Eyes in the Sky:
The Domestic Deployment of Drone Technology & Aerial Surveillance in Canada

by

Shayna Gersher

A thesis submitted to the Faculty of Graduate and Postdoctoral Affairs in partial fulfillment of the requirements for the degree of

Master of Arts

in

Political Economy

Carleton University
Ottawa, Ontario

Abstract

Drones are part of a digital network of data collection technologies that enable new flows of information. There is reason to believe that military, police, and corporations, with their sizeable budgets, are amongst the main purchasers of drones in Canada. In the context of a post 9/11 heightened security environment, these organizations rely on drones primarily for their sensory and data collection equipment, effectively rendering them surveillance technologies. The growing drone economy's corporate, government, and military partnerships are leading the regulatory development which ultimately fails to address civil liberties and privacy in Canada.

Acknowledgements

My Master's thesis journey could not be realized without the help of *so* many people, and also without the generous funding sustaining me over the last two years and enabling me to carry out this research and maximize professional opportunities. My first set of thanks is owed to all the generous sources of funding, particularly the Joseph-Armand Bombardier Canada Graduate Scholarship (SSHRC), the Ontario Graduate Scholarship, and Carleton University Graduate Studies Scholarship. There are numerous people that have helped shape my work, enriched the quality of my thoughts, and/or provided me with incredible opportunities to have my research heard on a larger scale. My deepest gratitude goes to Dr. David Goldberg, Dr. Katina Michael, Dr. Tyler Wall, Dr. George Rigakos, Dr. David Lyon, Dr. Helmut-Harry Loewen, Jeffrey Monaghan, and Ciara Bracken-Roche. Likewise, a group of dedicated and brilliant privacy advocates have provided me with knowledge, editorial touches, professional opportunities, and friendship, and so my sincerest thanks goes to Kasia Krzymien, Chris Prince, and Nicholas Koutros.

There is an incredible gem of a department at Carleton University that requires huge recognition for supporting my research and encouraging me over the past two years. Thank you to the incredible faculty and administration at the Institute of Political Economy, notably Donna Coghill, Dr. Laura Macdonald, and Dr. Janet Siltanen. A big thank you is also owed to my extraordinary PECO peers for the familial and inclusive bond that was forged in Dunton Towers and which made this, at times, arduous journey so much easier. I must say that a key criteria in my decision to enroll at the Institute of Political Economy was the selection of inspiring professors affiliated with the department. Around the time I was making my decision for which graduate programs to apply, the Conservative Party was proposing a contentious Lawful Access legislation. Dr. Dwayne Winseck was amongst a few prominent Canadian scholars interviewed in a short film, highlighting the unfettered surveillance capabilities of the proposed legislation. Dwayne's critique resonated with me and I was struck by how he made himself available to the public, and hence, to potential students across the country looking to study with the best minds. Thanks for agreeing to be my supervisor Dwayne. You have been nothing but supportive, have gone out of your way to make yourself available, and have improved my ideas and writing! I would also like to express my deepest appreciation to my thesis committee who has spent time reading my work amid their busy professor schedules, Michael Mac Neil and Dr. Martin Geiger. An additional thanks is owed to Martin, who provided me with valuable input and encouragement throughout the year.

Where would I be without those Monday texts reminding me to get my thesis done?! Or those ginger snap cookies delivered in the night to give me a boost of energy?! Or those kicks in the *tuchus* to get a university degree?! Or those impromptu practices in kitchens, living rooms, over skype preparing for conferences and media calls?! I would have packed this degree in long ago if it were not for my friends and family! There are no words to express my love and appreciation to you all. But know this, you will be seeing a lot more of me than in the past two years… That's for sure! I do want to give a little extra shout out to my papa David, mamachka Anya, all the

sisters (and brothers) in my life – notably Malvina and Sarina. Also my dedas and babas, *mishpoocha*, John and Velma. *Spasieba*, *toda*, *shukriya, danke*, thank you!!

It is no easy task to thank all those inspiring people in your life that shape you in the profoundest of ways. I must try to put to words my sincerest gratitude to a few more people for helping me get this thesis delivered! There are two "socio-therapists" I cannot live without and whom I was blessed to be taught and supervised by in my undergrad, and even more blessed today to call my friends, Dr. Kirsten Kramar and Dr. Heidi Rimke. I bet you two never could have imagined that taking me on as a student over six years ago would mean that I would never stop coming to you for professional, and now personal, advice. Thank you for encouraging me all these years and continuing to impart your knowledge and give me inspiration and strength in all my professional endeavours. Last, but definitely not least, an infinite number of thanks goes to Johnny – the root of my inspiration for this thesis and whom I tap into daily for emotional, spiritual, and mental support and creativity. Thanks for taking the jump with me to Ottawa and into this whirlwind of a journey, I am forever grateful to you for being my anchor here and for sharing your brilliance with me.

Table of Contents

List of Acronyms

ATIA – Access to Information Act

ATIP – Access to Information and Privacy

AUVSI – Association for Unmanned Vehicle Systems International

BLOS – Beyond Line of Sight

CARs – Canadian Aviation Regulations

CBP – Customs and Border Protection, United States

CBSA – Canada Border Services Agency

CCUVS – Canadian Centre for Unmanned Vehicle Systems

CF – Canadian Forces

DFATD – Department of Foreign Affairs, Trade and Development

DHS – Department of Homeland Security, United States

DND – Department of National Defence

DSA – Detect-Sense-and-Avoid

FAA – Federal Aviation Administration, United States

GAO – Government Accountability Office, United States

HALE – High Altitude Long Endurance

IBET – Integrated Border Enforcement Team

ICAO – International Civil Aviation Organization

IRB – Industrial Regional Benefits

IT – Information Technology

JUSTAS – Joint Unmanned Surveillance Target Acquisition System

NxtGen – Next Generation

NRC – National Research Council of Canada

PIA – Privacy Impact Assessment

PIPEDA – Personal Information Protection and Electronic Documents Act

RCC – Regulatory Cooperation Council

RCMP – Royal Canadian Mounted Police

RPA – Remotely Piloted Aircraft

RPAS – Remotely Piloted Aircraft System

SBI – Secure Border Initiative

SBInet – Secure Border Initiative-network

SFOC – Special Flight Operations Certificate

SPP – Security Prosperity Partnership

OPC – Office of the Privacy Commissioner of Canada

OPP – Ontario Provincial Police

UA – Unmanned Aircraft

UAS – Unmanned Aircraft System

UAV – Unmanned Air Vehicle

USC – Unmanned Systems Canada

USCG – United States Coast Guard

UVS – Unmanned Vehicle Systems

Preface

Unmanned aircraft, most commonly referred to as "drones," have an old history and one that is congruent with militaristic innovation. The Chinese General Zhuge Liang is considered to have deployed some of the first unmanned aircraft technologies as early as the second century BCE when he fuelled paper air balloons by oil-lamps to ward off oppositional forces at night (Jarnot, 2012, p. 1). Overtime, unmanned aircraft systems took on a variety of forms. The aerial torpedo for instance, developed by the United States during World War I, "combined the inventions of the radio, airplane, and mechanical autopilot" to produce an unmanned combat aircraft (Jarnot, 2012, p. 3). In Canada, drones emerged as a joint military-industry undertaking in the late 1950s (Carryer, 2008). During this time, Canada's drone industry was "recognized world leaders" in the military market for inventions such as Canadair's rocket-resembled CL-89 and CL-289 unmanned aircrafts (Carryer, 2008, p. 4). These earlier models however, are not the advanced drones of today. By the nineteen-nineties, modern technologies such as microelectronics, the global positioning system, various sensors, and/or laser-guided weapons were integrated into unmanned aircraft in ways that distinguish them from their predecessors (Singer, 2011, p. 69).

