underway."
Beier, 2003

Following the Persian Gulf War in 1991, military operations had to struggle in light of this new social and technical imagination of what warfare ought to look like. The idea of carrying out policy via cruise missiles throughout the "small wars" of Bill Clinton's presidency was shaped by doctrine which was largely a reflection of these new expectations.

Politically, "cruise missile diplomacy" had its detractors. In a 1999 floor speech, Republican Senator Frank Murkowski criticized "President Clinton's propensity to fire off cruise missiles apparently on a whim." Conservative talk-radio host Rush Limbaugh and others pointedly contrasted the large number of cruise missile attacks by the Clinton administration with the significantly smaller number under the Bush administration during the Persian Gulf War. Additionally, "peace activists, including some surgeons, particularly objected to the military's use of the term "surgical" to describe air raids, and its implied equation of destruction with healing." A navy officer at the time offered briskly; "Surgeons heal people; warriors kill them. Anyone who can't stomach that basic truth shouldn't play with weapons." (Gillespie 2007)

4.3 Precision Enters New Proving Grounds: Afghanistan and Iraq

"In the end, Clausewitz is right - war and politics are inseparable. Because airpower offers leaders options with reduced political risk, it will continue to be the instrument of choice in matters of coercion, deterrence, and war."
Wills, 2006

In spite of assorted criticisms, it seems that the promise and appeal of "surgical

warfare" and its attendant sociotechnical expectations have lived on. In fact, they have not simply lived on - they appear to have matured into the singly dominant concepts in which warfare is now understood, legitimized, and judged. Technical advances in laser and GPS guidance systems, aerial platforms, and networked connectivity leading up to the turn of the millennium have nurtured and expanded upon these expectations. By the year 2000, promises were given of a "new warfare" which would be "unlike any we have seen in the history of warfare, with breathtaking precision, almost eye-watering speed, persistence, agility, and lethality." (Conneta 2004)

In 2001, Afghanistan was invaded and media treatments of the war's beginning painted it as fulfilling the promises and expectations that had matured out of the Gulf and Kosovo Wars during the 1990s.

Media research by Carl Connetta provides a glimpse of the discursive environment:

> The Afghan war was a "bulls-eye war" (Washington Post, 12/02/01), a "finely-tuned war" (Christian Science Monitor, 11/21/01), and a "new low-risk war" (NYT, 12/29/01), characterized by "pinpoint air power" (NYT, 12/24/01), "pinpoint bombing" (Washington Post, 12/02/01), and "information-heavy combat weapons" (Boston Globe, 11/26/01) that were "precise at hitting targets" (Knight Ridder, 10/09/01) and "built to swiftly find and destroy" (Los Angeles Times, 10/03/01) an elusive foe. The US media verdict was virtually unanimous: "Technology brings new style of warfare" (Baltimore Sun, 12/17/01), "War in Afghanistan demonstrates air power's new ability" (Associated Press, 12/19/01), "Pinpoint Air Power Comes of Age in New War" (NYT, 12/24/01), and "High-tech US Arsenal Proves its Worth" (Boston Globe, 12/09/01).
> (2004)

4.4 Precision Finds a 21st Century Persona: The Predator Drone

"No modern UAV has captured the public's attention as much as the MQ-1 Predator."
Schwing, 2012

Increasingly, the face of this new form of "surgically precise", "pin-point" warfare is the Unmanned Aerial Vehicle, including the most popular and recognizable "Predator" model, commonly called "drones".

The "physical embodiment" of the networked nature of modern warfare, drones offer a new platform for carrying out warfare operations that is considered "the only game in town", in the words of U.S. Defense Secretary Leon Panetta. (Benson 2009)

New surveillance capabilities, the ability to remain in the air for extended periods, and removal of risk to pilots are credited as the defining characteristics of drones. Army Generals referring to new drone models have gone so far as to claim that military

technology has made a "100-year war-fighting leap ahead with MQ-1 Predator, MQ-9 Reaper, and Global Hawk." (Dunlap 2008) Advocates of the new technology are legion, with Former Chairman of the U.S. Joint Chiefs of Staff saying that "there are those who see the F-35 Joint Strike Fighter as the last manned fighter. I'm one that's inclined to believe that."(Kreps, Kaag 2012)

The social and technical expectations that call for increased precision and discrimination in targeting are always negotiating whatever the current technological context is. These attitudes and expectations are not just simply *applied* to whatever current technologies are in the spotlight; they are also in part a reaction and response to the technological environment. As Shaw puts it, "once precision is possible, it becomes politically imperative." (Shaw 2005)

Imaginations of "precise", "surgical" warfare seem to have "created pressure to be good by removing a possible excuse for being bad." (qtd in Zehfuss) These sociotechnical imaginations live in a context shaped by discussion, the impact of historical memory, and the "things themselves" within the technological environment.

Chapter 5: Inventing Precision: Analysis and Origin of Precision Measurement

5.1 Breaking Open the Black Box of Precision

"Is precision three-meter accuracy, or ten-meter, . . . or is that accurate?""
Sine 2006

This chapter opens the "black box" of precision through a detailed account of the actors and thought processes that culminate in the determination of the measurement known as "circular error probable", or CEP – the standard by which all bombs' accuracy are now standardized and evaluated. This chapter argues that this measurement is more a product of politics than technical innovation or advancement. Furthermore, it is argued here that CEP does not serve as a particularly helpful measure of a bomb's accuracy because it is a measurement that does not remain stable – it is subject to change at any moment depending on how a bomb is actually used. Lastly, the extent to which a bombs' CEP and its designation as "precise" actually reflects popular imaginaries about "precision warfare" is critically analyzed and questioned. These arguments are supported by scholarly research that have criticized the "precision" designation and CEP measurement as appropriate tools in evaluating and explaining a bombs' capacity, and by exposing confusion over this theme within the military community.

In a paper reflecting on "accuracy" in the military lexicon, Air Force Pilot Nick Sine recalls a recent experience:

"during a recent Pentagon discussion of weapons programs and future requirements, an Air Force flag officer asked for clarification of the term *precision weapon*. The question was: "Is *precision* three-meter accuracy, or ten-meter, . . . or is that a*ccurate*?""(Sine 2006)

Sine goes on to say that this specific question led to a lengthy debate that apparently was "never resolved but did draw attention, not only to the confusion generated by the current use of the term, but also its inadequacy in light of emerging technologies."(Sine 2006)

As it turns out, confusion over the definition of "precision" and concern that emerging technologies have complicated the situation further is the outcome of many influences - shifting trends in public conversation, a contestable measurement, a Boeing

product manual, shifting standards, and evolving military doctrine and tactics.

Sine makes the claim that "conventional wisdom considers a weapon “precise” if it possesses the capability to guide to a specific aim point." What this means is that in the military understanding, precision is simply a relative measure of something's capability to "hit the mark". Limiting an understanding of precision in this way however ignores the impact of a significant variable in assessing precision - explosive power. This narrow conceptual framework of precision allows for and supports the paradox that that a 16,000 kg bomb that produces a nuclear-style mushroom cloud can be deemed "precise". Bombs capable of exploding shrapnel *hundreds* of meters such as the frequently used JDAM missiles, are nevertheless designated as having a "precision" capability of only *ten* meters. The problematic nature of labeling such bombs "precise" often gets overlooked.

5.2 CEP: the what

Generally, considerations of missile precision are expressed using the measurement known as Circular Error Probable (CEP).The CEP of a weapon describes its ability to fall within a certain radius at least 50 percent of the time: (Zehfuss 2010) This means that a missile with a CEP of 5 meters will land within a 5 meter radius of its aim-point half of the time. The other 50 percent of the time, the missile will land somewhere even farther from the aim-point. These 50 percent of "misses" are likely to explode nonetheless and cause a similar amount of damage, but they are unaccounted for in determining this form of precision measurement. Methodologically, CEP research is founded on descriptions of missile behavior only in controlled tests, and CEP measurements are not subject to amend by battlefield experiences. (Zehfuss 2010)

Frequently fired JDAM missiles bearing a CEP of ten meters are therefore exploded to explode within ten meters of their aim-point - half of the time. This scenario may already seem unworthy of the judgment "precise" (especially when one considers the added distance achieved by exploding shrapnel), but it is an incomplete picture. It is an unfinished description of "precision" in this context, because a CEP says nothing about *how* a missile is fired, yet another important variable that makes conceptual framework behind "precision" even more problematic.

5.3 CEP: the how

A CEP that describes a missile's ability to fall somewhere does not say anything about *how* it is used, or even *who* or *what* is offering the missile with its coordinates - and

these are all significant factors that affect a bomb's accuracy when it is actually fired in conflict. The method of tracing satellite phone activity using GPS and then using the GPS information to guide a missile makes this clear. In both the Iraq and Afghanistan War it has been the case that a telephone was ultimately the only properly identified aspect in the target of a missile strike - the identity of the person carrying the actual telephone was not known.(Gregory 2012) What happens in such a case is that a "precise" missiles' CEP (usually between 5-10 meters) has become even more irrelevant through the process of aiming at a phone signal through GPS - a process that is only accurate within *100 meters*. (Zehfuss)

5.4 What is Hidden by "Precision"

In light of airpower's history of indiscriminate bombing runs in the first and second World Wars, the technological leap in accuracy that modern missiles provide is undoubtedly precise in comparison. In plain speaking, however, and as modern expectations have it, PGMs are not nearly as "precise" as they are described. An object that misses its target by over 30 feet a full 50 percent of the time seems highly imprecise in just about *any* situation - let alone one that involves bombs capable of sending shrapnel hundreds of yards further.

Seemingly taking the exaggeration further and calling bombing runs "surgical" and referring to these bombs as "scalpels" is problematic - to say the least. For my own part, it seems practically laughable, tragic, and apparently dishonest. Referring to a bomb such as the 16 ton Massive Ordnance Penetrator as a "scalpel" and labeling an MOP bombing run on a nuclear site that would spew out radiation for kilometers as "surgical" is something I leave for you to judge.

The media, academic, institutional and everyday discussions over bombs that focus on precision often overlook an always-relevant factor in the equation - explosive power. Perhaps this is because is because many of us have experience with targeting but not with large explosions, or perhaps it is simply easier or more comfortable for many of us to imagine and speak about bombs' accuracy rather than their explosions. Whatever the case, the bombs that are being aimed ("precise" or not) are also exploding powerfully. If a bomb is capable of sending shrapnel 200 meters, would *any* level of accuracy really make it "precise"? What about so-called "cluster bombs", which spread out into small bomblets that across acres of land often lay dormant and explode unpredictably in the future? Despite the fact that cluster bombs spread out and don't explode immediately

after landing (essentially becoming landmines), they are nevertheless labeled "precise".

The case today is that "precision", as it functions in popular and professional discourse, is a (highly problematic) judgment of a bomb's ability to fall somewhere (some of the time). "Precision" in the military lexicon and language of popular discourse is not a judgment or prediction about a bomb's relative explosive capacity - it is in no way related to those things surrounded by the bomb in its final moments and what happens to them. Once the bomb hits, precision is no longer a part of the "precision" assessment equation.

Intuitively, a discussion that allows for even a nuclear bomb to be called "precise" seems to be problematic, if not absurd. On the other hand, this is not completely unusual. One reason mentioned above is that today's weapons are indeed relatively precise when compared to the bombing campaigns of WWII and Vietnam. The other reason is that in a logic and lexicon that views and speaks about bombs in the abstract as falling onto "points", this language is its natural outcome.

This is a problem though for empirical assessments because bombs in fact explode in ways that are often difficult to predict. In certain times, structures surrounding an explosive impact (e.g. a building) can have an absorbing effect on a bomb's force. In other times, they might collapse - exaggerating and expanding upon the bomb's immediate destructive effects.

Military theorists have recognized the contradiction in "precision" assessments that do not account for bombs' destructive power, often in light of a strategic theory that seeks to understand operations in terms of effect (Effect Based Operations, or EBO). One air force research paper proposes that "a *precision weapon* be defined as a tactical capability providing measurable and quantifiable first-order effects and minimal unintended or undesirable effects. The intent is to focus specifically on the preciseness *of the effect the weapon achieves* and not the precision *that relates to its guidance-system accuracy." (Sine 2006)* This framing, however, has not yet become adopted by the military community and is not likely to be in the future, in part due to the fact that destructive capacity and unintended or undesirable effects are both largely contingent on highly unpredictable and always-changing battlefield conditions.

5.5 The Power behind "Precision"

The unpredictability of what a bomb's inherent "destructive power" actually amounts to in the real world and the attendant consequences of its use are made more clear if we consider the most frequently used bombs. A commonly used 500lb precision

missile that promises a CEP of *5 meters* (landing within 5 meters, half the time) also promises destruction, damage, death or harm to just about everything within *20 meters* of its impact "point". (Conetta 2004) Commonly used GPS-guided JDAM missiles in the 2000 lb. range with a CEP of *10 meters* exhibit an expectedly larger destructive force; "the probability of incapacitating injury to unprotected troops within *100 meters* of a 2000-pound bomb blast in the open is 83 percent; for those between *100 and 200 meters* it is 55 percent."78 (Conetta 2004) These examples further make clear that the measure of CEP discounts an important understanding of what "precision" amounts to in the real world and the way we talk about it.

With all of this in mind, it is no surprise that even the pilots who use "precision munitions" have a hard time talking about "precision" is, really.

The question asked by the flag officer detailed above, "Is *precision* three-meter accuracy, or ten-meter, . . . or is that a*ccurate*?", refers to the additionally complicating Air Force practice of commonly referring to weapons with a CEP of 3 as "precise" and weapons with a CEP of 10 meters as "accurate". Sine makes it clear that "these are not, however, official USAF definitions" and that they actually come from the bomb manufacturer's product manual and operational requirement documents. It is in bomb-producer Boeing which uses the terms "precise" and "accurate" to describe the capabilities of its two JDAM missile guidance-kit variants. (2006) In other words, the legacy of these terms is a result of a commonly referred-to operational manual and some clever branding on Boeing's behalf. For those skeptical of Boeing's claims, the manufacturer cites it's own study, the "Precision Strike Capability/JDAM PIP Accuracy Requirements Study", which "support the 3 meter and 13 meter CEP for the *precision* and *accurate* guidance kits, respectively" (Sine 2006)

5.6 Problems in the Press and in Practice

Complicating matters further is that in media reports and public military pronouncements, *all* munitions guided by either laser or GPS are referred to as "precision-guided munitions", regardless of their "given" CEP or what turns out to be their "actual" CEP as a result of common methods such as the GPS-phone-signal-targeting method or other variables that skew accuracy significantly. Even within military circles the designation of "precision" has taken a historical step backwards:

'just a few years ago military professionals would not have described most of the

guided weapons used in the Iraq war (bearing CEPs of 5-10 meters) as “precision” instruments, reserving this adjective instead for systems with a CEP of 3 meters or less’ (Conetta, 2004: 26).