In the contemporary moment, drones are most infamously associated with the United States' targeted killings throughout the Middle East and Africa, leading many to question the legality and ethicality of their use (Benjamin, 2013; Gregory, 2011; Adey, Whitehead & Williams, 2011; Delmont, 2013). However, there are many more uses beyond the military. Drones are increasingly being repurposed for commercial and public uses around the world. Small drones, such as those weighing 35kg, are being deployed in harsh climates such as the Arctic and Antarctica to conduct scientific research (Madrigal, 2009). Micro drones with

mounted cameras, weighing less than 5kg, were recently used in India to locate survivors during life-threatening flash floods and landslides (Chauhan, 2013). That same class of drone is operated across Canada for a plethora of purposes, such as for agriculture, where farmers monitor the health of their crops with infrared, thermal, and video imaging devices fastened to the belly of the aircraft (Mcmenamin, 2013). In fact, Canada's capital city, Ottawa, recently deployed a small and noisy drone to rid its popular Petrie Island beach of "pesky geese that dirty the waters with fecal matter" (*Fox News*, 2013).

It might very well appear that drones offer "almost limitless new applications" by virtue of their design (Canadian Centre for Unmanned Vehicle Systems, 2010, p. 12), but not every use bodes well for democratic societies that wish to uphold fundamental rights and freedoms. Take for instance, multinational oil and gas companies and organizations that are researching and developing drones for pipeline monitoring (Stangler, 2013). It sounds like an important use with zero downside. Oil refineries and petro-chemical industries operating in Canada already hire the services of drone companies to provide remote aerial inspection services for flare stack tips, cooling-towers and large storage tanks (Schobesberger, 2007; Digital Aerial, n.d.). Yet inappropriate uses are also being considered with respect to pipeline monitoring as divulged by former executive director Paul Drover of Canada's leading special interest group on the subject, Unmanned Systems Canada:

> Drover told *In These Times* that aerial surveillance from UAVs would enable pipeline companies to better detect "folks setting up camp." When asked if he was referring to activists, Drover replied, "that's the left side of the arc" (Stangler, 2013).

Drover's proposal to monitor so-called left leaning environmentalists and other groups could seriously impede on civil liberties. What this example begins to illustrate is the complexity of the

technological design of drones, and more broadly, the political practice and economical incentive of surveillance.

This thesis examines the rationalities and legalities justifying the use of drones. It argues that while there are indeed many valuable uses of the technology, it is likely that the integration of drone technologies into Canada's airspace will generate a series of social harms. The practices that will likely generate the most harm include deploying drones for non-specific, widespread, and persistent surveillance of private and public spaces, and also affixing such technologies to invasive software, such as facial recognition, or non-lethal and lethal weaponry. The focus on the downside as opposed to the benefits of domestic drone integration is not because I wish to terminate or oppose its development. On the contrary, there are many great uses of the technology, some of which are cited above. But there is no shortage of discussion about "how drones can do more good than harm" (Aeryon Labs, 2013). What needs to be advanced instead is a careful examination of the anticipated and unanticipated consequences of integrating and normalizing these "eyes in the sky," as one Royal Canadian Air Force commander called them in his bid to use drones for domestic security in Canada (Canada, 2013). As it stands, the current process of drone integration in Canada will more than likely expand domestic security and surveillance operations that could jeopardize citizen's rights and freedoms. There is still time, however, to ensure that adequate controls are placed on actors with disproportionate access to power. Moreover, the fact the drone debate is happening now makes it an opportune time to conduct academic research, as there is a chance of influencing nascent state policy, or at least to critically appraise the situation in order to bring much needed information to the Canadian public.

The organization of this thesis is as follows. The first chapter offers a working definition of a drone and introduces the reader to academic debates surrounding the domestication of this aerial device. Also included in this chapter is a methodological discussion. The second chapter highlights theories surrounding the politics of technology, surveillance, and the surveillance-industrial complex. The third chapter, derived from primary data, exposes the inappropriate regulatory regime guiding the integration of drones into Canada; the current and prospective uses and policies by law enforcement, border agents and the military in domestic operations; and also the role of the private sector in helping to bolster the expansion of surveillance systems for security operations in Canada. The fourth chapter takes into account the legal implications of drones in relation to Canada's privacy laws and introduces the reader to the political qualities embedded in the technology. The final chapter summarizes and assesses the key findings of the thesis, proposing an alternate path for introducing drones into Canada.

1 Chapter: Understanding the Drone Phenomena

It would be remiss to not speak about the politics that surrounds the word "drone." Drones have been called many things over time. In fact one source lists fourteen names since the late 1890s, but "the most enduring term … has been "drone"' (Newcome, 2004, p. 3).[1] The term appears to have caught on around the 1930s when the British named one of their own remotely controlled combat aircraft's "Queen Bee," from which the nickname drone apparently originates (Newcome, 2004, p. 4). Many governing bodies today prefer two sets of terms, such as the umbrella terms "unmanned aircraft" (UA) and "unmanned aircraft system" (UAS), or the more particularized terms, "remotely piloted aircraft" (RPA) or "remotely piloted aircraft system" (RPAS), all of which are defined below.

Attempts to move away from use of the word "drone" are not merely about correcting the inaccuracies of the classification, however, but also have to do with getting rid of the social stigma. Michael Toscano, the president of one of the largest international lobby groups on behalf of the technology, the Association for Unmanned Vehicle Systems International (AUVSI), is worried that:

> The average person on the street, and even intelligent and informed people, when they think of the word 'drone,' they think of the military, they think hostile, they think weaponized, they think large and they think autonomous, … if you say the word 'drone,' 80 percent will pick the picture of a Predator – that's what's wrong (Toscano, cited in Whittle, 2013).

[1] Other terms applied to drones include: Tesla's "Telautomaton", Sperry's "Aerial Torpedo", Pilotless Airplane, Radio Controlled Aerial Target (RCAT), Surveillance Drone, Special Purpose Aircraft (SPA), Remotely Piloted Vehicle (RPV), Unmanned Aircraft (UMA), Automatically Piloted Vehicle (APV), Unmanned Aerial Vehicle (UAV), Unmanned Tactical Aircraft (UTA), Unmanned Combat Air Vehicle (UCAV), and Remotely Operated Aircraft (ROA) (Newcome, 2004, p. 3).

The industry wants so much to get rid of any negative and violent connotations associated with their product that participants at the 2013 AUVSI conference were required to type the password "DONTSAYDRONES" when logging onto the venue's WiFi connection (Whittle, 2013). Vested stakeholders from law enforcement agencies in Canada also "don't refer to them as drones" and are concerned that "[p]eople's worst fear is [that police are] purchasing them to do surveillance" (Sgt. Domoney, cited in Freeze, 2012).

Throughout this thesis, an assortment of terminology is used but preference is given to the most infamous and accessible term – drones. This choice is deliberate and reflects philosopher Michel Foucault's idea that power is embedded in language, or more broadly, discourse (1988; 1995). Postcolonial scholar Ania Loomba succinctly describes Foucault's notion of discourse in the following way:

> the concept of discourse extends the notion of a historically and ideologically inflected linguistic field—no utterance is innocent and every utterance tells us something about the world we live in. But equally, the world we live in is only comprehensible to us via its discursive representations (1998, p. 39).

If language is laden with particular sets of ideas and values, then we can begin to understand how attempts to replace drone-speak with new terminology risk erasing and disregarding an enduring legacy of drones as technologies of war and surveillance.

1.1 Defining Drones

Drones are most commonly associated with an aircraft, but they can also include underwater or ground based systems. The focus of this thesis is not on the entire family of unmanned systems but only those that are aerially operated. The majority of scholars, governmental agencies, and media outlets writing about non-military drones tend to adopt official definitions supplied by civil aviation regulatory bodies worldwide, which are often

written with the help of industry organizations. Definitions such as the kind provided by the International Civil Aviation Organization (ICAO) are illustrative of the dominant way to conceptualize drones. ICAO, along with many of its member states around the world including Canada, has adopted the formal nomenclature of remotely piloted aircraft (RPA), remotely piloted aircraft system (RPAS), unmanned aircraft (UA), and unmanned aircraft system (UAS). According to ICAO, a remotely piloted aircraft is defined as "[a]n aircraft where the flying pilot is not on board the aircraft"; where as, a remotely piloted aircraft system is defined as "[a] set of configurable elements consisting of a remotely-piloted aircraft, its associated remote pilot station(s), the required command and control links and any other system elements as may be required, at any point during flight operation" (International Civil Aviation Organization, 2011, x). Remotely piloted aircraft (system) is a subset of unmanned aircraft (system), which is meant to distinguish the piloted from the potentially autonomous operation of drones, however both terms are often used interchangeably.

While the Canadian civil aviation regulator, Transport Canada, adopted the aforementioned terms, they have yet to be integrated into the *Canadian Aviation Regulations* (*CARs*), the body of rules governing drone operations. As such, the previously designated terminology "unmanned air vehicle" (UAV), officially adopted in 2003, is still in use by Canadian regulators and industry stakeholders. The term UAV replaced the original term "non-piloted aircraft" introduced into the *CARs* as early as 1996 (Transport Canada, 2012b, p. 35).

The problem with relying on such definitions is partly articulated by privacy advocate Roger Clarke (2014b), who explains that "regulatory agencies are constrained by constitutional limitations and their own enabling legislation, and in many cases this results in warped definitions of limited value for policy assessment" (n.p.). Clarke is correct to assert that

definitions supplied by aviation regulators have serious shortcomings. These definitions adopted en mass tend to mystify the sensory and computing characteristics of the drone by relying on overly technical descriptions that veer on the abstract and obtuse. In fact, the vast majority of drone uses depend on sensory equipment of some kind. This has led political scientist Peter Singer (2012), who classifies a drone as a robot, to assert that in order "[t]o operate, a robot is always gathering and storing information about the world around it. Always" (n.p.).[2] While drones can fly without collecting information, there are very few operations where this will be beneficial. For most uses then, we can consider drones to be intrinsically surveillance technologies.

Defining a drone in relation to an aircraft that is remotely operated or unmanned, and affixing the overly vague "systems" term to it and other technical descriptors essentially obfuscates the political qualities embedded within the technology, posing serious consequences not only for policy-making, but for human rights, civil liberties and privacy in particular. Such a view, that technology carries political qualities and is not necessarily neutral, belongs to a critical sociological and political theory tradition that Langdon Winner (1980) has dubbed a "theory of technological politics" (p. 123). A deeper discussion of this theoretical tradition will be advanced in the second chapter, and the implications of such definitional limitations will be further fleshed

[2] While Singer is not alone in classifying a drone as a robot (see Culver, 2014; Lin, Bekey, & Abney, 2008; Clarke, 2013), postmodern scholar, Chris Hables Gray, suggests that such nomenclature is problematic on two accounts. Firstly, robots require full autonomous function, whereas drones at this point must legally maintain a human in the loop. Secondly, referring to drones as robots provides a potential loophole for operators to be held liable or responsible for their actions, especially within the context of combat zones. Hables Gray prefers to conceptualize drones as cyborg systems (see "Chris Hables Gray on Singularity 1 on 1" [Video File at 8:28min]).

out in the pages ahead. For now, an examination of the range of issues in the literature on the domestic application of drones is in order.

1.2 Literature Review

Given that advanced aerial drones are an emerging technology, debates around their domestic use, regulation and impact have only recently surfaced among industry stakeholders, scholars, lawyers, government agencies, civil liberties organizations, journalists and other interested parties worldwide. In Canada, the debate is only beginning, but fortunately much that has been written elsewhere about civil drones, particularly in the United States, Australia, the United Kingdom and Europe, pertain to the Canadian situation as well. What follows is a summary of the central academic debates surrounding the emergence of drones for domestic use in these countries.

The academic literature comprising the domestic drone debate includes a diversity of perspectives from the fields of law, political economy, critical geography, journalism and mass communication, cultural studies, technology and society studies, military ethics, criminology, sociology, and other social sciences. It is often the case that a scholar's analysis will connect to more than one issue and so the proceeding analysis takes into account the major argument(s) advanced by the small and somewhat disparate group engaging with the matter of domestic drones. Those concerned with the emergence of domestic drones mainly explore the public and commercial domain, or what is broadly referred to as civil jurisdiction. However military operations on home soil are also factored into some domestic drone analyses. The proceeding review ultimately aims to identify and thematize, categorize, and evaluate the breadth of issues that make up the contemporary debate over drones in the context of their domestic deployment.

Particular attention is paid to the harms identified in relation to drone operations and also to references of Canada in the literature. The debates can broadly be grouped under the following four headings: safety and liability; privacy and surveillance; social justice, ethics and surveillance; and the politics of security.