The overall atmosphere of discussions about "precision weapons" and attendant assumptions, expectations, and imaginations of people in general is not lost on the people who are ordered to use them. To quote Lieutenant General Michael C. Short, the overall air commander of Allied Force, “Our politicians need to understand that (aerial bombing) isn’t going to be clean. There is going to be collateral damage. There will be unintended civilian casualties."(Gillespie)

Historically, many conflicts described as "precision warfare" have largely employed bombs that do not even fall under the problematically broad heading of "precision guided munitions". Using the recent Iraq War as an example, Conetta points out:

Guided-weapons constituted about 68 percent of the total air-delivered munitions used in Iraq. Among these weapons CEPs ranged between 3 and 15 meters, with the mean being approximately 8 meters or 25 feet. This is sufficiently inaccurate to guarantee that a significant percentage of weapons aimed at the center of a building will land in the street -- or in the building next door. Regarding cluster bombs: these can be delivered by guided or unguided means; either way, when they arrive at their destination, they act as relatively-indiscriminate “area weapons,” spreading hundreds of sub-munitions over a 20-acre swath of land. And, although their delivery may be guided, they remain distinctly imprecise in the time dimension: five to 10 percent of their constituent bomblets fail to detonate, thus inadvertently (but predictably) becoming land mines that lie in wait for future victims." (2004)

5.7 Precisely as Described?

It seems clear that public concerns "precision bombing" and expectations of limited innocent deaths are improperly addressed by the terminology surrounding "precision warfare" and its reality. As Zehfuss points out, whatever imaginations of "precision warfare" might be, they should acknowledge that "the ability to destroy precise targets with efficiency and from a great distance does *not* equate to the ability not to destroy, or even protect, the surrounding area." Military estimations of "safe distances" can help to shed some light here. For commonly used 500 and 2000 pound bombs typically designated with a *CEP* between 5 and 10 meters, the "safe distance" for

unprotected soldiers is generally set at approximately 500 and 1000 meters. This is for good reason - the military's own research indicates that the probability of 'incapacitating injury" to troops within 100 meters of a 2000 pound bomb blast in open areas is 83 percent. For troops farther away, between 100-200 meters, the risk of such injury is still 55 percent. (Conetta 2004)

In the words of PGM historian, "air power is, at bottom, a blunt instrument designed to break things and kill people in pursuit of clear and militarily achievable objectives on the ground."(Gillespie) The belief that a highly destructive blunt instrument can be capable of surgical may indeed represent "a singular triumph in branding", as Connetta suggests.

In light of this, it seems that many claims of modern bombs being designed to "prevent civilian casualties" are untenable, not to mention that such claims go against the claims offered by those who design and create these bombs. Consider the commonly used Hellfire missile, one of the smallest and most accurate missiles (weighing only 100lbs, with a CEP of 3 meters) and which presently is most often employed against "soft targets" (i.e. un-armored people). The Hellfire missile's product description says nothing about it being designed to "prevent civilian casualties", but it does mention that it is designed to destroy tanks. Despite the intentions behind the Hellfire missile's design as an anti-tank missile, thousands have been used in the ongoing Afghanistan War - not against thickly armored tanks, but against groups of admittedly "soft targets".

5.8 The Power of Perception

It is worth mentioning that the munitions used by the US Air Force which dominate modern battle contexts are much more accurate than they have been in the past. Nevertheless, current socio-technical imaginations of a "new warfare" distinguished by "surgical strikes", "pin-point precision" alongside expectations of discriminate destruction and civilian safety remain popular. In fact, the socio-technical imaginations of "precision" that have significantly impacted the media and military discourse as well as broader political reactions and policy choices also have an effect that is observable in individual attack operations and the pilots who conduct them - and not just when they are having round table discussions about the inadequacy of military terms.

In other words, these broader socio-technical imaginations (regardless of how ultimately problematic they are) can find their way into specific targeting operations in ways that end up surprising attack pilots at the tactical level, with adverse effects, as

evidenced by the February 21st case study further explored in the following section.

Chapter 6. Case Study: "21 February 2010 CIVCAS Incident in Uruzgan Province"

"Technologies do not merely assist in everyday lives, they are also powerful forces acting to reshape human activities and their meanings."
Bijker 2009

On February 22nd, 2010, ISAF commander Gen. Stanley McChrystal was in a rush to arrive in Afghanistan - but not with the intention of commanding soldiers. General McChrystal was there to offer an apology. (Vogt) The day before, an air strike in the Uruzgan province attacked what turned out to be a convoy of civilians. Three missiles were fired in total - one aimed at each of the convoy's three vehicles, in addition to a burst of small rockets. In spite of one missile having missed its target by over five meters, the result was devastating and the majority of the passengers were killed outright.

The attack resulted in significant media attention, with headlines including "NATO Airstrike Kills Afghan Civilians" (NYT), "Afghan Ministers voice anger as civilians killed in NATO air strike"(Reuters), and "Afghanistan condemns deadly Nato air strike in Uruzgan"(BBC). The high civilian death toll prompted David Cloud of the LA Times to file a FOIA (Freedom of Information Act) request seeking to make NATO's own post-action follow up investigation available to the public.

It may be significant that this airstrike also has a local analogy for local Afghans who may recall a similarly disastrous attack in the same province eight years earlier in the war in 2002, in which an air strike on a wedding party left 48 Afghans dead. (Wood 2010)

It was the kind of event that General McChrystal had been openly dreading. A few months earlier, McChrystal had issued a new "tactical directive" to NATO coalition troops and stressed its implementation across all levels of command. The new directive was a response to mounting casualties in 2009 which had resulted in international condemnation, and prompted former Defense Secretary Robert Gates to admit that civilian deaths were causing "enormous harm" and "we have got to do better" (Wood 2010). McChrystal's tactical directive was aimed at limiting the use of Close Air Support (CAS) strikes exactly like this one.

McChrystal wrote:

I expect leaders at all levels to scrutinize and limit the use of force like close air support (CAS) against residential compounds and other locations likely to produce civilian casualties in accordance with this guidance. Commanders must weigh the gain of using CAS against the cost of civilian casualties, which in the long run make mission success more difficult and turn the Afghan people against us.

I cannot prescribe the appropriate use of force for every condition that a complex battlefield will produce, so I expect our force to internalize and operate in accordance with my intent. Following this intent requires a cultural shift within our forces – and complete understanding at every level – down to the most junior soldiers. I expect leaders to ensure this is clearly communicated and continually reinforced.

McChrystal stressed to his NATO troops, that the "loss of popular support" was the "decisive" element in the war. (Wood 2010) In the context of the Afghanistan war, errant strikes have emerged as valuable propaganda material and strong talking point of Taliban operations and have repeatedly earned public condemnation from Afghanistan president Harmid Karzai.

In fact, the general showed up just after Afghan president Karzai's council of ministers had publicly denounced the attack as "unjustifiable". (Boone 2010) McChrystal had insisted on the new directive limiting such airstrikes partly with the hope of avoiding apologies like this one. Standing before television cameras in a conference room in Kabul, the general delivered a speech that was translated into local Afghan dialects and uploaded to Youtube for "public" consumption. It contained both an expression of regret, and a promise.[5]

After delivering the speech, McChrystal ordered a thorough internal investigation of the events that surrounded the attack.

The investigation, resulting in a report titled "*AR15-6 21 Feb. 2010 CIVCAS Incident in Uruzgan Province*", began the following day and was led by general P. McHale over the following months. Nearly a year later, Los Angeles Times journalist David S. Cloud sought a copy of the investigation by filing a Freedom of Information Act (FOIA) request.

The LA Times' request was granted, and the investigation was unclassified and

[5] "The Great People of Afghanistan, Salam Alaikum. Sunday morning, the International Security Assistance Force, while conducting a mission with Afghan Security Forces, launched an attack against what we believed to be a group of insurgents in Kotal Chawzar, in Southern Afghanistan. We now believe the attack killed and injured a number of Afghan citizens. I have spoken with President Karzai and apologized to him and the Afghan people. I have instituted a thorough investigation to prevent this from happening again. We are extremely saddened by this tragic loss of innocent lives. I have made it clear to our forces that we are here to protect the Afghan people. I pledge to strengthen our efforts to regain your trust to build a brighter future for all Afghans. Most importantly, I express my deepest, heartfelt condolences to the victims and their families. We all share in their grief and will keep them in our thoughts and prayers."

made available on government FOIA release websites. Cloud then outlined the narrative exposed within the AR15-6 Investigation in an article titled "Anatomy of an Afghan War Tragedy", which was published in the LA Times on April 10th, 2011, and linked to the investigation file. (Cloud 2011)

Chapter 7. Reconstruction of the "21 February 2010 CIVCAS Incident" Narrative of Events:

Note: The following section is a reconstruction of an airstrike that took place in Afghanistan as a part of the NATO led war that began in 2001. This particular airstrike is remarkable for research purposes because of the public availability of a "post-action" investigation that includes interviews with officers involved in the day's events as well as interviews with the survivors, images from the scene of the strike, medical records that detail the consequences of the attack and more. The following narrative reconstruction of this airstrike uses the material and information obtained by this investigation as well as media reports.

"We have been made to believe that (drones) have awesome sights and can see it all."
- Kiowa helicopter pilot, from AR15-6 Investigation pg. 1441

At 2:45 AM local time on the previous day of February 21st, 2010, helicopters carrying a group of NATO troops supported by 30 Afghan National Police and 20 Afghan National Army soldiers dropped from the night sky and touched down on the hard sands outside of Khod Village in Afghanistan. Their mission was to surround and seal the villages' borders, occupy it, and search through the village in order to attack and destroy enemy fighters. During their stay, the troops would try to increase popular support for the Afghan government and the NATO forces conducting the Afghanistan War. (Mcc 2010)

The troop consisted of sixty-seven fighters from NATO Coalition forces including Afghan police and army. Entering the village of Khod, the ground force spread throughout the village, establishing safe pathways by disabling insurgent explosive devices, and clearing out structures to be used as temporary safe houses.

During this time, the Ground Force Commander intercepted disturbing satellite communications nearby. The communications indicated that Taliban forces in the region were planning to surround and attack. The following interview excerpt details a Major recounting the scene:

> **Major:** Sir, as soon as the sun came up, that's when the team started to maneuver into the village.
> **Interviewer:** And your mission was what?
> **Major:** Sir they were trying to clear out improvised explosive devices and some (enemy leaders) - it's a typical safe haven for them. And immediately upon their

> first objective they encountered an explosive device in the wall or doorway, They proceeded to reduce that and throughout the morning as they moved to their objectives they continued to hear over intercepted satellite communications everything from "gather the Mujahedeen", "we will not let them occupy this ground, we will surround them and kill them", to sounds of one of the leaders trying to escape the village and was waiting for someone else to show up and escort them because he was kind of pinned down by two of the (classified).
> *(AR 16 Investigation pg. 1312)*

The troop continued to spread throughout Khod. Meanwhile, outside the village, a Predator drone and AC-130 helicopter working with the mission identified three vehicles seven kilometers away. The vehicles' movement appeared to match the intercepted Taliban communications referenced by the Major above. The Ground Force Commander then ordered the Predator drone's crew to continue tracking the vehicles. The commander on the ground expressed his concern that these vehicles posed a threat to his troops within Khod.

At this time, albeit in a completely different time-zone, the Predator Drone's crew received the Ground Force Commander's (GFC) command. The "Predator Crew", had a much different perspective than the troops in Khod – "fighting" from sand-colored trailers standing approximately thirty-five miles northwest of Las Vegas, in Nevada's Creech Air Force base.

After receiving the GFC's order, the Predator pilot and sensor promptly returned to doing what they do throughout every one of their 12-hour shifts - talk on their headsets about what they see on their screens.

The following transcript reveals the Predator Crew's conversation recorded by headset microphones:

Pilot: Can you zoom in a little bit man, let me take a look...
Sensor: at least 4 in the back of the pickup
Pilot: What about the guy under the north arrow, does it look like he's hold'n something across his chest
Sensor: yeah it's kind of weird how they all have a cold spot on their chest
Pilot: It's what they've been doing here lately, they wrap their (expletive deleted) up in their man-dresses so you can't PID it
Sensor: yeah, just like that last one, there was a shot a couple of weeks ago they were on those guys for hours and never saw them like sling a rifle but pictures we got of them blown up on the ground had all sorts of (expletive deleted)...
(AR 15-6 Investigation)

Also at this time, in yet another time-zone, a man and woman in Hurlburt Florida were looking at their computer screens as well. The woman works as a "Screener" and the man is a "full-motion video (FMV) analyst" for the private security company SAIC

Corp. and they are both essential elements of UAV operations. It is their job to process Predator Drone footage and imagery in real time in support of ongoing war operations. (3) They are both part of an "exploiting crew" which also includes a Geo-spatial map analyst. Collectively, this crew is overseen by an Intelligence Tactical Coordinator (ITC). The following interview excerpt with the ITC responsible for coordinating this "exploiting crew" provides an account of the scene at the Florida office:

> **ITC:** I take a step back and really... The exploiting crew has a screener and two FMV analysts and a Geo-Spatial Analyst. They are working with the (Predator crew commander) who is relaying to the (ground force commander in Afghanistan). Occasionally I will ask a question or two.
> **Interviewer:** What is the purpose of your role as you are looking at the screen with your background?
> **ITC:** I make assessments or tell them what I think is going on or I make recommendations to them to look at something.
>
> **Interviewer:** Who has the overall decision on what is on the screen?
> **ITC:** Typically it is the Screener. The FMV analysts are going to tell the Screener what they see and if they don't agree they may ask for a review but ultimately it is the Screener who puts it in the chat. They are the only people who have the ability to do reviews. The Predator crew and I don't have that ability.[6]
> *(AR15-6 Investigation)*

Under the watch of a Predator Drone, the convoy of vehicles continued to struggle along outside of Khod. Minutes later, the Screener in Florida noticed what appeared to be a child on her screen and typed it into her Mission Commander (MC) chat window.

The Mission Commander (MC) in Nevada received the message and passed it on through his headset microphone to his Predator Crew. The following headset chat log excerpt reveals the recorded conversation that followed:

MC: Screener said at least one child near SUV
Sensor: bull (expletive deleted)...where!?
Sensor: send me a (expletive deleted) screenshot, I don't think they have kids out at this hour, I know they're shady but come on
Pilot: at least one child... Really? Assisting the MAM (military age males), uh, that means he's guilty

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[6] Though the events of the Feb. 21 attack caused some controversy over the role of private contractors in combat ops, their use remains. Some legal analyses have focused on the nature of these contractors' work. As Dunlap writes, "Once civilian technicians or contractors become involved as "operators" in "combat operations," they risk being characterized as "unlawful combatants" under international law.74 This has a number of consequences, including the possibility that if captured they can be tried and punished for their hostile acts, to include the same things for which a uniformed combatant would be immune.74 It is very doubtful that many of these "surrogate warriors" are cognizant of their new status or comprehend the ramifications of it." (1999)

Sensor: well maybe a teenager but I haven't seen anything that looked that short, granted they're all grouped up here, but.
MC: (The exploiting crew in Florida) are reviewing
Pilot: Yeah review that (expletive deleted)... why didn't he say *possible* child, why are they so quick to call (expletive deleted) kids but not to call a (expletive deleted) rifle
MC: "two children were at the rear of the SUV"... I haven't seen two children
Sensor: the SUV just started...

A moment later the Predator Crew Commander's head perks up, and he is heard saying the following:

MC: Is this the child entering the rear of the SUV?

The Mission Commander's question about the child entering the rear of the SUV was not answered right away. He sat up from behind his monitor in Nevada, called the Aerial Commander on the ground in Khod and told him about the Screener's assessment of two children among the vehicles. The Commander in Khod replied with an order. His exact words were;

"Define children. Are we talking adolescents or toddlers?"

The Mission Commander hung up the satellite phone and typed the directive into a chat window. In Florida, a conversation began - What is an adolescent, anyway?

7.1 Coming to "terms" with Adolescence: Terminology's Tactical Influence

It is not unusual for children to be present during modern warfare situations and environments that fall under the broad heading of "Counterinsurgency Operations". Depending on the expected effect of certain military operations, targeting groups of individuals that contain children is acceptable under international humanitarian law (IHL), and understood as an inevitable consequence of the nature of war and the weapons that define it.

Popular imaginations and expectations of modern warfare nevertheless impose high standards on innocent deaths, particularly ones that consist of children and women. Despite extensive examples of direct and indirect involvement in warfare, women and children have are categorically provided with presumed innocence in modern wars. Children in particular provide an especially complicated area of judgment; the deaths of innocent children are universally powerful in terms of emotional impact and moral calculations of war, and yet they compose the most difficult category of identity due to varying cultural assessments of what "childhood" amounts to.

Post-strike interviews with the Screener, FMV Analyst, and their ITC reveal how they each considered "adolescence" throughout the event on February 21, 2010:

Interview with FMV Analyst

Interviewer: Do I understand there was another screener you were working with?

FMV analyst: Yes, sir, I was brought in as an additional body. I was not the primary screener.

Interviewer: Who was that?

FMV analyst: Mrs. (classified)

Interviewer: How do you spell that?

FMV analyst: (classified)

Interviewer: Same last name as you?

FMV analyst: Yes sir.

Interviewer: Is she related to you?

FMV analyst: Yes sir.

Interviewer: How is she related?

FMV analyst: She is my wife sir.

Interviewer: What does adolescent mean to you?

FMV analyst: Based on my personal knowledge and training we receive is, I would say between the ages of 9 to 14.

Interviewer: But what does that mean to you - combatant, or noncombatant?

FMV analyst: The way I make my call out sir, if I believe a person is a combatant I would not call out adolescent but would call out instead MAM (military age male).

Interviewer: Is adolescent a different call out than child or children?

FMV analyst: I think it varies from screener to screener. One screener may be more comfortable with calling out adolescent. It is very difficult to tell. I personally believe an adolescent is a child, an adolescent being a non-hostile person.

(From AR15-6 Investigation)

Interview with Screener

Interviewer: How many children or children-like people did you asses during this operation?

Screener: Two children, or as I (later) called out in chat, adolescents.

Interviewer: What does adolescent mean to you?

Screener: Anything under 13 but not younger than 7.

Interviewer: Is an adolescent a combatant or a non-combatant in your mind?

Screener: No... I mean it is kind of tricky. If I applied it to the States I wouldn't think them to be dangerous, but in a war situation they are considered dangerous.

Interviewer: In this case when you went from children to adolescents what were you communicating in your mind?

Screener: I was trying to put in there that the age was between 7 and 13 years old.

(From AR15-6 Investigation)

Interview with Intelligence Tactical Coordinator (ITC)

Interviewer: When you identified the children was that an upgrade to adolescents or was it children and adolescents, what does that mean to you?

Intelligence Tactical Coordinator (ITC): An adolescent for us is a noncombatant. A little person, a person that is half the vertical size of an adult versus someone that is three quarters the size of an adult.

(From AR15-6 Investigation)

Meanwhile, outside the village of Khod, three vehicles full of Afghans continued to make their way unaware that thousands of meters above them, a Predator drone circled in the sky at about the speed of highway traffic.

Back in Nevada, the Predator Pilot and Sensor continued to observe the convoy struggle across the unforgiving Afghan landscape. Some minutes go by and then the Predator Pilot and Sensor notice the Afghan convoy come to a halt by a small creek, and the passengers step out of their vehicles. The Afghans begin to wash themselves and pray. How this activity was interpreted by the Predator Drone's Sensor and Pilot is revealed by the following chat log excerpt:

Sensor: ... This is definitely it, this is (the Taliban) force. Praying? I mean seriously, that's what they do.
MC: They're gonna do something nefarious.
(From AR15-6 Investigation)

The Predator drone continued to scan and swoop out of the convoy's sight. Over in Florida, the primary Screener made her final decision about the "adolescent or toddler" directive. She typed into her chat: adolescents.

The Mission Commander in Nevada saw the typed message of "adolescents" and revised his message to the Predator crew, noting "Adolescent near the rear of the SUV." The microphone chat log indicates that the following conversation immediately ensued:

MC: Adolescent near the rear of the SUV.
Sensor: Well, teenagers can fight.
MC: pick up a weapon and you're a combatant, that's how it works.
(AR15-6 Investigation)

At this time back in Afghanistan, the Ground Force Commander in Khod ordered two '58 Kiowa Warrior attack helicopters stationed nearby to intercept the Drone Crew's "target". The Predator Crew described the convoy to the Kiowa Warrior pilots but failed to mention the possible presence of women or children.

As the attack was called in, a Safety Observer joined the Predator Crew in viewing the post-strike reaction. Almost immediately after the explosion, something appears unusual to the Safety Observer. The following excerpt reveals the conversation between him and the rest of the Predator crew immediately after the attack:

Safety Observer: Dude, this is weird
...

Safety Observer: Are they wearing burqas?
Sensor: That's what it looks like
Pilot: They we all PIDed as males, though. No females in the group
Sensor: That guy looks like he's wearing jewelry and stuff like a girl, but he ain't... if he's a girl, he's a big one
…
Sensor: Those are all people.
MC: Yeah.
Sensor: That's what I was worried about.
Safety Observer: What?
Sensor: What are those? They were in the middle vehicle.
MC: Women and children.
Sensor: Looks like a kid.
Safety Observer: yeah. The one waving the flag.
(AR15-6 Investigation)

Chapter 8. Analyzing the Visual

8.1 Observation, Visuality and Objectivity: Key concepts in understanding the impact of a sociotechnical imaginary of drones

"With the current understanding of society, we tend to see knowledge as a component of economic, social and political life. But we can also turn the argument around and consider social, political, and economic life as part and parcel of a particular knowledge culture."
Knorr-Cetina, 2007

The relationship between truth, reason, and vision has an extensive history in western thought. Plato's allegory of the cave, over two thousand years old, is still popularly known across cultures for its success in exploring this idea. The visual tradition bears its mark on many languages. Understanding, we say, is to "see" what someone else is saying. We speak of our "mind's eye" which during times of uncertainty becomes "unclear". To change one's thought processes (perspective), is to adjust how one "sees things" or one's "point of view". All of our experience together form within us a certain way of thinking - our "worldview". When we can't actually use our eyes to see something, we "envision" it nonetheless, using what else - our "imagination". Countless other examples abound.

This chapter argues that the western visual tradition that has become a dominant aspect of scientific knowledge production is important in understanding the sociotechnical imaginary of drones as well as the "work" of drones' sociotechnical networks. To this end, broader considerations of identity and efforts to evaluate and standardize bodies from an aerial perspective are influenced by the sociotechnical imaginary of drones as objective surveillance machines. In doing so, the sociotechnical imaginary of drones may reinforce or open up new forms or practices of normative judgment within this global surveillance context by legitimizing identification practices which aim to reduce bodies to "signal intelligence". In order to critically examine claims of drones' objectivity, this chapter offers a historical analysis of how "observation" has been socially negotiated.

How we come to "see" the world scientifically itself has a long tradition. In a comprehensive examination of observation as a practice within the historical development of scientific efforts, Lorraine Daston argues that "Observation is the most pervasive and fundamental practice of all the modern sciences". (Daston 2011) In Histories of Scientific Observation, Daston and other historians of science trace the evolution of observation as it was practiced, promoted and itself perceived as a more or

less integral part of advancing scientific knowledge.

Within the scientific community, observation was at times attacked as involving the researcher too "actively" within scientific methods, opening the door to researchers' manipulation of "raw" data. Was it not possible that "overly engaged" researchers become tempted to force their own theoretical preferences onto their data, thereby "contaminating" its authenticity? Some scientists during the early 19th century such as the astronomer John Herschel and mathematician Charles Babbage suggested that scientific training may actually backfire in the pursuit of objective observation, motivating scientists to "hoax", "trim", or "cook" their data. During this time, Babbage promoted a sort of de-skilling of scientific researchers, claiming that the objects of Nature may be magnified (mechanically, via microscopes) to plainly reveal herself ("forced to record her minutest variations on so magnified a scale", in his own words) and therefore be observable by lesser skilled research assistants in possession of more "ordinary faculties". (Daston 2011)

The aim of having a researcher who "no longer reasons, he registers", left a substantial mark on the history of scientific thought in the form of the Vienna Circle and the philosophical tradition known as logical positivism, but was ultimately deemed untenable. (Daston 2011) In the early 20th century, this idea was challenged by microbiologist Ludwik Fleck, who in the process pioneered a system of understanding science sociologically.

Ludwik Fleck, in his 1935 essay "Scientific Observation and Perception in General", exposes the inevitability of theoretical entanglement within all scientific observation, no matter who peers through the microscope. According to Fleck, observation is always and unavoidably theory-laden for the researcher, and the researcher herself may not even be conscious of these observational dispositions. Fleck referred to these theoretical-observational dispositions as *thought-styles*. This internal disposition is developed socially within the scientific community and arises unconsciously in a researcher at work; "following from his mood of thought, from the set of its mental readiness, from his mental thinking practices – in short from what we call the *thought-style (Denkstil).*" (1935)

Fleck's *thought-styles* represent a form of trained perception that may become habitual, unconscious, and socially or institutionally supported. If, as Daston (2011) puts it, observation "discovers the world anew"; *thought-styles* are what guide this process of discovery.

Fleck, however, did not limit his critique to scientific observation. According to Fleck, observation in "everyday life" is similar precluded by thought-styles; in particular, the "foremost role" in such daily encounters is supplied by one's emotions. Specifically, Fleck wrote that these emotional factors "result from the entire mental life of the given person and which produce the directed readiness to certain perceptions." (Fleck 1935)

How can Fleck's theory of thought-styles (and its socio-scientific origin) help us to understand the sociotechnical imaginary of drone technologies and their attendant practices both within the broader thought collectives of the "public" and military communities? We can look at the development of a "casualty conscious" public as situation in which a thought collective has become attached to a thought style that emphasizes the role of civilian casualties. This emotionally-attendant *thought-style* was socially supported by media coverage and promoted institutionally through governing organizations, we can see how the sociotechnical imaginary of "precise", "clean" wars came to emerge and grow in the last three decades.

The military's increasingly techno-scientific epistemic community can be seen as promoting an epistemology and practice of identification based on the reduction of bodies to characteristics that can be visually captured through an aerial perspective. These characteristics are then evaluated mechanically through mechanical pattern-recognition algorithms and what Daston calls "trained observation". This form of surveillance, as it is practiced, is a reflection of a thought-style which supports the sociotechnical imaginary of drones and "objective" targeting. In its institutionalized form within global surveillance networks, this sociotechnical imaginary supports a "regime of living" in which people's identity and physical embodiment are reduced to track-able and quantifiable information.

8.2 Signaling Identity: The military's thought-style

"We are put in the position of being, really, the voice of reason. That falls on us."
Lt. Col. Timothy Gosnell, (on the role of UAV pilots like himself) (quoted in Schanz 2007)

In the military lexicon, knowledge generally is described as falling under the category of "human intelligence" or "signal intelligence". In practice, this means that human intelligence is derived from face-to-face human interaction on the ground, and signal intelligence is derived from observation of materials such as intercepted radio and telephone communications and airborne surveillance systems. Conceptually, within the military's thought community (as evidenced by military training, curricula, and military research papers), these two sources of knowledge are generally divided in the theoretical

tradition of subjective knowledge (“human intelligence”) versus objective knowledge (“signal intelligence”).

As a result of this theoretical alignment, which we could call the military’s *thought-style*, the gathering of digital information in the form of networked systems may seem to be given added priority. Considering that the western rational tradition of understanding and knowledge has always held a priority on knowledge deemed "objective", it may not be surprising that signal intelligence, and those who can observe it “at a distance” is treated as the most “objective” and unbiased form of identification. This state of affairs may be further supported by a seemingly pervasive visual logic and lexicon that aims to "look at the facts" and which generally describes "seeing", "observing", "surveying", and "scanning" as passive, non-subjective, and emotionless acts.

A deeper view into the thought collective of the military may be possible by analyzing how epistemic categories are negotiated within academic military journals. In the military journal Parameters, a 2008 paper by Charles Dunlap, the executive director of Duke University’s Center on Law, Ethics and National Security, brings us back to the subjective/objective conceptualization as it applies to the military's human/signal intelligence framing of knowledge. Dunlap points out that traditional counter-insurgency theory highlights the importance of human intelligence derived from indigenous sources, but then goes on to downplay the veracity of this knowledge, saying "while such intelligence can be quite valuable, it has to be viewed through a cultural lens and is vulnerable to a multitude of subjective machinations of those furnishing the information." (2008) According to Dunlap, "visual observations", on the other hand, "have a grammar all their own." This visual grammar, which relies on “pattern of life” recognition algorithms and persistent observation, is argued as offering a superior and more precise vantage point than troops located nearby on the ground. (2008) The message is intuitive and powerful - people are subjective, pictures are not.

Putting aside the contributions of Fleck and Daston, we might find it easy to ask: could anything be more objective than a photograph? After all, countless weekly TV legal dramas seem to suggest that a picture of the subject at the scene of the crime is the most powerful evidence that can be offered. We might reason in the following manner: if the rule of law is the product of our best attempts at codifying a system based on justice and fairness, and photograph evidence is held within this system as the highest level of objective proof, then it follows that photographic methods must be the best and fairest

way to identify who is guilty in the "scenes" of war. One simply needs to take a dispassionate look at the pictures, right?

This line of thinking has repeatedly been considered fundamental and obvious, as Daston's (2011) historical treatment of observation has shown. However, as the events of Feb. 21st and the investigating officer indicate, observations of photographic material, even those made by crews "sitting safely in Creech AFB", are also "vulnerable to a multitude of subjective machinations", as Dunlap puts it. (2008) The problem is that pictures can't control the eyes that look at them - what looks one way through someone's eyes can look differently through another's. When Fleck described the seemingly humble task of viewing microbes through a microscope, he wrote that in fact "two observers possessing fairly different thought styles have no common objects of observation". (1935) This seems to be especially true when people are straining at complex categories of identity, and this appears to be evident throughout the Feb 21 Case study.

8.3 Mediated Identity: How Information becomes Identification

Issues over identification in the military context of targeting demand the confrontation with a number of difficult categorizations - maturity, ability, intent, innocence, and more. The Feb. 21 case study is a prime example - consider the varying responses of all the actors involved in the question of determining the "identity" (in fact, a certain identity related to combat status) of the Afghan people who appeared "smaller than normal" on their screens. Within the events of the case study, an array of reactions to a number of issues shows up. Questions about what constitutes "childhood" across national contexts, as well as categories of guilt, innocence, and potential war-fighting capacity were all tossed around, with very little conceptual symmetry or consistency along the way. The two "Screeners" involved, credited with having the best imagery available at the time also happened to be husband and wife and sharing the shame shift, nevertheless had completely different attitudes towards the smaller figures on their screens - in terms of age, war-fighting capability, and determinations over potential innocence and guilt.