1.2.1 Safety & Liability

There is widespread agreement within the scholarly literature that drones have a significantly poorer safety record in relation to their piloted counterparts. Hence, while safety is touched upon in all the literature, only a few conduct a regulatory analysis of the laws that are in place to ensure their safe integration into national airspaces (Gogarty & Hagger, 2008; Clarke & Moses, 2014; Ravich, 2009). There is mutual interest among this group of scholars in finding a way to integrate drones safely into civil airspaces around the world, however where their analyses diverge is around the types and extent of controls that should be put in place (Gogarty & Hagger, 2008; Clarke & Moses, 2014; Ravich, 2009). One perspective suggests that civil aviation regulators within the US must not stifle economic growth, the competitiveness of the American drone sector, and the immediate need for national security, by delaying the development of a clear and enforceable set of aviation rules (Ravich, 2009). Hence, for legal scholar Timothy Ravich (2009), for example, regulators should see to it that drones posing fewer physical safety risks be integrated into US national airspace at an earlier date than those requiring technological improvements. At the same time as legislators and regulators promote the safe and incremental integration of drones into national airspace, they must also ensure that contract, tort, property and regulatory rights are also in place to guarantee public safety (Ravich, 2009).

While Ravich (2009) only points in passing to various laws that can protect public safety, others have conducted a thorough analysis of them, indicating that tort, aviation, general liability and criminal laws throughout many countries are in need of serious updating if they are to effectively limit the physical harm potentially caused by drone deployment (Gogarty & Hagger, 2008; Clarke & Moses, 2014). In addition to ensuring that appropriate controls are in place with regards to public safety, this latter group of scholars also contends that laws addressing privacy (Gogarty & Hagger, 2008; Clarke & Moses, 2014), autonomous machines, the weaponization of drones, or their use to collect evidence (Gogarty & Hagger, 2008) ought to be the subject of immediate consideration as well. Others have positioned their analysis around the assumption that legal hurdles surrounding the safe integration of drones into national airspaces will be overcome. The law scholar Geoffrey Rapp (2009), for instance, focuses on the legal protections in place for law enforcement agencies that might protect them against potential civil lawsuits that could arise from their use of drones. The overall thrust of this argument is to prepare law enforcement on the risks involved in the use of drones, as well as the range of legal instruments available to protect them should liability concerns arise (Rapp, 2009).

1.2.2 Privacy & Surveillance

The majority of scholarship focuses on the privacy threat posed by the domestic deployment of drones for surveillance purposes, and consequently examines the legal protections in place to safeguard rights to privacy (Villasenor, 2014; Villasenor, 2013; Gogarty & Hagger, 2008; Dunlap, 2009; McBride, 2009; Finn & Wright, 2012; Black, 2014; Vacek, 2009; Calo, 2011; Clarke, 2014a). The bulk of these analyses centre on US privacy laws (Villasenor, 2014; Villasenor, 2013; Gogarty & Hagger, 2008; Dunlap, 2009; McBride, 2009; Finn & Wright, 2012; Black, 2014; Vacek, 2009; Calo, 2011), however some examine the European, UK and

Australian contexts as well (Gogarty & Hagger, 2008; Finn & Wright, 2012; Clarke, 2014a). These analyses tend to be policy driven and based on specific jurisprudence dealing with surveillance and privacy. Without going into all of the details and nuances of these legal debates, the thrust of these discussions centre around whether existing privacy laws are sufficient to protect citizens from drone-based surveillance carried out by either individuals, public and/or private agencies. Many have demonstrated that privacy or data protection legislation along with previous court rulings in the US, Europe, UK or Australia are, in varying degrees, too weak to adequately protect citizens from the intrusive and complex capabilities of drone-based surveillance (Gogarty & Hagger, 2008; Dunlap, 2009; McBride, 2009; Finn & Wright, 2012; Black, 2014; Vacek, 2009; Calo, 2011; Clarke, 2014a).

Others are more optimistic in their analysis, suggesting that constitutional, common and statutory laws within the US could provide a level of privacy protection for civil society as drones increasingly take to the skies (Villasenor, 2014; Villasenor, 2013). Some have gone as far as suggesting that the creation of drone-specific legislation to protect privacy in the US could have contradictory effects of undermining national security interests and the growth of a viable industry while doing very little to safeguard privacy (Ravich, 2013). There are those that have extended their privacy analysis to consider a number of legal acts, authorizations and exemptions that permit law enforcement to conduct lawful surveillance of the general public, even though citizens are largely constricted from doing the same (Clarke, 2014a). Granting disproportionate power to law enforcement to carry out public surveillance is a growing trend throughout the US, Europe and Australia, leading Roger Clarke (2014a) to argue that the introduction of drones will likely exacerbate this trend, further undermining privacy and fundamental democratic rights. While a scholarly analysis with respect to the strength of Canadian privacy laws in the face of

drone-based surveillance has not yet been carried out, legal scholar Joseph Vacek (2009) did implicate Canada by examining the emergence of drones at the US northern border. Vacek (2009) contends that the existing visual and infrared sensors attached to large Predator drones for border security operations on the US-Canada border will likely not constitute a search under Fourth Amendment jurisprudence because the technology is still immature and not privacy intrusive enough to penetrate its gaze within the home.

These analyses are predominately legal in scope, however many offer a discussion of the harm that drone-based surveillance poses to privacy. Some have articulated the harm through Orwellian metaphors of "Big Brother" or "Police Patrol," whereby the government exercises supreme control over its population through techno-surveillant means, serving as an example of where society may head without adequate privacy protections in place (Dunalp, 2009; McBride, 2009; Black, 2014; Vacek, 2009). Some draw on Michel Foucault's "panopticon" metaphor – itself inspired by Jeremy Bentham's prison model – to describe the impacts of drone deployment, which can operate invisibly throughout society, thereby inducing a self-disciplinary and normalizing effect for those under observation (Clarke, 2014a; Finn & Wright, 2012; McBride, 2009). In addition, some describe the consequences of drone surveillance as provoking a "chilling effect" on a host of political, religious and intimate behaviours in both public and private spaces, thereby threatening to erode a number of democratic values, including privacy (Clarke, 2014a). In short, many are concerned that surveillance drones could become ubiquitous in the near future (Gogarty & Hagger, 2008; Vacek, 2009), and that their widespread use threatens to destroy society's expectation of privacy – an expectation upon which the whole edifice of privacy protections in western capitalist democracies has been erected (Dunlap, 2009; Finn & Wright, 2012; Black, 2014). Others are more hopeful and suggest that drones could "help

restore our mental model of a privacy violation. They could be just the visceral jolt society needs to drag privacy law into the twenty-first century" (Calo, 2011, p. 29).

1.2.3 Social Justice, Ethics & Surveillance

While an erosion of privacy is one way to conceptualize the impact that surveillance drones will have for civil society, another is to view the impact broadly as a matter of social justice and human rights (Murakami Wood, 2007; Finn & Wright, 2012; Bauman & Lyon, 2013), or as an ethical conundrum (Singer, 2012; Gogarty & Hagger, 2008; Galliott, 2012; Culver, 2014). A group of sociologists suggest that new technologies, including drones, are changing the nature and scope of modern surveillance as a result of its electronic form (Murakami Wood, 2007; Bauman & Lyon, 2013). For David Murakami Wood (2007), drones can broadly be situated as one of many new computing technologies contributing to the pervasive structuring of everyday life. Civic life, as a result, is becoming more and more organized around, and dependent on, fixed and mobile computing devices that are increasingly networked and ubiquitous. In the process of digitizing social spaces and life, Murakami Wood (2007) argues that opportunities for the surveillance of people is made easier, while concepts such as anonymity, privacy, and human rights are harder to maintain, and will require society at the outset to become engaged in matters of technological design and governance. Zygmunt Bauman and David Lyon (2013) contend that drones along with a host of new technologies are contributing to the evermore "liquid" nature of surveillance, by which they mean that surveillance is moving beyond bureaucratic panoptic observation towards a subtler, fluid and consumerist form rooted in the pervasive place of electronic media in the modern world. The impacts of this liquid form of surveillance are twofold: while electronic devices tend to generate pleasure and enjoyment, they also enable hidden forms of discrimination through the acquisition

of data and the creation of profiles that seek to sort populations according to perceived categories of risk (Bauman & Lyon, 2013). Hence while issues of privacy are certainly implicated in this new form of surveillance, the authors' contend that more is at stake, such as issues of "fairness and justice, civil liberties and human rights" (Bauman & Lyon, 2013, p. 13).[3] While privacy is the focal point of Rachel Finn and David Wright's (2012) analysis, they also demonstrate how law enforcement's use of surveillance drones for domestic purposes in Europe and North America intrudes upon more than just privacy. Drone technologies as they are currently deployed by law enforcement disproportionately target marginalized populations – migrants, protestors and the poor – spurring worries over not just privacy, but civil liberties and matters of ethics (Finn & Wright, 2012).

Some position their analysis around the ethical dilemmas of civil drones that will need to be contemplated prior to their mass proliferation (Singer, 2012; Gogarty & Hagger, 2008; Galliott, 2012; Culver, 2014). Political scientist Peter Singer (2012) argues that as the technical capabilities of drones improve and their numbers increase, drones along with other robotic technologies are poised to become more intelligent and powerful in the future, having revolutionary impacts for civil society as well as prompting ethical questions for consideration. Some of the ethical conundrums that need grappling with in the immediate moment are the development of autonomous weaponized drones, the looming global robotics race, privacy impacts, and the variety of shapes, forms and sizes that drones will embody for domestic

---

[3] Elsewhere David Murakami Wood and David Lyon discuss in greater detail why framing the social implications of surveillance in sole terms of privacy is not fully adequate. For both sociologists, privacy is often limited in the West to data protection legislation and frequently framed in individualistic terms, such as privacy belonging to the personal realm (Lyon, 2003, pp. 1-2; Ball et al., 2006). Such definitional constraints of privacy cannot explain the more far-reaching implications of digital surveillance, such as widespread social discrimination through arranging personal data into categories of risk or value (Lyon, 2003, p. 1; Ball et al., 2006).

applications (Singer, 2012). Others suggest that autonomous drones mirror ethical issues as substantial as nuclear weapons since they provoke widespread fear and generate power imbalances, spurring a need for debates that focus on whether drones should be created at all (Gogarty & Hagger, 2008). Military ethicist Jai Galliott (2012) has turned his attention to the civilian realm, arguing that two issues are in need of immediate attention with respect to drones: safety and privacy. For Galliott (2012), drones have a higher accident rate than piloted aircraft and thus their deployment threatens the safety of civilians, raising ethical questions of whether they should be allowed to operate in domestic airspace. With respect to privacy, drones could be deployed by individuals, corporations and law enforcement in places and spaces they should not invade, raising ethical concerns over their intrusion, collection, storage and sharing of information, but also misinterpretations of the data they collect (Galliott, 2012). Others have examined the ethical dimensions of drone deployment within the context of journalism (Culver, 2014). For media ethics scholar Kathleen Culver (2014), the deployment of robotic drones for journalistic purposes must be ethically weighed against the utility, or the good, they will provide for society. Since drones are safety hazards, Culver (2014) argues that their potential to cause physical harm must be weighed against the potential for life savings. Other ethical dimensions include the remote acquisition of data, which could remove journalists from the context of their reporting thus skewing the information attained (Culver, 2014). Moreover, privacy violations may increase in frequency, especially if operated over what are generally considered unprotected public spaces, spurring moral dilemmas in need of consideration (Culver, 2014). Culver (2014) also highlights how the data journalists acquire through drones could be seen as valuable to law enforcement, which will require journalists to stand firm against becoming assisters to unlawful surveillance.

1.2.4 The Politics of Security

Various scholars situate their drone analysis within the context of security, drawing connections between civilian law enforcement agencies, the military and their shared technologies (Williams, 2011; Wall & Monahan, 2011; Salter, 2013; Neocleous, 2013a; Neocleous, 2013b; Feldman, 2011). There is a consensus among some that the transference of military-grade drones deployed within the 'war on terror' for domestic law enforcement purposes is contributing to the increasingly militarized tactics of American policing and border patrol (Williams, 2011; Wall & Monahan, 2011; Salter, 2013). It is argued that military drones deployed within the US for domestic security and abroad in combat zones has the dual effect of blurring the boundaries between military and civilian agencies, and furthermore contributing to a thickening of international borders, rendering border zones increasingly impenetrable towards perceived threats (Williams, 2011). For others, the introduction of military drone technologies along with their strategies into domestic security operations threatens legally enshrined rights, and also contributes to a distancing effect between the observer and those observed. The results of such mission creep include the dehumanization, racialization, homogenization, and marginalization of 'othered' populations rendered into the dominant targets of surveillance (Wall & Monahan, 2011). The reliance on drone technologies within military and civilian spheres signals for some the primacy of air control for the management of populations (Williams, 2011; Wall & Monahan, 2011), which increasingly depends on categorizing and monitoring populations preemptively and according to ascribed levels of risk (Wall & Monahan, 2011).

Some have examined the militarization of policing through a gendered and cultural lens, arguing that while American police promote the effectiveness of a technology still beset with

economical, practical, legal and technical limitations, another way to understand their interest in deploying surveillance drones domestically is that it enables police to embody, enact, and bond through combative subject positions (Salter, 2013). Therefore the adoption of military drones for domestic law enforcement applications is being fuelled in part by masculinist desires of power and domination, both helping to embed military strategies into the management of crime control and national security, whilst normalizing the state's violent responses towards crimes that require social solutions (Salter, 2013). Political economist Mark Neocleous' (2013b) drone analysis moves beyond the conceptualization of the military and civilian law enforcement becoming evermore enmeshed, and instead argues that the two security agencies are historically one policing entity, reflecting an age old mechanism of state power that ensures the capitalist social order. From this perspective, policing from airspace is not concerned with distinguishing civilian zones from combat ones; instead, the growing reliance of drones for aerial policing must be understood as a desire to expand the police presence and occupy greater, and increasingly vertical, spaces for doing so (Neocleous, 2013b). What is more is that the future of aerial policing will rely not only on drones, but also on the use of no-fly zones within civilian-military domains, contributing to enhanced police powers and control over the airspace while lessening the chances for resistance (Neocleous, 2013a). Others have analyzed the US deployment of drones in theatres of war and at home as part of an enduring colonial project of the US empire, whereby drones become a visual technology for racializing from above, thereby augmenting the continued legacy of racialization on the ground, both within and beyond the United States (Feldman, 2011).