Sociologist Sam Weber (1991) remarked that there is "no war without representation." Weber wrote about the war as a shared public experience - an experience heavily mediated and transformed by the new information environment shaped by 24 hour news programs and the growing reach and influence of television. Technological developments in display and communications systems have expanded on our visual cultures, and have correspondingly impacted the experience of warfare by its direct

participants.

As warfare becomes increasingly characterized by remote detection, this means that it has also been increasingly represented through signals displayed on screens. In the past, war-time efforts at colonial policing and population surveillance and security have been traditionally performed by "boots on the ground" interacting eye-to-eye with the target population. Today, similar efforts to "embrace" populations (to put it in John Torpey's (2000) terms), is increasingly adopting the two-dimensional "aerial perspective" offered by modern military platforms such as the popular Predator Drones.

The technological promise offered by persistent aerial presence is that because of drone platforms' high definition footage, pilots can accurately and intimately identify the bodies that are moving below. In areas too dangerous (at least for ground troop presence) or too underdeveloped (in the sense that passports and formal identification are not commonplace) the solution to the problem of identification, it is suggested, is a matter of increasing screen resolution. Thus, what is proposed is a technical fix to a complex social problem.

One way to understand this state of affairs, I suggest, is that the sociotechnical imaginary of drones as precise and objective tools of surveillance (which is underscored by broader military and public thought-styles which rely on epistemologies that emphasize visual information and "trained observation") serves as a way of supporting what STS scholar Irma Van der Ploeg calls the "informatization of the body". As she puts it:

"Today, the socio-technical production of social categories and identities through IT-mediated surveillance relies increasingly on a gradually extending intertwinement of individual physical characteristics with information systems." (Van der Ploeg 2005)

Van der Ploeg suggests that this "informatization of the body" risks going beyond merely another form of representation, but instead having ontological and thus normative impact. In other words, if "identity" *as such* becomes a concept increasingly understood through mere observation of information, then it may be the case that moral declaration of what ought to be done with or to such bodies is impacted. By leading to an increased politic of "the body as information", the sociotechnical imagination behind drones and continued use may be institutionalizing and adding technological durability to moralities of the body in which identity is reduced only to those elements which can be scanned and quantified.

8.4 How a sociotechnical imaginary of drones may contribute to "Regimes of Living"

It may be the case that surveillance and identification have always been ethically problematic. The interest of this thesis is to analyze how these age-old issues have been problematized in novel ways as a result of the sociotechnical imaginaries that coincide and are co-created by new forms of surveillance that are exemplified by drones. In order to help analyze this situation further, I think that anthropologist of science Andrew Lakoff's (2006) theory of "regimes of living" may be useful. According to Lakoff:

"By 'regime of living' we refer to a tentative and situated configuration of normative, technical, and political elements that are brought into alignment in situations that present ethical problems – that is, situations in which the question of how to live is at stake." (Lakoff 2006)

By applying Lakoff's concept to this essay's subject matter, we can further understand the sociotechnical imagination of drones within both the public and military's epistemic communities co-creating and supporting a specific configuration of "normative, technical and political elements". Together these elements contribute to a specific regime of living – one that engages with the desired achievement of a form of governmentality concerned with disciplining foreign populations. Ethical problems are produced within a framework that assumes the priority and legitimacy of states' "embrace" of populations as it is practiced through aerial surveillance networks that rely on the reduction of bodies to "signal intelligence". The result is a "regime of living" in which ethical questions relating to bodies are framed and dealt with only in informational terms.

One consequence of newly problematized ethical questions that arise out of (or are simply reinforced by) specific sociotechnical imaginaries may be confusion in addressing traditional ethical problems. Perhaps it is the case that when Mosser (2010) argues "applying net-centric, techno-wizardry solutions to complex, anthropologically driven questions may be generating the right answers to the wrong questions", this is a result of applying a concept of "the body as information" within a normative environment struggling to accept such a theory of digital embodiment as a valid one.

If we return to Fleck's concept of thought styles, we can view the newly problematized morality as an expression of a conflict between opposing thought styles. In this case, the thought-style of drones and their sociotechnical imaginary (a thought-style based heavily on visual logics, informationalized bodies and trained

observers) is currently being negotiated in an epistemic and moral environment which still contains the influences of sociological thought-styles (thought styles which put primacy on subjective experience, and stress the limits of objective classification) which may be fundamentally incompatible. Van der Ploeg seems concerned that the thought style embodied by drones and their attendant imaginaries will come to rule the day. If Van der Ploeg's fears are borne out, then a dominant "regime of living" in which ethical questions relating to bodies are increasingly framed and dealt with only in terms translatable by IT-mediated surveillance.

8.5 A Thought Style Made Durable: Screen Resolution as a Social Solution

As modern warfare is increasingly characterized by remote detection, it has also been increasingly represented through signals displayed on screens. Traditional wartime efforts at colonial policing and population surveillance and security that have been traditionally performed by "boots on the ground" are increasingly adopting the two-dimensional "aerial perspective" offered by modern military platforms. Social concerns and expectations are offered a technological promise - because of high definition footage and drone platforms, pilots now more than ever can "make sure that we have the exact, right target in our crosshairs", as one Colonel puts it.

Mosser (2010) argues that "applying net-centric, techno-wizardry solutions to complex, anthropologically driven questions may be generating the right answers to the wrong questions." The problem with seeking an answer in higher definition footage is that it is a singly technical solution (ultimate signal quality and panoptic surveillance) to a problem that is largely non-technical - the problem of identification.

The investigating officer of the Feb 21st events acknowledges that all parties involved in the targeting process understood the requirement to avoid a strike near a compound or built up area. However, the issue was not about recognizing and avoiding civilians that might be nearby, but of recognizing what was right there in the crosshairs:

> *"The breakdown occurred in the failure to mitigate the risk that the convoy themselves had non-combatants. The reports of "adolescents", even if they were teenagers old enough to fight, should have caused a recognition that there were non-combatants in the convoy. Throughout the encounter, all parties involved assumed that all adult males were legitimate targets and even teenagers old enough to fight were legitimate targets."*
> *(AR 15-6 Investigation pg. 38)*

8.6 The Life of PID: When Thought Styles and Terminology Collide

"My immediate response to (the possibility of civilian casualties) was "couldn't have been... couldn't have been". To this day watching that Predator feed and the 3 "army buses" or buses. Watching that Predator feed they look like bad guys... I hate to say that in those terms especially because we have (civilian casualties)."
-Sergeant Major interviewed after 21/2/2010 strike (From interview in AR15-6 Investigation)

"What we say is what we do."
(From interview in AR15-6 Investigation)

In the military lexicon, the identification of a proper military target is expressed in the acronym PID (Proper Identification of Target). In this context, the rules of engagement dictate that PID must be established and maintained prior to an air strike. So, in order for a strike on the ground to be legal in the laws of the sky, a "proper military target" must be identified, and this positive identification has to persist over time and up to the time of the strike. The laws of war (at least with regard to declared wars) allow for the inevitability that the calculus of war (proportionality and distinction) allow for the killing of innocents, that accidents will occur and the reality that identification is a complicated process.

The practice of PID allows a side in war to justify and support their adherence to this guideline of war. It aims to address the expectation that innocent people be kept safe from the battlefield - an incredibly complex battlefield that can drop out of the sky and can erupt virtually anywhere at any time. This is a battlefield largely influenced by the current level and network of technology, along with the crews that sustain them, the publics that prefer them, and the economies and economics supporting and sustaining them. PID is another part of this network, a tool and tactic for keeping things together in a politic that is averse to innocent deaths even in war.

In practice, identification is a complicated process, and it doesn't always "work" the same way. The Feb 21 attack's investigator reported that all of the headquarters above the ground team, all "supporting commands (PREDATOR, AC130) and key leaders (all Battle Captains, SOTF S3, SOTF CDR, CJSOTF-A S3, CJSOTF-A JOC Directors)" involved throughout the process "did not understand what PID meant." (AR 15-6 Investigation pg. 38)

What most believed was that it meant the positive identification of an **object** - specifically, a weapon. The officer goes on:

"For example, MAJ (name classified) defined PID as "that means you PID whatever it is you are identifying. If you PID a weapon, then you saw a weapon." LTC (name classified) stated "PID means with a reasonable certainty that some form of surveillance has made identification of a person, vehicle or compound..." Not one single

maneuver leader or staff officer outside the (classified) community was able to define PID within the CJSTOF-A chain from the 06 command down to the ODA." (AR 15-6 Investigation pg. 49)

The misuse of PID in this case study and its consequences can be understood as an expression of what Adey et al. (2012) describe as the military's "dialectics of subjection and objectification" at work. Viewed through the military's distinct thought style, objects of attention are translated into subjects of attack once their identity is objectified by the institutionalized process of achieving PID. This "distanced and rational bureaucratic orientation", which bears the conceptual scaffolding of the military's thought style and procedural legitimization via PID, enables the continual production of new object-subjects of surveillance. (Adey et al. 2012)

8.7 Targeting the Objective or Objectifying the Target? The Informatization of Identity and Innocence

"As more powerful technological tools intrude into the process of command, they bring with them the risk that a generation of officers will be more inclined by instinct to turn to a computer screen than to survey the battlefield, and that the use of precise operational terms will be displaced by computer-talk. If that happens, we may have lost more than we have gained"
Kott, 2011

Contemporary analysis on aerial warfare has remarked that "while shaped by international law, the making of the air-target is almost always fuzzy."
(Adey, et al. 2012) When a screen is put in front of you, and you are given the rule and command to identify a proper military targets, you are naturally going to look for things - things that look like targets. Or things that *could* be targets. Like the network of military characters involved in Feb 21st, you'd also look for other things - things that might indicate a target, like a weapon.

It's not altogether surprising that the acronym PID was used falsely to identify objects, and not "proper military targets". After all, objects are what you're looking at while you're looking for targets. Furthermore, all "proper military targets" always end up being an object - a person or group of people, a stash of weapons, a vehicle containing people. It was the job of the predator crew and others to analyze these images and communicate about them. The investigation does not reveal a tool or acronym for positive identification of objects, presumably because it doesn't exist. If it does exist, then it must have been even less known by everyone involved because it was never used. The atmosphere of decision-making was gripped with an unintended conceptual slant. The members of the network only had one formal tool in their process of identification (PID, which they did not understand), and this tool is only good for identifying valid targets,

not the much more common action of identifying objects. In a military mind molded by the use of an encyclopedic list of acronyms, if there's an acronym that seems to fit, it's going to be put to use. And that's what happened.

The problem with using PID to identify an object other than targets (i.e. an object that somehow underwent or is undergoing a process of becoming eligible for attack) is that some objects like weapons, though obviously associated with enemy forces in war, are also associated with hobbies, habits, or even daily life by many people just going about their lives - this author included. Afghanistan is a place where very many people reasonably carry weapons for their own personal safety. When objects such as weapons are identified as targets, the more relevant information about the carrier and his behavior may be mentally pushed aside:

"As additional facts, such as the presence of children and distinct movement away from the ODA, became available, no level of command reassessed the PID declaration. This is due, at least in part, to all levels of confusion at all levels of command with what PID means. Positive Identification of a weapon or object is a onetime determination. If you see a weapon, you have a positively identified it. However, whether something is a legitimate military target must be based on the totality of the circumstances and is thus subject to review upon receipt of additional information. Once PID was declared early on in the engagement, no level of command reviewed the determination despite the evidence of children in the convoy and movement away from the ground forces."
(AR 15-6 Investigation pg. 49)

There are few things less obvious that the fact that we sometimes see what we are looking for. Often, our experience shows us, what we see depends on "how" we are looking. The "picture" we get from a politically touchy article is going to be different if we read it from the point of view of; profession "as a fellow teacher"; class "as a member of the working class"; political identity "as a republican"; family position "as a mom", and so on. As on Sergeant made clear in the follow up investigation, it is not always so easy in practice for drone pilots to know what they're looking at:

"*SFC: For on thing... the feed that we received on the ground, I had a chance to review it once we returned to the firebase. What the guys at the firebase was looking at was crap. It was a lot of static and cracking... After looking at the video afterwards someone was saying when the vehicles had stopped, the (people began to pray). Someone said they might be people pulling security. When I looked at the video they also could have been taking a piss. Whoever was viewing the video real-time, maybe they need a little more tactical experience. It needs to be someone that knows the culture of the people. I have seven trips here, four of them near Uruzgan so you know the culture of the people. If I can say anything they just need to be familiar with what they are looking at."*
(AR 15-6 Investigation pg. 49)

Just how were the actors involved in Feb. 21st looking at their screens and these things? In Fleck's terms, what was their "thought style"? The investigation officer laments hearing that there is a "fighter jock" culture among air crews - a "Top Gun

mentality". One officer involved in the events of Feb 21st said that "...everyone around here, it's like Top Gun, everyone has the desire to do our job; employ weapons against the enemy. The entire time they thought this was a group of enemies, they were thinking 'hell yeah, we want to help out and be a part of this'. I don't think they were bloodthirsty had they known that these were women and children."(AR 15-6 Investigation)

The piloting environment, even of remote pilots situated comfortably in steel bins in Nevada, nevertheless retains a culture that was once characterized by plane on plane dogfights, glorified and made immensely popular by action movies. The film Top Gun is particularly remarkable because its success drew military recruiters to set up recruitment stations outside of movie theaters across the United States. Ever since the success of Top Gun as an Air Force recruitment tool, film producers have been able to seek financial assistance from the military's media relations department for developing movies that portray the U.S. military in a positive light and offer their scripts for review and editing by military public relations professionals. The days of aerial dogfights are over, but the culture retains its influence:

"Except for the ODA, all other units indicate a desire to strike the target rather than assess the situation. This originated with the Predator internal transcripts where the Predator crew, numerous times challenged the assessment of the Screener by either rejecting it, challenging the accuracy, changing assessments, or determining assessments that had no foundation painting a picture for the ODA commander, enhancing the chances that this "target" would be struck."
(AR 15-6 Investigation pg. 27-28)

Chapter 9. Drones and the "Cycle of Calculation"

"We live in a technological society, I argue, to the extent that specific technologies dominate our sense of the kinds of problems that government and politics must address, and the solutions that we must adopt."
Barry, 2001

"Struggles over what will count as rational accounts of the world are struggles over how to see."
Haraway, 1991

As in Hans Harbers' (2005) case study of a crashed F-16, this case study presents "a hybrid situation in which human beings and technology are tightly interwoven – a mixture, a muddle of man and machine." (Harbers 2005)

One way to understand this "muddle of man and machine" is to pick apart its processes by analyzing the situation as a networked activity incorporating the roles and input of actors – human and nonhuman. Of particular use in such an endeavor is to view this network as what Bruno Latour calls a "center of calculation." Broadly speaking, centers of calculation are places in which knowledge is produced through the accumulation and processing of resources. The form that these resources take, the methods in which they are accumulated/evaluated, and the actors and thought processes involved in the process are what define the center of calculation its knowledge production.

Latour refers to this process of calculation as a "cycle" because of how resources are reenacted and renewed throughout the calculation process. These resources are recycled and reconstructed in ways that support and reflect the epistemic, social, institutional and technological structures of this network. The cycle is therefore one of "accumulation" according to Latour, and is dependent on "inscription devices" – technologies and practices which are used as means of investigation, measurement, and representation. These inscription devices are responsible for creating the resources or "inscriptions" that become a part of this cycle of accumulation.