1.2.5 Summary

While the literature on drones is vast and growing fast, there appears to be little mention of the emergence of drones for domestic application in Canada. While it is essential that an examination of the Canadian context be undertaken, lessons can nonetheless be drawn from the preceding analyses. To begin, protecting civil society from the potential physical harm of drones, as well as ensuring adequate safety laws are in place, are indeed worthy of study. However, significant research and funding by governments and industries worldwide, including in Canada, have been allocated to address the safety issue. Therefore it is likely that the weak safety record of drones will be resolved sooner than the social and ethical impacts of their deployment. The focus of this thesis is to move beyond the safety and liability debate and towards an examination of the social impacts that citizens may be left to absorb in the wake of drone integration for domestic operation. Therefore concerns identified within the privacy, social justice and ethics, and the politics of security sections have particular relevance for a Canadian analysis.

As was mentioned previously, legal scholarship examining the efficacy of Canada's privacy laws as it relates to drone-based surveillance is rare. Undertaking a comprehensive analysis of Canadian privacy legislation is unfortunately out of scope for this thesis. There are, however, various policy analyses issued by Canadian Privacy Commissioners, and a recently released report by the Surveillance Studies Group (discussed below), that will be assessed in the chapters ahead in an effort to determine the strength of these laws for protecting citizens from drone-based surveillance by private and public actors. With respect to this discussion, the privacy analyses conducted within the US, Europe, and elsewhere may provide useful insights for the Canadian context. Of particular use are the discussions surrounding the impacts of drone-based surveillance to privacy. Lastly, Joseph Vacek (2009) implicates Canada in his privacy

analysis by suggesting Predator drones operated on the US northern border are not intrusive enough to constitute a search, and while it is out of the scope of this thesis to engage in his legal argument, the capabilities of this technology will be examined.

The sociological literature that examines the changing nature of surveillance and the effects of this transformation on civic life will form part of the theoretical underpinnings carried out within the next chapter. It will be necessary to reevaluate Finn and Wright's (2012) assertion that law enforcement operations in North America and Europe tend to disproportionately target marginalized populations. With regard to discussions of ethics, the possibility for weaponized, autonomous and covertly designed drones will have sweeping implications for the quality of life in Canada and will be further explored. An ethical issue that is of particular importance and that extends beyond Kathleen Culver's (2014) examination of drone journalism is the issue of deputation, whereby the private sector becomes the surveillance arm for the state. So few within the literature raise this important point and it is one that will need to be considered within the Canadian context. Finally, whether conceiving of the military presence and their transference of technologies into civilian realms as a blurring of boundaries, or as a continuum of a general policing or colonial project, or as a combat culture existing among police, the significance of these revelations for my analysis will be to examine how security policy and practices, particularly within the US, influence the Canadian context. Critical geographer Alison Williams (2011) made note of the fact that Canada's shared border with the US is subjected to militarized strategies and aerial spy technologies, however more details as to the nature and extent of these drone operations and the interagency collaboration within and along Canadian borders needs to be fleshed out.

While academic studies focusing on the Canadian drone context are largely absent, there are scholars within Canada beginning to research the issue. The Surveillance Studies Group at Queen's University, for instance, were commissioned on behalf of the Office of the Privacy Commissioner of Canada to investigate the phenomena. The group, in April 2014, released the report, *Surveillance Drones: Privacy Implications of the Spread of Unmanned Aerial Vehicles (UAVs) in Canada*, which will be discussed further in the third chapter. In addition to this report, there is scholarship that references the emergence of drones in Canada, particularly with respect to border operations (see Gilbert, 2012a). However, on the whole, the academic literature in Canada is thin. This, indeed, is one of the key reasons this thesis is so important. In other words, it helps to fill a large gap in our knowledge of domestic drones. It should also be noted that some reports are available from consultancy agencies, such as Block G that released a study in 2013 called *Watching Below: Dimensions of Surveillance-by-UAVs in Canada*, but these reports are prohibitively expensive. They most certainly were beyond the reach of this thesis' budget. The steep cost of such reports also means that they are only rarely available to the general public, if at all. While the author of this thesis has published papers about domestic drones – which will be integrated within the third chapter – the paucity of scholarly and other writing outside the circle of drone makers, users and a few government agencies in Canada ultimately helps dominant actors to control the agenda of public discussion on the topic.

1.3 Methodology

The objective of this thesis, as I have indicated, is to examine the emergence of civil drone technologies in Canada. The research specifically aims to provide a canvassing of views on the matter of civil drones, and to determine whether the potential social harms will out weigh

any benefits that might accrue from their domestic integration. In order to pursue this objective, it is necessary to examine the central actors and agencies involved in the policymaking and production process for drones, and to ascertain the governing rationalities underlying their adoption in Canada. To carry out this research, I examine existing policies on the civil use of drones and do a qualitative analysis of primary data obtained from the federal government of Canada though Access to Information and Privacy (ATIP) requests. I also draw upon information released on the websites of Canadian drone associations and companies. The following section begins by describing the purpose of requesting ATIPs from the Government of Canada, which is accompanied by a discussion about the agencies selected and excluded from such requests, as well as the process and its results. I offer a description of ATIPs because, as will be seen, this was one of the primary means by which data and information on the topic could be brought into the light.

1.3.1 Why Access to Information & Privacy (ATIP) Requests?

The *Access to Information and Privacy Act*, also referred to as the *Access to Information Act* (*ATIA*), "gives Canadian citizens, permanent residents, or any person or corporation present in Canada a right to access information that is contained in government records" (Treasury Board, 2014a). In other words, obtaining records from the federal government is the right of all Canadians. The benefit of accessing unreleased documents from the Government of Canada is that it allows researchers the opportunity to investigate their subject matter in potentially more detail. It could expose new policies, partnerships and trends within (and outside of) government previously unknown to the researcher. While the possibility for new findings is of great value, accessing information is also "a substantial part of how we hold government accountable, and remain an informed citizenry" (Schoenhoff & Tribe, 2014). Gaining access to the government's

information is, however, not without its challenges in Canada. Sociologists' Jeffrey Monaghan and Kevin Walby describe the barriers they faced in obtaining governmental data on recently developed policing and surveillance projects related to three mega-events in Canada:

> The depths of information accessed through the ATIA can be remarkable, yet researchers continue to encounter stonewalling. These difficulties in using the ATIA demonstrates what Marx (1984) explained as the government's unwillingness to release 'dirty data' on contentious issues. Due to redactions, delays, as well as problems such as chronic under-funding of ATI branches (see Roberts 2006), ATIA users are aware that these requests rarely lead to full-picture explanations (2012, p. 138).

While most governmental agencies are required by law to comply with ATIP requests, as Monaghan and Walby reveal, the researcher is significantly disadvantaged if their request could expose any hidden or "dirty" dealings of government. In addition to the tactics highlighted by Monaghan and Walby, the government can also withhold or delay the release of information through lawful exemptions, time extensions, and high search fees (Vallance-Jones, 2014). Fleshed out in the following section is a description of the challenges, but also successes experienced in my quest for information from the federal government.

1.3.2 ATIP Process

There are two ways to obtain information through the ATIP process from the Canadian Government. A person can either make a formal access to information request, or informally request a previously released ATIP (Treasury Board, 2012b). Both methods were used in this thesis and each has its benefits and drawbacks. The benefit of making a formal request is the ATIP can be tailored to suit the specific needs of the researcher. However, the drawbacks include the likelihood of time delays, high costs, and heavy redactions if the request is topical as opposed to generic in nature (Vallance-Jones, 2014, p. 3). Requesting a previously released ATIP, on the other hand, is beneficial because the documents tend to be released quickly and at no cost, but

they may still contain redactions and are likely not customized to fit the researcher's needs. The following paragraphs detail the formal and informal processes undertaken in acquiring 23 ATIPs from six federal agencies: Transport Canada, Public Safety Canada, Royal Canadian Mounted Police (RCMP), Department of National Defence (DND), Canada Border Services Agency (CBSA), and the Department of Foreign Affairs, Trade and Development Canada (DFATD). The information sought from these six agencies covers the time period from 2001 to 2013. Prior to discussing the formal and informal ATIP process, a brief description is offered as to why some agencies were selected, and others excluded, in requests for information.

1.3.3 Agencies Selected & Excluded from ATIPs

Of the six agencies selected, Transport Canada plays a key role with respect to the regulation and authorization of drones for civil use, and hence obtaining information from them is of great importance. Moreover, Transport Canada works closely with commercial stakeholders and thus might be able to shine a light on the role the industry plays in the policy making process for drones. With respect to the RCMP, they are an active user of drones in Canada, and thus I was pleased to discover previously released records from not only the federal policing agency, but also from its associated security agency, Public Safety Canada. Information from the CBSA was formally requested because there was no record of any previous releases. Since the US border patrol is deploying drones on its shared border with Canada, examining the potential involvement of Canada's own border agency could provide important discoveries. While the focus of this thesis is on the domestic integration of drones, obtaining information from the DND is relevant since the department has already used the technology for security operations at a political summit in Alberta in 2002, and is also planning to deploy drones in the Arctic and elsewhere in Canada. Information from the Department of Foreign Affairs, Trade and

Development Canada was ultimately pursued as a result of discovering the agency in my extensive search through previously released records online.

A number of agencies were excluded from requests for information because of cost and/or time restrictions. Federal agencies left out of the process include Industry Canada, NAV Canada, 1 Canadian Air Division, the Transportation Safety Board, and the National Research Council of Canada (NRC), even though they are delegated some regulatory responsibilities for drones. Provincial and municipal government agencies, such as police services, were also excluded from access to information requests. The role of these agencies, however, do still factor into the thesis since information is available within public documents, or from ATIPs that were obtained from other agencies mentioning their involvement.

1.3.4 Formal ATIP Requests

The process for requesting information from the federal government can be daunting if never done before. Knowing where to look, or how to proceed with framing the request, is one of the first obstacles in the process. Many thanks are owed to the mysterious "Joe B.," writer and creator of *Paroxysms,* a website that "center[s] mostly on "Canadian" issues, and … chronicle[s] the steady decline into an autocratic state as well as the occasional post about WikiLeaks, and other projects related to radical transparency" (Joe B., n.d.). Joe B. made available – for all to read and download – two ATIP requests he obtained from Transport Canada and the RCMP about drones in Canada. He also offered an excellent step-by-step tutorial about *How to request information from the Canadian Government*:

> Step one: Which part of the government are you getting information from?...
> Step two: Find the right forms…
> Step Three: Write [the] cheque...
> Step Four: Writing the request…
> Step Five: Sign, Date and Send the Request…
> Step Six: Response and Complaints… (Joe B., 2012).

These six steps were my guide for the two formal requests I made to Transport Canada and the Canada Border Services Agency (CBSA) for information.[4]

The first step of the process involved locating online the mailing addresses of both Transport Canada and CBSA's ATIP coordinators.[5] The next step required locating the ATIP request form online and printing two copies, since at the time both agencies were only accepting requests by mail.[6] Step three involved the preparation of two cheques to the Receiver General of Canada for $5 each to cover the processing fee. The fourth step had to do with properly formulating the requests. Joe B. suggested to "[h]ave a timeframe … and provide as much detail as possible" and to ask for "things like … briefing notes, things that we know exist" (Joe B., 2012). I took Joe B.'s advice and made the following two requests:

> *Initial Transport Canada request, Sept. 25 2013*: All information since 1996 regarding unmanned aerial vehicles (unmanned aircraft systems, remotely piloted aircraft systems, or drones). Including briefing notes, Special Flight Operations Certificates, current regulations and activities involving the Unmanned Air Vehicle (UAV) Systems Program Design Working Group;
>
> *CBSA request, Sept 30 2013*: All information since 2001 regarding unmanned aerial vehicles (unmanned aircraft systems, remotely piloted aircraft systems, or drones). Including email correspondence, briefing notes, and any exchange between Canadian or foreign governmental bodies.

In addition to the written requests, I provided my contact details to both agencies, and also explicitly stated that electronic copies be sent to me via email. Apparently one of the ways people incur additional charges is when an agency claims printing costs (Joe B., 2012). The

---

[4] While it might be unusual to cite a traditionally unauthoritative voice in a scholarly text, Joe B.'s skills in acquiring access to information requests came highly recommended from confidential sources.

[5] For a complete list of all ATIP Coordinators, see website: http://www.tbs-sct.gc.ca/atip-aiprp/apps/coords/index-eng.asp (Treasury Board, 2014b).

[6] See Appendix A to look at the Access to Information Request Form, which is available at: http://www.tbs-sct.gc.ca/tbsf-fsct/350-57-eng.pdf

formal requests, along with its respective forms and cheques, were signed, dated, and mailed. Thirty days later, CBSA issued a letter indicating the request was received and that they required a thirty-day extension. The agency completed the request within a total of 70 days, cost free, but subject to some exemptions – the details of which will be elaborated in the results section below. Transport Canada, on the other hand, opted to phone me a month after I sent the request relaying the first of many problems.

Over the phone, Transport Canada's ATIP officer said my initial request would take time to process because every file has to be manually processed from 1996, which also requires obtaining approval from all relevant parties. Hence a consultation process with each company participating in drone regulations was necessary before Transport Canada could release information. Moreover, companies are granted 60 to 70 days to respond, and while some companies issue a response, others do not – and in this latter case, information might not be disclosed. Since the private sector is heavily involved in the regulatory process for drones, and the information they hold is important to understanding the trajectory of developments in Canada, I revised my request in an effort to fast track and simplify the process:

> *Revised Request to Transport Canada, Oct 24, 2013*: Seeking all information, excluding email, pertaining to the "UAV Systems Program Design Working Group" from 2010 to October 24, 2013, especially recommendation 106 on RPAS (remotely piloted aircraft system). Seeking all information, excluding email, pertaining to the "Regulatory Cooperation Council (RCC) Air Transport Working Group" from its inception to October 24, 2013.