Within this case study, the Predator Drone is one such "inscription device". It is a technology embedded in a network of actors interested in investigating, measuring, and representing certain targeted populations and geographies. This network of actors work with drone inscriptions in an effort to produce knowledge to these ends. In this way, the Predator drone acts as a technology that allows certain actors to "act at a distance". Through subsequent violent means (which here take the form of a missile strike) a form of governmentality is hopefully achieved, through which the subjects of this network's surveillance are disciplined.

Let us attempt to break down this cycle of calculation. Latour himself uses the example of cartography. In Latour's example, an explorer is sent out to survey a new land, take notes, and return to his epistemic workplace in order to put the pieces together and generate a map. This process continues as more and more explorers are sent out. Each new explorer is equipped with the maps of prior explorers, coming back with newly drawn maps that are expectedly/assumedly an improvement on the last ones.

Unmanned aerial vehicles, such as the Predator drone, are also explorers. They, like map-makers, are "inscribers" too. In a similar way, Predator drones are sent out to explore and survey areas where knowledge is contentious, continually sending back visual representations to areas in which these representations are accumulated. Drones transmit these products to a globally-networked "epistemic workplace" (consisting of the Screeners in Florida, the Pilot and Sensor in Nevada, and other actors in the US and stationed at bases throughout the Middle East), and these actors "put the pieces together" and decide what is "out there" and what do with it. We can look at this entire network, including the drone itself, as a center of calculation.

We should now ask ourselves, as Galison (1997) asks: why were these inscription devices "created, reproduced, and used in particular ways in particular places?" The answer should not be static because the motivations, intentions and uses of technologies are prone to evolve over time. In the case of the Predator drone, it was initially designed as a surveillance aircraft without any weapons or attack capabilities. However, to say that the earlier Predator drone models did not have "attack capabilities" may be a bit of a misnomer. Even without bombs, drones can and do assault their subject populations and geographies in ways that matter - by inscribing, representation, organizing, categorizing, witnessing, and "deciding upon" its visual targets, surveillance tools arguably do plenty to attack the integrity and identity of their subject bodies and geographies. (Gregory 2011)

As the case study makes clear, the cycle of accumulation in which the Predator drone acts as an inscription device is not simple or straightforward, and nor does it proceed without contestation. The actors which handle these inscription devices are varied – some employed by the military, some by private industry, with various levels of authority and not all are capable of communicating with one another. Work shifts begin and end, with some information being passed onto the next actor and some left out. Categories relevant to assessing and judging the drones' inscriptions, such as adolescence, were understood differently by everyone involved. Furthermore, lexical devices such as PID, which were meant to assist in the formal designation of targets within the drones

inscriptions were also not understood. Some of the human actors within the drones' calculation center also admitted to ignoring or missing certain parts of their screen display, either out of insufficient attention (i.e. lack of observer "discipline") or an incomplete video feed (i.e. missing pieces of the inscription). Some of the actors simply added that they had either just woken up, or had been working for up to 16 hours. Many of the actors expressed surprise when the "target" was finally struck.

Despite the messiness of the cycle of accumulation, the decision was nevertheless made to attack the subjects of this process. The attack was in fact stopped before every Afghan subject of this process was killed because the Helicopter pilot at the attack scene recognized "brightly colored clothing" on some of the Afghans and determined they were therefore likely to be female and thus not enemies and not proper targets. The Predator drone, which had been observing the convoy using a night vision and thermal infrared filters, had not displayed the colorful burkas throughout the cycle of accumulation. The recognition of the Afghan women waving their brightly colored scarves convinced the intercepting helicopter pilots to stop bombing and reconsider their calculations. The following excerpt from the airstrike's investigation reveals the pilot's thought process at the time:

> **Interviewer**: What did you think at that time, when you saw those females?
>
> **Helicopter Pilot:** Not a great feeling, thinking that was not what we expected to see on that target. Up to that point it had been very clear that the Predator's observation was all males. At that point a couple of possibilities are going through my head, first that there was a misidentification of the individuals, then that maybe someone was just wearing brightly colored clothes because we have seen a couple of incidents where males were wearing female clothing as fighters in an attempt to maneuver. We just as quickly as possible tried to assess it and pass along the possibility that there were females down there. (AR15-6 Investigation pg. 787)

Only after the attack took place, were the Afghans capable of recognizing that they were subjects in a process of accumulation and calculation, and able to resist against the identities that had been decided for them within this process.

When the helicopter pilot above reported the presence of what he considered to be likely females, the assessment of his own eyes were downplayed against the observations of the Predator's digital eyes and its crew. First the pilot informed his captain that there was a possibility of females – often equated as innocent - among the

convoy. When the captain reported this new information to his commanding officer in order to update their attack reports and records, he was told not to "second guess" himself. Observe the following interview to see how efforts towards victim identification receive resistance in controversial operations such as this one:

> **Captain:** When I talked to the commander I told him that we had a possible incident. That our Kiowa pilot had identified bright colored clothing and that there was a possibility of women and children on the objective.
>
> **MG:** I want to be clear on this. So you called around 0910 and the commander picked up and that surprised you. Now I want you to be very clear on what you recollect as to what you said to the commander.
>
> **Captain:** I was informed at that time that it was possibly a good target, not to second guess myself.
>
> **MG:** Just lay it all out there. I would have to say this, when we have a conversation like this we remember them well. So I need to know because we are trying to get to the truth here.
>
> **Captain:** When the commander picked up the phone I gave him an overview of the engagement and I told him that we had a possible incident – that there were possible women and children in the engagement area.
>
> **MG:** Were those words used, possible women and children?
>
> **Captain:** Yes. At that time I was told that he believed it was a good target and not to second guess myself or words to that effect.
>
> **MG:** Do you remember the other words?
>
> **Captain:** I was told at that time that it was a good target, not to second guess ourselves, these things happen, and we need to have all the information.
>
> **MG:** You are having a hard time telling me this, tell me why.
>
> **Captain:** Loyalty to Command.
>
> (AR15-6 Investigation pg. 958)

In this case study, doubts over the validity of the airstrike and reports of women and children at the scene of attack were repeatedly pushed down the command chain. The presence of women and children at the bombing site were not officially recorded until surgeons at a Dutch-run Afghan hospital reported their presence in their victim logs.

We can look at this negotiated identity process through the same Latourian terms. Here, military cycle of accumulation was able to resist contrary inscriptions and witnessing efforts aimed at challenging how the identities of the Afghans were

categorized. Attempts to challenge the category of "enemy" and "proper target" were given throughout the Predators' hours-long surveillance by the Screeners analyzing the Predator inscriptions in Florida. After the attack had taken place, the Afghans' own efforts to challenge this identity work (by openly waving their scarves in the air for the pilots to see) were recognized and incorporated into this cycle of accumulation but were cast aside. It was not until an outside actor (the Dutch hospital crew, a separate entity from military operations) had their hands on the actual bodies of the victims, that the category of "proper target" was finally recorded into the military cycle of accumulation.

The case study also serves to open up the two distinct epistemic framings of knowledge within the US military targeting apparatus. As mentioned earlier, these framings are categorized within the military as "signal" intelligence and "human" intelligence. Signal intelligence is primarily inscribed by aerial surveillance vehicles such as drones using telescopic video cameras. Human intelligence, on the other hand, comes from eye witnesses and interviews and manifests itself primarily in written form (notes, documents, written reports etc.) In this case study, signal intelligence was used to identify people as targets, determine their guilt and take action. Technological "acting at a distance" through the Predator as a "witness" was enough to make a person a target, but the physical witnessing by the pilot's own eyes was not enough to make the people non-targets. Ultimately, the most intimate form of human intelligence - knowledge derived from interacting with and handling the people's actual bodies themselves, was required to return the Afghans' identities to "non-target". In the words of one officer involved in the events, "ground truth" was needed to determine the true identity of the Afghans. In this case study, the category of guilt was quickly determined from Predator inscriptions, but the category of innocence (even though supported by conflicting Predator inscriptions showing women and children) required up close and personal follow-up work. The following interview offers a detailed description of the contested identity process at work and how these epistemic preferences played out at an operations base in Afghanistan which was monitoring the strike:

> **MG:** When you left to go to your meeting what was the mood in the operations center after discussion of brightly colored clothes, women, and children were being reported from the helicopter pilot and the Predator? An operation had just gone down and by your testimony and others as well, is that you were surprised by the strike… All of that was buzzing and surely there must have been something going on in the area. Would it be fair to say that there was a lot of

energy on this situation right now?

CPT: That would be fair to say.

MG: (In terms of reporting) Was there mention of women, was there mention of children, and was there mention of brightly colored clothing?

CPT: No, not in the reports that got sent up, sir.

MG: Can you help us understand why? Because civilian casualties is obviously a big deal.

CPT: Yes sir.

MG: So the potential of women and children on the site would be a big deal, correct?

CPT: Yes sir.

MG: Why is that fact seemed to be remitted from every report? That goes from your headquarters to the next headquarters?

CPT: I think that we were waiting for boots on the ground to confirm what potential as being observed by the Predator and Helicopter pilot, sir.

(AR15-6 Investigation pg. 1273)

As earlier chapters of this essay have also shown, the way in which these Afghans' bodies were "inscribed" was far from "objective" and shows the traces of its attendant center of calculation throughout the event. This can be traced in the colorless Predator inscriptions, the Predator crew's desire to engage the target despite evidence challenging its validity, the confusion over what "adolescent" means in terms of targeting procedures, the lack of understanding of PID, to the later denial of reports of women and children by commanding officers.

How does the follow-up investigation itself consider problems within the targeting procedures behind this case study? What does the report give as reasons for the "faulty" strike? The problems listed are numerous and include the following:

- Headquarters located in Afghanistan failed to provide analysis to the Predator crew and ground force commander concerning women and children, as well as failing to inform leadership of potential presence of women and children.
- Numerous officers in leadership roles that should have been woken up were not woken up to provide oversight.
- Headquarters were engaged in a passive "monitoring" role instead of an active "command and control" role.

- Additional facts about the nature of the convoy did not lead to a re-assessment of target declaration.
- All units except for the ground commander "indicated a desire to strike the target rather than assess the situation."
- The unprofessional behavior of the Predator crew, who "acted almost juvenile in their desire to engage the targets."
- The night battle captain was "inexperienced and did not fully understand his role"
- Insufficient understanding of the Tactical Directive
- Insufficient understanding of and confusion over the following terms: PID (proper identification of target), MAM (military age male), Air TIC (air troops in contact), adolescent, and "imminent threat".

In Galison's (2000) *An Accident of History*, he claims that investigations of technological "accidents" often struggle with psychological, sociological and technological explanations. Similarly, the AR15-6 investigation explains this "incident" as a result of problems related to *communication*, *culture*, and *observation*.

9.1 Communication

Communication, particularly the application of certain labels, can be seen here as an act of inscription within the accumulation process. Certain terms, such as MAM or "imminent threat" carry legal categories within them that are crucial to the process of identification because they attribute an important status onto their subjects – these terms represent a shift from "civilian" to "combatant". The use of these terms by observers within the targeting process are critical in attributing and conveying an identity that is "actionable" in the sense of being able to be attacked.

The terms that were confused and misused in this case study are not inherent to drone technology or specific to a limited variety of operations. This is an important point in considering the accuracy behind even the most "technologically advanced" Predator drones and similar technologies. The relevance of terminology shows that there are ingredients in the targeting process beyond high definition cameras and persistent surveillance- that identification goes beyond screen resolution.

Important terms and labels were frequently misused throughout all levels of command in this case study. In this center of calculation, terms ran through the cycle of accumulation and contributed to determinations of identity and the decision to attack.

These terms and the actors using them in this case study were an important element of the sociotechnical network of Predator drones, and they also a part of what makes a Predator drone what it *is*. Not only do these terms and their use influence and shape such systems like the Predator, they also influence and shape what the Predator *does*. The investigation itself makes this clear, stating that:

"Reporting at all levels of command used these terms throughout the event from target identification through the strike in an incorrect and inconsistent manner. Lack of common term understandings added to the confusion at every level creating a perception of threat that might not have existed." (AR15-6 Investigation pg. 48)

9.2 Culture

The Predator drone, as an actor within this center of calculation, is also a subject and part of its wider cultures. What the Predator drone inscribes is dependent on the motives and wider "culture of use" or "use culture" that it is embedded in. By "use culture" I mean broader cultures that influence the principle users and use of a technology. The Predator drone is entangled within a "use culture" that reflects the inherently offensive doctrine of the Air Force, and which glorifies fighter pilots and aerial combat generally. The name of the technology, "Predator", is itself a clear reflection of its dominant "use culture".

The offensive "use culture" that dominates the Predator drone stands as an obstacle to towards disciplining the observational actor of the human actors in this network/center of calculation. The investigation claims that Predator crews should be a "dispassionate check" – in other words, ideal examples of Dalston's "trained observers". Instead they were found to have a "proclivity to pull the trigger vs. observe" and a "Top Gun mentality". (AR15-6 pg. 888) This "use culture" is part and parcel of the sociotechnical system that is the Predator drone.

This "use culture" is considered to be problematic and in direct contention with the official "use culture" outlined in the war's Tactical Directive, which states:

"We must avoid the trap of winning tactical victories- but suffering strategic defeats- by causing civilian casualties or excessive damage and thus alienating the people." (AR15-6 pg. 47)

The Predator drone as a network and center of calculation represents a clash of "use cultures". One of which is inherently offensive and has a rich cultural history (the "Top Gun" mentality), and another which is issued hierarchically and was established in 2009 – the Tactical Directive.

Both of these cultures – the one stemming from the dictates Tactical Directive and the "Top Gun mentality" – are cultures that find themselves negotiated within the Predator network. Within this network, they compete with each other and other elements with the aim of shaping the Predator network's "use culture". In this case, it is unsurprising that the culture with a longer past, commercial analogues, decades of institutional support, and analogous and well established identity labels such as "fighter jock", is the one that prevailed. This is the culture that currently dominates the Predator network's "use culture", and this seems likely to continue.

The Predator network's aggressive "use culture" also interacts with wider sociotechnical imaginations of the technology as "precise" and "objective" instruments of war. Despite being well established and supported by the prevailing "use culture", the sociotechnical imaginary of drones is constantly under negotiation and review. Within the case study, some of the officers made statements that expressed how they were personally negotiating this imaginary. Take, for example, the following interview excerpt:

> **MG:** What can we learn from this?
>
> **CW3**: Not to trust drones, and I say that honestly sir, in our community we have been brought up to believe we can rely on Predators and surveillance platforms for good intelligence… (Because of the Predator Crew's confidence) in what they had, their information appeared reliable. We thought our troops would be out flanked…
>
> (AR15-6 pg. 1444)

9.3 Observation

The dominant sociotechnical imaginary of Predator drones is one of nearly flawless machinery that objectively survey known enemy territories and carry out "clean", "surgical" attacks. However, when the black box of Predator drones is opened up and understood as a sociotechnical network, a different image arises. The Predator drone and its attendant imaginaries are immersed in a sociotechnical network – a center of calculation – that is far more complex and far less orderly than one is led to suspect.

As an inscription device, the Predator drone is subjected to a number of various levels and forms of display and attention throughout the "cycle of accumulation". Some officers interviewed in this case study, resisted the imaginary of Predator inscriptions as helpful and a benefit to targeting work. Consider closely the following Major's response to the case study events:

> **MAJ:** One of the big things we discussed… how to make sure this doesn't

> happen again. (…) We didn't have eyes on, minus the Predator platform, that we can all see. Who watches what? All the discrepancies between who watches what. What I see may be different from what someone else might interpret on the surveillance feed. (…) This is all personal, I don't believe in that dynamic targeting process either. I think a Pred strike does the same thing that this does; it leaves a lot open for confusion and discussion.
> (AR15-6 pg. 816)

Although sociotechnical imaginary of Predator drones is one of crystal clear, high definition footage that is transmitted seamlessly in real time and "speaks for itself", there were a number of statements in the case study investigation that revealed the Predator drone as embedded within a center of calculation that is confused, messy and inconsistent. Consider the following comments given by officers in the investigation:

> **MG:** Who else is watching the Pred mIRC chat on the floor?
> **PO2:** Everyone.
> **MG:** Is it on a big screen?
> **PO2:** It is on a screen but it doesn't look the same as my screen does.
> **MG:** Does it have all the stuff on the screen?
> **PO2:** I'm not 100 percent sure.
> (Ar15-6 pg. 1126)

> **COL1:** Because when you are looking at the Predator feed, it's that narrow view from a soda straw… But on the Pred feed it indicates the direction of the movement of the icon of the thing that you are following in the bottom left hand corner.
> **COL2:** OK, well I missed that.
> (AR15-6 pg. 547)

> **COL:** Let me just ask, when you were watching the Predator feed, do you guys not refer to the mIRC chat as well? It's kind of like watching TV with the volume down. So when you're watching the Predator feed is there no connection with the volume?
> **MAJ:** Like I said, sir, that's definitely a shortcoming on that day… we were watching the Predator feed with the volume down and that's something we've

corrected at this point.

(Ar15-6 pg. 830)

These examples and others throughout the investigation show the targeting process of Predator drones to be "fuzzy" indeed, as Sapolsky writes (STS Handbook 2007). Within this center of calculation, Predator "transcriptions" were inconsistently displayed and understood, as well as contested by various actors throughout the targeting process. This contestation of transcriptions was confused, disorderly, and at times went against the prescriptions of formal guidelines. Various actors within the center of calculation were judged by the investigation to be "unprofessional", "immature", "incompetent", over-worked, and simply not awake when they should have been. What makes a Predator drone what it is, and do what it does is largely a product of this social environment. Contrast the sociotechnical imaginary of the Predator drone with the frustration expressed by the following colonel as he interviews a member of the Predator's socio-technical network:

> **COL:** Then how come no one in your command… could identify PID, TIC and imminent threat. No one, I mean no one, not even you could define it correctly. Those are critical components of applying Rules of Engagement. And you will see this trend of new people coming in and no mechanism to ensure they are trained. Everyone says we trained it until we peel it back. So how come no one understands those terms, if in fact the briefing was functional, if in fact the training was functional. Most of your people thought it was the identification of anything. Well hell I suspect if you are doing identification of anything I suspect you are not going to get a whole lot of practicing battle drills because you are doing PID every hour.
>
> (AR15-6 pg. 1110)

If there is an immediate lesson from the events of this essay's case study, it is that what a Predator drone does "on stage" is very much a reaction to what is going on "behind the scenes." The Predator drone's "black box" turns out to be its people. And despite having "game-changing" technology on their side, these people still struggled in major and obvious ways.

Throughout the events of the case study, it becomes apparent that the drones' "vision" is far from being easily accessible or ready-made. In other words, drone imagery does not "speak for itself" but is rather more like a series of what STS scholar Joseph

Dumit refers to as "expert images". (Dumit 1999) According to Dumit, "expert images", though appearing legible to a lay person, are images (transcriptions) produced with the assistance of a mechanical medium that *require* interpretation.

Rather than blaming faulty equipment or inconsistent user interfaces, the case study investigation mostly attributes the incorrect identification of Afghans as a result of human influence. The problem, according to the investigation, is not to be found in the equipment or displays or the structure of the network or the terminology. The problem was that the people involved didn't have the right attitude, didn't understand the meaning of the terms, didn't communicate honestly, and didn't know exactly *where* or *how* to look at their screens. In the language of Dumit and Latour, the transcriptions and "expert images" in the cycle of accumulation were not being interpreted properly.

Investigation AR15-6 makes it clear that the problems that led to the "21 February CIVCAS Incident" were "people" problems. Perhaps then, if people are the problem, drones would be better off without them?

Chapter 10. Autonomy as an Answer

"We live in a technological society, I argue, to the extent that specific technologies dominate our sense of the kinds of problems that government and politics must address, and the solutions that we must adopt."
Barry, 2001

War strategy today is still guided in large part by the Clausewitzian notion of "the fog of war". The concept of "the fog of war" has a long legacy that is frequently re-enacted in the modern American military context. The phrase "fog of war" and references to Clausewitz still feature prominently in Department of Defense and State Department policy papers as well as strategic papers arising out of military institutions that focus on the counterinsurgency operations now being carried out in large part by Predator drones and their "sister" technologies.

Predator drones have already been hailed as helping to lift the more literal aspects of the "fog" of war through infrared cameras capable of penetrating dusty landscapes, and persistence capabilities which allow them to survey geographies in steady and consistent passes. The less literal aspects of war's "fogginess" is often represented as a result of the inherently human element of war that cloud war operations –fear, distress, confusion and emotions generally.

This classic strategic problem finds itself re-framed in the modern context. It goes like this - if the "human element" contributes to the fog of war, and lifting this fog is key to victory, then it follows that militaries must attempt to remove this "human element" where possible. Besides, it is claimed, humans are expensive, complicated, and unpredictable. Not to mention, humans can also simply get tired while on the job (as we saw in the case study which featured some officers working up to 16 hour shifts), and can be killed. If humans are so much trouble, then why bother with them? Perhaps if we simply removed humans from the picture, the sociotechnical network of drones wouldn't be so messy?

10.1 Ethics, Autonomy, and Accountability

"It is not my belief that an autonomous unmanned system will be able to be perfectly ethical in the battlefield, but I am convinced that they can perform more ethically than human soldiers are capable of performing."
Arkin, 2011

A major criticism of the thesis case study within the investigation was that the officers' culture and attitude did not fit the demands and expectations of their job as objective observers and managers of war operations. In addition to simply not knowing what the rules of engagement and laws of war are, they also behaved in a way that did not exemplify the moral basis for these international guidelines. As a result, the AR15-6 investigation castigated some officers as "immature" or "juvenile" and recommended they receive further "vignette" training in which they act out simulated battles in an attempt to practice exercising more restraint and cooler judgment.

Ironically, some research has suggested that it is in fact the simulated nature of drone warfare and Predator networks that contribute to the moral lapses that were criticized in the case study investigation. By extending the distance between target and targeter, it is suggested that killing is made less psychologically salient and therefore easier to carry out. In *On Killing: The Psychological Cost of Learning to Kill in War*, Grossman writes that such distancing in war allows for humans to overcome the psychological response of regret and remorse. Historical examples abound in which certain populations are distanced categorically or physically from other populations in an effort to make them seem less human and therefore deserving of treatment which would normally be considered inhumane.

Increased drone autonomy, it is suggested, may offer a "way out". How exactly might an increase in Predator drone autonomy make war more ethical? In *The Case for Ethical Autonomy in Unmanned Systems*, roboticist and researcher Ronald Arkin suggests that ethical decisions be made mechanical.

What exactly would it mean for a Predator drone to be "ethically autonomous"? Within the framework currently being explored and developed by the Georgia Institute of Technology Mobile Robot Laboratory, drones would be tasked with the authority and responsibility to carry out their attacks in accordance with international norms as expressed in protocols of war operations such as the Laws of War and Rules of Engagement. If morality can be codified into legal protocols, can it also be programmed into war machines? Arkin and his team of researchers aim to show that the answer is in the affirmative.

How exactly would one go about programming international legal protocols of war and its associated moral norms into the processes of a Predator drone? Arkin writes that the problem is one of transforming "International Protocols and battlefield ethics into machineusable representations and real-time reasoning capabilities for bounded morality using modal logics". (Arkin 2010)

Arkin's team is at the forefront of developing "ethical autonomy" in drones, and he himself admits that such a task presents a great challenge, and may not even be possible. One might also question whether such a task is actually even comprehensible, or makes sense, or is a good idea, or completely "misses the point", and so on. Instead of pursuing such a line of critique here, this thesis will instead analyze Arkin's reasoning.

Interestingly, Arkin and his team at the Georgia Institute of Technology are concerned that drones themselves may now be contributing to the problem of unethical behavior on the battlefield. For Arkin and his group of researchers, the Predator drone (as it is now) is a Promethean gift. On the one hand, drones have the benefit of being of being faster, cheaper, and having "longer range, greater persistence, longer endurance, higher precision" and "faster target engagement" than previous technologies. On the other hand, drones further separate man from his enemy and offer the potential to attack virtually anybody, anywhere, at any time. Arkin views drones as a double edged beast that ought to be reigned-in in order to prevent the abuse that it renders to easily available:

"One could argue that battlefield atrocities, if left unchecked may become progressively worse, with the progression of stand-off weapons and increasing use of

technology. Something must be done to restrain the technology itself, above and beyond the human limits of the warfighters themselves." (Arkin 2010)

It seems that Arkin and others like him believe that the technological capabilities of drones result in ready-made ethical problems that are socially seductive. By presenting the ethical quandaries as new and specifically the product of such a Promethean object, the problem is cast as potentially having a specifically technological origin.

One way to look at this is that Arkin sees the drone as a device that generates "problematic" inscriptions, in the sense of lending themselves to abuse by human observers. The inscriptions themselves are not inherently problematic or themselves the result of potentially problematic social processes. How the drone "looks for" or "sees" and what it does is not problematic except to the extent that it is guided and managed by people in real time. These people that manage the inscriptions in real time are, Arkin tries to make obvious, the real problem.

In his paper, the academic robotics director references a Surgeon General's Office report conducted in 2006 that assessed "battlefield ethics" and mental health of soldiers enlisted in the 2003 Iraq War. This report found, among other details that "disturb" Arkin, "only 47% of Soldiers and 38% of Marines agreed that noncombatants should be treated with dignity and respect." (qtd. In Arkin 2010) Arkin presents a veritable laundry list of statistics that paints the military mindset and its soldiers as callous, uncaring, indiscriminate, reckless, and willing to cover up wrongdoing. These are the people, he reminds us, who are handling drone inscriptions and doing the observation work. Perhaps we would be better off relieving them of the responsibility. Indeed, according to Arkin, it would be a relief for the soldiers to no longer have such a burdensome task on their shoulders. Soldiers who, as the roboticist points out, are increasingly diagnosed with post-traumatic stress disorder and the most likely segment of the population to commit suicide.

What does it mean to shift the observation work and the management of drone inscriptions away from the soldiers who presently do this work in real-time? Arkin suggests that this work would become the work of the drone, or better said, the work of "real-time reasoning capabilities for bounded morality using modal logics". In other words, drones' own real-time ethical decision making actions should be "prescribed" by programmers and robotics professionals – men like Arkin. In this ideal future scenario, the currently emotion-laden work of hot-headed soldiers would instead be replaced by

the cool-headed translation work of programmers who "transform" legal and moral protocols into executable algorithms.

In this new vision, the age-old problem of the "trained observer" is hopefully side-stepped by getting rid of the observer altogether. The observer was too difficult to train anyway, argue the proponents of autonomy, and so we're better off doing away with him and letting the machine do the observation itself. Of course, this cannot really be so. If anything the observer is simply pushed "downstream", to those who program the rules of observation. In the end, pushing the "observer" downstream through "ethical programming" will do little to remove "the social" from the sociotechnical network of drones.

What does "pushing the observer downstream" mean for the sociotechnical network of drones? Such a question is worth considering, as autonomous decision-making in drones is expected only to increase in the future. At present, the direct operators of drones (the Pilot and slightly to a lesser extent the Sensor) are considered to be directly responsible for the actions of drones such as the Predator drone. If in the future the pilot's role is simply limited to pressing a take-off button and providing general oversight to the operation of a whole fleet of drones (as is currently being planned and has already been tested to some extent) and is no longer actually "pulling the trigger" or even giving direct attack commands, then to what extent would he be accountable for the drones' attacks? What happens to accountability when decisions to pull the trigger are no longer made by real-time human observation and judgment, but by drone programming? Does drone accountability get pushed downstream to the roboticists and programmers as well?

These questions have been raised by both researchers within the robotics field, as well as social analyses of drone warfare and numerous media articles within the last two years. Despite suggestions from both the UAV industry and military circles which indicate otherwise, the U.S. State Department's official response to these concerns have been that in the "foreseeable future" there will always be a human "on the loop" when it comes to carrying out drone strikes. Using the Department of Defense's own system of rating levels of autonomy in UAVs, this means that in the "foreseeable future" (which, according to policy documents, appears to mean between 20 and 30 years' time) drones will continue to operate within the first three levels of autonomy. It is worth mentioning that these levels of autonomy are not distinctly or exclusively expressed within specific technologies – Predator drones and other UAVs operate at varying levels within this

autonomy rating, with their activity and use over the course of a mission varying up and down between the levels of autonomy.

Chapter 11. Sustaining Imaginaries and Negotiating Narratives

In Brian Rappert et al.'s (2007) collective volume, *Technology and Security: Governing threats in the New Millennium*, Bill Durodie explains in his chapter "Understanding the Broader Context", that technologies and their use is contingent upon the social context in which they find themselves. This is the message of co-production theory, as explained in this essay and applied to the technology of the Predator drone. Critical in this co-productive process is the way in which technologies and their sociotechnical networks are perceived and imagined. When we wish to analyze a technology as a sociotechnical assemblage or in instrument in a cycle of calculation, it is important that we consider what kind of imaginative attention and visions are associated and promulgated in relation to these technologies. The technology must be viewed in its broader societal context, in which "the ambition or imagination of those societies – or lack of these – are essential influences." (Durodie 2007)

In chapter 2 of this essay, *Precision Warfare: A Sociotechnical History*, I offered a historical analysis of the social processes and events that culminated in the production of "precision guided missiles" and their attendant socio-technical imaginary, and how the imagination associated with PGMs was carried over to the Predator drone. The ways in which this occurred were complex and relied on the efforts of many sets of actors (including politicians, weapons manufacturers, and prominent military personnel), the promotion and repetition of "turning point" events, and influenced by certain epistemologies (e.g. the visual/informationalized epistemology bound up in what the military calls "signal intelligence", as well as the historical legacy of mechanical objectivity that developed throughout the scientific tradition).

The development of the sociotechnical imagination of "precision warfare" characterized by "surgical strikes" was shown to have met opposition within the same communities that promoted it the costly strongly – politicians, military personnel and even the weapon manufacturers themselves had all exercised reflexivity and expressed criticism to this sociotechnical imagination at some time and in some form.

The Predator drone as a political artifact and technological assemblage has

continued to be shaped by the imaginaries embedded within what Mosser calls the "societal embrace" of a technology. In the last few years, the sociotechnical imaginary of the Predator has become increasingly contested. Ten years ago, political commentary on the Predator drone was more likely to resemble the following quote by U.S. president George W. Bush on December 11, 2001:

> "The Predator is a good example. This unmanned aerial vehicle is able to circle over enemy forces, gather intelligence, transmit information instantly back to commanders, then fire on targets with extreme accuracy. Before the war, the Predator had skeptics because it did not fit the old ways. Now it is clear that the military does not have enough unmanned vehicles." (The Citadel, 2001)

What is especially interesting about the quote above by former U.S. president George W. Bush is that it alludes to prior negotiation of the Predator's imaginary, pointing out that the technology had received resistance from "skeptics", because it "did not fit the old ways". When George Bush delivered this speech, he was standing before a corps of cadets at a military academy, and was referring to how the predator had received backlash within military circles because it's un-piloted nature ran against the current of a military culture that has long celebrated aerial "dog fights".

As Colin Gray writes, "Airpower in all its forms has always been the product of a specific vision, or visions, of utility." (Gray 2009) Historical research coming out of the Journal of Conflict has suggested that military capabilities are more likely to influence choices about engaging in "small-scale uses or threats of force more than they do decisions about entering major wars." (Fordham 2004) Because it is often the case with military technologies that decisions about development are made before their end-product is put to use, Fordham suggests observing and analyzing what relevant decision makers consider to be their anticipated "future needs."

In George Bush's speech from above, the former president took the opportunity to outline his vision for the "future of warfare" and it is therefore noteworthy in light of Fordham's research. Bush specifically calls for a military force that calls for "innovation" rather than "obsolete bases, obsolete programs, or obsolete weapon systems", and provides examples of three specific technologies that will exemplify the "wars of the future" – Predator drones, Global Hawk surveillance drones, and precision guided missiles. (The Citadel 2001)

Since the time of Bush's speech at the Citadel Military College, the Predator drone and the sociotechnical imaginaries around it has been forced to navigate much more than the Air Force's embedded "culture of honor" related to pilots that led to the drones initial institutional resistance. The actors that are contesting the imaginary of drones, and the places in which these imaginaries are contested has become much more diversified. The following quote by a Republican senator Rand Paul in June of 2012 would have been virtually un-mentionable in 2001, but finds widespread support today:

"(Drones) flying over our homes, farms, ranches and businesses and spying on us while we conduct our everyday lives is not an example of protecting our rights. It is an example of violating them … When I have friends over for a barbecue, the government drone is not on the invitation list." (CNN 2012)

The fact that a comment like the one quoted above by Republican senator Rand Paul was both politically impossible and popularly un-imaginable in 2001 is a prime example of how the sociotechnical imaginary that surrounds drones has been negotiated and evolved within the last decade. Rand Paul's comment serves as a potent reminder of what Mosser calls the "interconnected nature of American technology, the American military and American society in general." (Mosser 2010)

Rand Paul's remarks about drones showing up uninvited to Americans' backyard barbecues also serves to highlight the way in which drones' proliferation has opened up new concerns about government surveillance on domestic populations. The success of the Predator drone abroad has helped to place the technology firmly in the imagination of the American public who no longer have trouble envisioning how such a technology might become a threat to their own constitutional rights if used to the same extent in their own skies.

11.1. Managing Perceptions, Negotiating Narratives

In Technology and the 21st Century Battlefield, Charles Dunlap stresses that with war technology, "Policy is critical because even where a particular course of action is technically moral and legal, there remains the important question of *perceptions*." Perceptions which "materially affect the public support that military operations conducted by democracies require." (Dunlap 1999)

The management of perceptions and narratives of Predator drones as potential domestic spy technologies has received more energy as a result of increased public unease with the unmanned aircraft. In "Privacy and Drones: Unmanned Aerial Vehicles",

a policy paper by Canada's Information and Privacy Commissioner, suggests that "the increased use of drones or “unmanned aerial vehicles” has the potential to result in the widespread deployment of panoptic structures that may persist invisibly throughout society." (Cavoukian 2010) The policy paper’s introduction references both Foucoult and Bentham's theoretical treatments of surveillance structures, and the theme of drones representing a new form of Panopticon is carried throughout.

Under the "Recommendations" section, the author lists among other suggestions "public debate" which are depicted as follows:

“Consultations should be conducted with relevant stakeholders… in order to examine the necessity of any proposed UAV program and if any policies are required to ensure its acceptability to the public.” (Cavoukian 2010)

In order to combat increasingly negative public perceptions of drone aircraft, the U.K. trade group Unmanned Aerial Vehicle Systems Association has suggested that drones which are used outside of war operations "be decorated with humanitarian-related advertisements, and be painted bright colours to distance them from those used in warzones". (Gallagher 2012) Similarly, in response to public unease over drones, the U.K.'s Civil Aviation Authority has advised the UAV consortium Astraea to ""paint a more positive picture" of drones to combat fears about "big brother" and "spy in the sky"". (Gallagher 2012)

Some historical research has been critical of the “perception management” and “narrative work” that has defined certain technological assemblages. (Beier 2003, Gray 2009) A prominent example that this was mentioned earlier is the case of precision guided missiles as they were used during the 1991 Gulf War. In that example, PGMs were portrayed through official channels a and nightly television footage as having defined the nature of all bombing operations throughout the Desert Storm conflict, despite having only been used in approximately 7 percent of bombing runs. (Wills 2006)

The misleading narrative of a PGM-only air force during the Gulf War was a concern to military leadership, some of whom felt that politicians may become too confident in the efficacy of PGMs and begin to rely on the weaponry as a “quick fix” instead of developing adequate strategy. (Wills 2006) Vick et al. (2006) point out in *Airpower in the New Counterinsurgency Era,* that "the political battlefield that counterinsurgency operations must seek to dominate is one in which perceptions and beliefs matter." In other words, foreign perceptions and social responses matter as well.

Since the 2010 Feb. 21 attack, General Stanley Mcchrystal himself has announced

that "drones had helped US troops but were hated around the world and that their overuse could harm American security in the long-term" (Madrigal 2013) Mcchrystal described his concern in detail:

"What scares me about drone strikes is how they are perceived around the world," he said in an interview. "The resentment created by American use of unmanned strikes ... is much greater than the average American appreciates. They are hated on a visceral level, even by people who've never seen one or seen the effects of one." (Madrigal 2013)

The drone technology, according to Mcchrystal, has supported a "perception of American arrogance that says, 'Well we can fly where we want, we can shoot where we want, because we can.'" (Madrigal 2013)

Within the military's veteran community, the creation of a new honorary medal for drone pilots has received significant backlash. (Sanchez 2013) The award, which outranks the highly touted Purple Heart (given to soldiers wounded in combat), recognizes "extraordinary achievement" by members of the military who "may not even be on the same continent as the action", has already been derided as a "Geek's Cross" by some. (Sanchez 2013) Hoping to reverse the policy, veterans have written to congressmen and president Obama, referring to the medal as a "joke". (Dawn 2013) Joe Davis, spokesman for the VFW (Veterans of Foreign Wars), America's largest foreign veteran's group, has also attacked the drone medal policy. (Sanchez 2013)

The prominent U.S. nuclear research and development agency Sandia National laboratories, along with defense contractor Northrop Grumman have suspended certain research efforts into developing nuclear powered drones out of concern that the American public will not accept such potentially hazardous technology, which could easily be transformed into an effective "dirty bomb". (Fielding 2012)

The social and psychological impact of drone use is already receiving some interest and research at the level of drone pilots (who apparently are nearly as likely to experience PTSD and stress related problems as the troops they support around the world). The social impact on privacy, which is seen as being threatened by domestic drone surveillance, is also being negotiated at the levels of policy and legislation. Populations on the receiving end of USAF and CIA drone operations have latched onto the technology as an icon of American imperialism and a "symbol of American arrogance" - a sentiment that according to defense advisors may soon develop from a matter of bad international reputation to a "serious strategic liability" in world affairs.

The broader sociopolitical consequences of drones becoming viewed as "quintessentially American" as say, SUVs is impossible to predict but seems unlikely to be a positive development in the long term. Foreign perceptions, as a result, are a target of a great deal of political effort, even at the level of war operations - following the case study air strike, a military confidence-building effort (dubbed "Operation Rebuild Hope") was carried out (including meetings and prayers with local elders, medical service and supplies, the funding of social village projects and other services and products).

Chapter 12. Conclusions and Considerations

"There is considerable value in writing the history of a dominant weapon—of privileging one particular "winning technology," so to speak—because of what such history reveals about society."
Gillespie, 2006

In the United States, state-sponsored development of unmanned aircraft has existed in some form ever since the Serbian-American inventor Nikola Tesla introduced the concept of unmanned flight in 1915 and argued that such pilotless aircraft could be used for national defense. (Army UAS Roadmap 2010). Nearly a century later, in 2010, the Predator drone reached the 400,000 combined flight-hour milestone.

The road from Tesla's influential dissertation on pilotless aircraft to the popularity of the Predator drone has been far from linear. Only after the introduction of the Global War on Terror have UAVs gone from a historical oddity considered to be at odds with the spirit and culture of the U.S. military to being touted as the new "eyes of the Army" in both policy documents and political discourse. The advent of "smart bombs" and use of the Pioneer UAV in the 1991 Desert Storm conflict provided "success stories" for unmanned aircraft, repeatedly invoked as positive exemplars and a turning point for military interest in unmanned operations.

More recently, the wars in Afghanistan and Iraq have been lauded as "proving" the successful impact of increased dependence on pilotless aircraft, and as validating UAV investment that came out of the late 90s. Since the turn of the millennium, UAV use and development has skyrocketed. The poster child for UAVs, the Predator drone, took over ten years to reach the milestone of 100,000 combined flight-hours - but only ten *months* to fly the last 100,000. By 2009, approximately 40 percent of US air force purchases had become unmanned. One year later, the number of pilots trained for the Predator and Reaper drone systems outnumbered the sum total of pilots trained for all other aerial vehicles combined. (Chambliss 2010)

As U.S. strategist Colin Gray points out, the aircraft that the U.S. military employs "is the result of ongoing negotiation among many stakeholders, civilian and military." (Gray 2009) Over the course of this essay I began by suggesting that the STS theory of co-production can help in "opening up" and analyzing the actors and elements of this process of techno-social negotiation:

"the STS literature eschews thinking about technologies as merely applied science or simply as artifacts... STS instead recognizes what would, ordinarily, be regarded as "social, cultural, economic, and political context' of the technology is usefully thought of as *constitutive* of technology." (Rappert et al. 2007)

In other words, technology is also "politics by other means", to paraphrase once more what Carl von Clausewitz said. Understanding technology as a political medium bridges the analytic gap between the "material" and the "social" and casts new light on these relationships.

Technology is both a product of and form of politics. International consortia, policy documents and common rhetorical output from governments across the world regularly use "technology" and "innovation" as discursive tools and calls for action associated with economic growth and well-being. Policy output in the form of documents, rhetorical statements, funding initiatives, as well as legislation reveal at all levels of the policy-making process how conceptually enmeshed technological development is with economic development or simply "progress".

However, it cannot simply be said that nowadays all politics is techno-politics, and that every nation everywhere is imagining and aiming for the same technological future. Techno-politics, like "every day" politics, is often "local". A nation's politics of technology can reveal important local differences, support visions and concepts of national identity, and directly impact societal configurations and relationships. In the introduction I used the example of South Korea's "politic of gaming" and contrasted it with the way video games are often the subject of politics in the U.S. to show how broader societal concerns (in this case, deterioration of family and social bonds in South Korea, and gun shootings in the U.S.) are negotiated in an evolving technological environment.

The life of politics and technology have always been intertwined processes because of their impact on social affairs. In the words of Bruno Latour, "technology is society made durable". Technologies are used to express and promote specific visions, and co-production theory allows us to see that technologies themselves are a part of this

vision-producing process. The Predator drone is one such technology, and part of my effort in this essay is to show that it is a technology whose influence, history, and conceptual associations should not be taken for granted.

This essay has been part of an effort within the STS community to open up these relationships, identify "black boxes" and expose complications that are not apparent "on the surface". Other STS studies have focused on the development and reception of a particular technologies (e.g. the bicycle, the British tank, the nuclear submarine) in order to provide a narrative and focus to techno-scientific analyses and to expose the complexities and messiness behind seemingly straightforward technologies and development processes. Furthermore, the technologies that "rule the day" are the result of interactive processes of social negotiation which play an important role in shaping what a technology is, how it is used, and how it is imagined. As Gillespie puts it, "there is considerable value in writing the history of a dominant weapon—of privileging one particular "winning technology," so to speak—because of what such history reveals about society." (Gillespie 2006)

12.1 Re-considering the Research Question and Possible Answers

This thesis began by introducing the technology of unmanned aerial vehicles (commonly known as "drones") and setting out to answer the following question:

What are the socio-technical imaginaries related to UAVs, and how do they matter in how targeting processes are understood at the level of specific attacks?

This research question on its surface can be seen to contain four necessary avenues of analysis – sociotechnical imaginaries, surrounding discourses, conceptual contexts, and specific processes of targeting. Each of these avenues of analysis were approached broadly under the theory of co-production and more specific theoretical concepts were used along with slightly different methodological approaches in order to address each part of the research question in ways that seemed most appropriate and relevant. Because of its prevalence and popularity in political discourse, the Predator drone was used as an exemplar for UAVs as a whole.

In order to unpack the results of each of these research avenues, I will separate them here and address them each one by one.

12.1.1 Socio-technical imaginaries

The socio-technical imaginaries commonly associated with the Predator drone appear

to have a historical legacy that is prominently influenced by use of precision guided munitions (PGMs) throughout the Gulf War conflicts in the early 1990s. Public access to "the battlefield" was during the Persian Gulf War was delivered primarily through the visual imagery through television broadcasts, and was mostly mediated through official government channels (as opposed to displaying footage mediated by embedded war journalists, as was the case in Vietnam). (Ibid.) In particular, selective instances of "precision success", such as the oft-reproduced video of a missile shooting down a building's chimney, were promoted as unproblematic displays of the new technological capacity of PGMs. (Beier 2003) At this time, "smart bombs" and "precision strikes" began to enter the popular lexicon, and the possibility of war practically devoid of "civilian casualties" became a popularly promoted imaginary. (Connetta 2004)

The sociotechnical imaginary of "precision strikes" and "casualty-free conflict" that rose into public consciousness during the 1990s have not simply lived on - they appear to have matured into the singly dominant concepts in which warfare is now understood, legitimized, and judged. This seems to have been in part due to the continued promotion of these imaginaries throughout the wars in both Iraq and Afghanistan, beginning in 2001 and 2003.

The Predator drone has since been hailed as the "physical embodiment" of this landscape of sociotechnical imaginaries – imaginaries of war and aggression that find themselves expressed in the discursive landscape as being "surgically precise" and capable of avoiding civilian casualties in even the most complex of environments. The imagination of drones as persistent, all-seeing, objective administrators of justice can be found throughout military literature, policy documents and official rhetoric. (Adey et al. 2007)

12.1.2 Discursive Environment

How this sociotechnical imaginary related to the Predator drone is discursively expressed has been a focus of this essay. I believe that these discursive limitations are made very clear throughout the case study that is detailed here, which paints a completely different picture of the targeting process and the technology itself than is conveyed by the prevalent rhetoric of drones as objective mechanisms of surveillance capable of un-problematically identifying proper targets in a counterinsurgency environment and delivering "pin-point", "surgical strikes."

I believe that I have shown here that the political and rhetorical focus on "precision" and other such accuracy claims, while seeming to offer technical explanation

of the drone program, in fact reveals very little about the technical capabilities of the technology and it especially conceals the "human element' behind the technology, which was shown here to be wrought with confusion.

The human network directly involved in drone operations (i.e. the drone operators in Nevada, the screeners in Florida, and the officers located "forward operating bases" in Afghanistan) seem to represent the ultimate "black box" of the Predator drone. The case study analysis here opens up a technological black box that contains a whole cast of characters who make Predator drones what they are and do what they do.

It even seemed to be the case during the military's own investigation that it's investigators were discovering their own "black boxes" in this network. The discovery of these internal black boxes and accompanying expression of clear exasperation, disappointment and surprise is expressed by the following investigator:

> "Then how come no one in your command… could identify PID, TIC and imminent threat. No one, I mean no one, not even you could define it correctly. Those are critical components of applying Rules of Engagement. And you will see this trend of new people coming in and no mechanism to ensure they are trained. Everyone says we trained it *until we peel it back*." (AR15-6 pg. 1110, my emphasis)

To expand on the language of this investigator, this research has shown that the discursive environment that surrounds the Predator drone may seem to be appropriate on the surface, that is, "until we peel it back". The discursive landscape then becomes a clear "cover" for a technological and associated cycle of accumulation/calculation that is much more complex, and far more messy than any popular rhetoric gives credit.

The "black box" of human observers, operators and controllers detailed in this essay's case study had nearly all been employed for a number of years and have been involved in hundreds of such drone attacks. In the air strike studied here, the most important targeting tool, (expressed in the acronym PID, which exists to aid in accurate identification and keep bombings within the guiding laws of conflict) was not understood by anyone involved in the operation. The legally and socially problematic element of directly involving private sector civilian workers in ongoing bombing operations (opening a window to their being considered combatants in war) was made apparent in the investigation but ignored.

Aside from the highly problematizing and black-boxed "human element" behind

the Predator drone, the political focus on technical claims of precision are misleading even if taken at face-value in terms of the technical level of actual accuracy in operations in which the targets are properly identified. This appears to be largely because determinations of a Predator drone's "accuracy" are based on a separation of the bomb from the platform that fires it. Official determinations and judgments over a Predator drone's "accuracy" brush over the targeting methods and techniques that lie beneath drone operations, which ultimately is the structure that determines the accuracy of every "precision" or "surgical" strike.

Even if we put aside the black-boxed network of human actors behind the *identification* process, (which ultimately decides whether every strike is "accurate" or not), there still remains the problematic fact that Predator drone missiles are fired in many different ways, all of which affect the attack's level of precision. Despite the emphasis on a missile or Predator drone's "inherent" precision, the actual targeting methodology (a methodology that affects the "success" rate and accuracy of drone air strikes just as much as the equipment used) is largely overlooked.

It is worth noting that perhaps it may not come as a surprise that "precise" in this context turns out to be not nearly as precise as anyone would reasonably expect - it has historically been the case that exaggeration is standard fare in the politics of technology and war. The bombs being dropped today are much more accurate than those of previous wars (e.g. consider the widespread "fire-bombing" of Dresden ad other cities by B-52 bombers throughout WW2 which were purposely intended to decimate civilian infrastructure and lead to widespread suffering), and yet they can hardly be considered precise in terms of commonly nursed socio-technical expectations. I would argue that in the minds of most people today, it seems beyond far-fetched to label weapons "precise" which regularly miss their mark by 30 feet, shoot potentially deadly shrapnel hundreds of meters, or break up into explosive shards that explode sometime in the future.

The basic conversation that surround discussions of autonomy as related to UAV operations is also problematic and somewhat contradictory - - politicians and the military continue to stress that humans are still "in the loop" with regard to UAV operations in order to address answers about accountability, while ignoring this human element when it comes to strategic bombing, which is supposedly overcome by technological advances - increased resolution and imagery, pattern recognition, increased duration of surveillance, and other such things. In other words, the conversation around drone use wants to "have it both ways" - the accountability of human operators with the technical

ability provided by drone technology.

At this point in March 2013, concerns expressed on a near daily basis across the political, media and social landscape about accountability and responsibility of the drone program are given "human" answers (e.g. "the responsibility is ultimately on the pilot", who are still "in the loop" and controlling the drone) and concerns about "ability" are given technical answers "the drones can see everything",etc.). Hidden are the 12-16 hour work shifts, shortened training programs, involvement of domestic civilian contractors in carrying out bombing runs, a culture "wrapped up in killing bad guys", and more.

12.1.3 Drones as Social and Epistemic Artifacts

In "The Limits of Security Governance", Theo Farrell claims that our development, adoption, and use of new military technologies does not hinge solely on technological capacities and product specifications – "political, organizational, and strategic imperatives also determine how technologies are designed, built, and used." (Farrell 2007)

It has been a message of the research within this thesis that these "imperatives" are crucially influenced by the conceptual and epistemic climate of the communities that assert and promote them. These conceptual and epistemic climates were shown here to be influenced by their own histories, negotiations with "opposing" communities and traditions, as well as their technological environment.

Within the context of the Predator drone, this conceptual atmosphere is significant partly because drones are painted as being producers and purveyors of knowledge, especially with regard to human identities as well as allowing for an objective pathway for normative determinations about innocence and guilt. Because decisions to attack are informed by and mediated through these conceptual and epistemological lenses, they also have a direct impact on the efficacy of drone operations by actively affecting processes that impinge on a strike's accuracy.

The epistemic atmosphere in which the sociotechnical network of the Predator drone is entangled appears to have been influenced by the epistemic legacy of mechanical objectivity and trained observation that owes its maturation and propagation to the western scientific tradition. This tradition, broadly speaking, has identified proper forms of "knowing" with properly disciplined forms of "seeing".

As a co-produced artifact, the Predator drone can be seen as the natural technological endpoint of a surveillance culture steeped in a positivist epistemological tradition that emphasizes visual inscriptions translated by mechanical objects which are

credited with being free of the subjective influence of human interpretation. Graham Spinardi's research on the Fleet Ballistic Missile Program, points to how broader "institutional factors" influence technological forms. I am arguing here that prevailing epistemological traditions and legitimized forms of knowing are one such factor in helping us understand Predator drones. Spinardi writes:

"There are many instances of technical choices made in the Fleet Ballistic Missile Program, and good evidence of a range of political and institutional factors shaping these choices... Technology cannot, then be seen as simply an applied science, following a 'natural' pathway determined by the discovery of the real world." (Spinardi 1994)

Epistemological traditions, even the most positivist, are nevertheless the product of socio-cultural processes that subjectively favor them because of the way in which the epistemology expresses the social norms of this culture. These epistemologies and cultural forms of "seeing" (and *how* they are "put to use" and by *whom*) are ultimately the product of cultural and subjective preferences. As historian of technology Caroll Pursell sums up the idea, "the purposes (ethics and values) of our society are built into the very form and fabric of our technology, and the latter does not exist in some neutral sphere divorced from that purpose." (cited in Gillespie 2006)

In the context of Predator drones, this technological and epistemic legacy appears to find itself expressed in what Jasanoff (2004) calls "the reduction of individuals to standard classifications that demarcate the normal from the deviant and authorize varieties of social control." In order to promote or sustain a certain "form of life" or "regime of living" in which such a practice of identifying populations as "informationalized bodies" plays a prominent role, this practice of population identification and control must appear legitimate or at least effective. The sociotechnical imagination that has been promoted for the Predator drone appears to try and do just that – act as a technological device that legitimizes and makes possible such a worldview.

However, as the Uruzgan case study shows, this translation of individuals into standard classifications (combatant/noncombatant, threat/non-threat, toddler/teenager) involved a great deal of real-time negotiation between human actors who themselves disagreed on the borders and meanings of these classifications. It seems as if this internal chaos and confusion has been purposely or unconsciously black-boxed by sociotechnical imaginations of drones so as to make these "forms of life" seem more practically or politically attainable.

12.1.4 Targeting processes at the level of specific attacks

Examples abound in the events of the case study in which not only the human actors impact the operation of the drone, but the drone "acts back" and influences the behavior and observations of the human actors. Imaginations were recognized to have played a role, as made clear by one officer's statement that "I can say that honestly sir, in our community we have been brought up to believe that we can rely on Predators and ISR platforms for good intel" (AR15-6 2010). The predator drone itself is also recognized as influencing the nature of the task of observation – after one officer is asked why the Predator pilot seemed so aggressive and determined to strike, he explains by saying "it looks like my guys are leaning for a strike, part of that is that they kind of have to based on the platform they are flying."(AR15-6 2010)

Derek Gregory has argued in his research on drones that drones as technocultural systems "not only *detect* objects and people but also *produce* both objects on the ground and surveillant subjects." Rather than simply providing an objective picture of what lies beneath them, the Predator drone performs a normatively laden task of presenting humans as object/subjects capable of having their identity and intentions determined through "the narrow view of a soda straw", as one of the officers in the investigation puts it. According to Gregory, drones allow for military violence in this setting to seem "everyday, bureaucratic and even mundane by the technologies and practices of image production." (Derek Gregory 2004) Indeed, the separation of labor within the Predator drone network's cycle of accumulation does seem to support Gregory's claim.

12.2 Final Remarks

This thesis has argued that as form of politics, drones focus public attention on "unruly" populations that can be made neatly 'legible' though visual imagery. The sociotechnical imaginary of drones contributes to both the framing of specific political problems (foreign population control) and certain political solutions (pre-emptive offensive action offered by aerial platforms). By leading to an increased politic of "the body as information", the sociotechnical imaginary of drones and their continued use may be institutionalizing and adding technological durability to moralities of the body in which identity is reduced only to those elements which can be scanned and quantified. The result is a "regime of living" in which ethical questions relating to bodies are framed and dealt with only in informational terms. I have argued here that this "regime of living" impacts the way in which foreign populations are understood, and in doing so, influences

the framing and evaluation of moral questions about how these populations ought to live.

The dominant sociotechnical imagination of Predator drones is one of nearly flawless machinery that objectively survey known enemy territories and carry out “clean”, “surgical” attacks. I believe that the research within this essay and in particularly the examination of the Uruzgan case study make clear that the underlying network behind UAV targeting methods is still wrought difficulty and confusion. Far from being objective 'eyes in the sky', drones reflect an easily recognizable politics - of their users, industry, and underlying doctrines. Once the black box of Predator drones is opened up, a different image arises - one that is far more complex and far less orderly than one may be led to expect. Increasingly, a pervasive regime of living stems from these messy origins. I suggest that perhaps we may benefit from confronting these messy origins before placing our confidence in the worlds they seem to promise us.

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Appendix A:

ABSTRACT:

The usage and proliferation of "drones" is now a dominant matter of interest in technological, political, moral and legal discourse. A prominent concept in addressing the role of visions and expectations in shaping technology is Sheila Jasanoff's "sociotechnical imaginaries". The concept of sociotechnical imaginaries is used to understand how drones have become enlisted as a symbol and ideal of objective surveillance, precision, and global security.

The manner in which this sociotechnical imaginary has been expressed in broader political contexts is explored through a historical analysis that spans from the Persian Gulf War of the early 1990s through to present time. At the level of specific operations, the expression of this imaginary is approached through an extensive examination of the contents of the NATO investigation's report - "21 February 2010 CIVCAS Incident in Uruzgan Province". This report offers a detailed account of Predator drones' sociotechnical network, which is opened up and analyzed here using STS theory – in particular, Bruno Latour's theory of "centers of calculation" and "cycle of accumulation."

As a part of this center of calculation, the Predator drone is viewed as an "inscription device" that plays an important role in this network's processes of identification. Seen as a co-produced object of and form of politics, the Predator drone's reputation as an objective surveillance tool is approached critically and questioned. It is argued here that drones and their surveillance products are in fact embedded with a particular thought style and concept of observation that have been socially negotiated and a subject of historical controversy.

By leading to an increased politic of "the body as information" and a greater reliance on drones' "centers of calculation", the sociotechnical imagination of drones serves to institutionalize and add technological durability to moralities of the body in which identity is reduced only to those elements which can be scanned and quantified. In doing so, the sociotechnical imaginary of drones contributes to a "regime of living" which impacts the way in which foreign populations are understood, and in doing so, influences the framing and evaluation of moral questions about how these populations ought to live.

Appendix B:

ZUSAMMENFASSUNG:

Die Verwendung und Ausbreitung von „Drohnen“ erfährt immer größer werdendes Interesse in technologischen, politischen, moralischen und rechtlichen Diskursen. Ein weitverbreitetes Konzept in der Wissenschafts- und Technikforschung, das sich mit der Rolle von Visionen und Erwartungen im Zusammenhang mit Technologien beschäftigt, ist Sheila Jasanoffs Konzept der „sociotechnical imaginaries“. Dieses Konzept wird in dieser Arbeit dazu verwendet, um zu verstehen, wie Drohnen zu einem Symbol und Ideal von objektiver Überwachung, Präzision, und globaler Sicherheit gemacht werden.

Die Art und Weise wie dieses „sociotechnical imaginary“ im größeren politischen Kontext dargestellt wird, wird durch eine historische Analyse, die von den Persischen Golfkriegen in den 1990ern bis heute reicht, elaboriert. In Bezug auf spezifische Einsätze wird der Ausdruck dieses „Imaginary“ durch eine ausführliche Inhaltsanalyse des NATO-Ermittlungsberichts „21 February 2010 CIVCAS incident in Uruzgan Province“ untersucht. Dieser Bericht liefert eine detaillierte Darstellung des soziotechnischen Netzwerks, das in dieser Arbeit durch STS-Theorien – im Speziellen Bruno Latours Theorien der „centers of calculation“ und „cycle of accumulation“ – untersucht wird.

Als Teil dieses „center of calculation“ wird die Predator-Drohne als „inscription device“ verstanden, das eine wichtige Rolle in den Identifikationsprozessen des Netzwerks spielt. Betrachtet als ein ko-produziertes Objekt und Form von Politik wird das Ansehen der Predator-Drohne als objektives Überwachungsobjekt kritisch analysiert und hinterfragt. In diesem Kontext wird argumentiert, dass Drohnen und ihre Überwachungsinstrumente in der Tat in einen bestimmten Denkstil und in ein gewisses Beobachtungskonzept verankert sind, die in der Vergangenheit bereits gesellschaftlich aufgerollt und kontrovers diskutiert wurden.

Indem es zu einer stärkeren Politik im Sinne von „Körper ist gleich Information“ und einer zunehmenden Abhängigkeit von „centers of calculation“ der Drohnen kommt, dient das hier verwendete „sociotechnical imaginary“ dazu, die Moral des Körpers, in der Identität auf jene Teile, die gescannt und gemessen werden können, reduziert wird, zu institutionalisieren und zu dieser Moral technologische Stabilisation hinzuzufügen. Hierbei steuert das „sociotechnical imaginary“ von Drohnen zu einem „regime of living“ bei, das sich auf die Art und Weise, wie fremde Bevölkerungsgruppen wahrgenommen

werden, auswirkt. Infolgedessen beeinflusst das „sociotechnical imaginary“ zudem das Framing und die Bewertung von moralischen Fragen darüber, wie diese Bevölkerungsgruppen leben sollen.

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