In this revised request, emails were excluded because Transport Canada indicated they take a longer time to process. Also the date of my request was changed from 1996 – the year Transport Canada integrated drones into the official regulations governing airspace – to 2010 – the year Transport Canada and the industry's joint working group drafted the first set of regulations for drones. Even though much was excluded from the request, some new information was also

added. Recommendation 106 was added because it involves Transport Canada's joint government-industry working group's "entire new proposed Part on RPAS" regulations, which I knew existed after reading Joe B.'s complete Transport Canada ATIP request (Transport Canada, 2012b, p.116). The "Regulatory Cooperation Council (RCC) Air Transport Working Group" was also added to my request since the US Federal Aviation Administration and Transport Canada established the group in an effort to harmonize drone regulations. Beyond these revisions, it should be noted that my phone call with the ATIP officer was cordial. In fact, he even threw in some previously released records about drones that could not be found online.

These changes were confirmed a week later over the phone, and the Transport Canada ATIP officer quoted me a search fee of $410 that had to be paid in advance. The *Access to Information Act* requires federal agencies to provide "five free hours of search and preparation time" and in comparison to some provincial rates, "a low $10 an hour rate for this work" (Vallance-Jones, 2014, p. 16). Hence Transport Canada claimed 46 hours of search time to process this request, leaving 41 hours unaccounted for. After paying the fee, the bonus material arrived in the mail along with a letter indicating that Transport Canada required "[a]n extension … beyond the statutory 30 day time limit pursuant to paragraph 9(1)(c) of the *Act*" (Transport Canada, personal communication, November 14, 2013a).

I emailed the Transport Canada ATIP officer about the details of the letter, who explained the extension was "needed to go through the 3rd party consultation process. There is no set time for this process to take place; however, in most cases if all goes well this process can be completed in aprox. 60 day [sic]" (Transport Canada, personal communication, November 19, 2013b). Being new to this process, I decided to wait and see if my request would be completed within 60 days. At the time of receiving the letter of extension, I could not have anticipated that

another four months would pass before hearing back from a new ATIP officer about the status of my application:

> It has come to my attention that some records might be possible Cabinet Confidences which requires consultation to our Legal department and is a lengthy process… Do you want our Office to process the possible Cabinet Confidences or would you prefer that we exclude from your request possible Cabinet Confidences and expedite the process? (Transport Canada, personal communication, March 6, 2014a)

Being unfamiliar with what constitutes a Cabinet Confidence, I emailed back the new ATIP officer who informed me that

> [a]lmost all records containing possible Cabinet Confidences are drafts that leads to The UAV Phase 1 Final Report and UAV Systems Program Design Working Group Phase 1 Regulatory Recommendations and other final versions. It is my opinion that these records are futile for you as you will obtain the final approved versions almost in their entirety (Transport Canada, personal communication, March 7, 2014b).

After some consideration, and in the interest of time, I agreed to opt out of receiving the Cabinet Confidences. However another month passed, and nothing arrived in the mail.

On May 7, 2014 – over seven months from the time of my initial request – I contacted the second ATIP officer indicating concern and frustration over the status of my request. In particular, I indicated that if the request did not arrive immediately, I would be left with little choice but to contact the Office of the Information Commissioner of Canada (OIC) – the federal agency in charge of the complaints process for ATIPs. The officer responded quickly assuring that the package would be released shortly. After waiting nearly eight months for Transport Canada to deliver the request, I filed a letter of complaint to the Information Commissioner on May 12, 2014. In the letter, I asked the Information Commissioner's office to help me obtain the request and to be compensated for some of the cost. Unfortunately, the Information Commissioner's office can only consult Transport Canada within 60 days of the initial request to

negotiate any high fees (Office of the Information Commissioner, 2014). At the time of this writing, the complaint is still under investigation.

1.3.5 Informal ATIP Requests

The procedure for making an informal request for a previously released ATIP is rather simple if you know where to look. The Government of Canada maintains an updated list online of completed access to information requests that is searchable according to keyword, institution, month, and year.[7] A search through completed requests online can produce fruitful results. In total, I located 21 previously disclosed ATIPs from five agencies: Transport Canada, Public Safety, Royal Canadian Mounted Police, Department of National Defence, and Department of Foreign Affairs, Trade and Development.

I searched the government's online database of previously released records for anything related to drones, its associated acronyms, or relevant policies. Hence when five agencies turned up with a variety of material on drones, I requested all records – even if it did not appear directly relevant to my thesis. After making note of the request summary and number, I emailed the ATIP officer at the appropriate agency.[8] Included in the email to the ATIP officer was the request summary and number along with my full name and mailing address. Each request was delivered to me on CDRom, at no cost, and within two months of writing the emails. In fact several arrived after only 3 days of making the request.

On two occasions I contacted the ATIP officers from DND and DFATD after a couple of weeks had passed to inquire about the status of my application. While both agencies provided the

---

[7] For the online list of completed access to information requests, see the website: http://data.gc.ca/eng/search/ati (Government of Canada, 2014a).
[8] The email addresses of the ATIP officers can be found online at: http://www.infosource.gc.ca/emp/emp05-eng.asp#chapters (Government of Canada, 2014b).

completed requests, the DND ATIP officer was the only one to politely respond to my email. I ended up contacting the DND ATIP officer again upon discovering that the CDs were in an unreadable format. The ATIP officer responded quickly informing me that some requesters "are not able to open the files because of the specific software required to open this sort of PDF" and suggested I "try opening the disk on another computer or two" (DND, personal communication, December 10, 2013). After trying out the discs on a PC rather than MAC computer, I was able to view the information. An in-depth discussion with respect to the limitations of the data and its electronic format will be advanced in the results section.

1.3.6 ATIP Results

Getting access to information from the federal government yielded mixed results, since some information was harder to obtain than others. The previously released records from the selected agencies were a rather quick and simple process, while on the other hand, the formal requests proved only partially successful. Of the 23 formal and informal requests made to the Government of Canada for access to information, 22 were completed. An additional two requests were obtained from Joe B., which made the total number of records obtained from the federal government 24, totaling 5,490 pages.

The requests focus broadly on aerial drones in Canada, and can specifically be grouped according to the following themes: civil drone regulations and operations; law enforcement and security agencies' use, plans and policies for drones; national and international partnerships and policies surrounding drones; and private sector involvement in each of the preceding themes. Some requests contain information about marine drones, and drones operated, purchased and/or exported to foreign countries. These latter requests are used only to the extent that information

was gleaned about aerial drones for domestic use. For a look at the request summaries in their totality, see Appendix B.

The ATIPs supplied from the six agencies include one or more of the following document formats: briefing notes, emails, memos, powerpoint presentations, discussion papers, and research and policy reports that in varying degrees came with redactions. These documents were supplied on disc with the information converted to image-based pdf files. An audit evaluating access to information requests across Canada from October 2013 to April 2014 revealed that information supplied as "paper printouts" or converted to "PDF or images files" is common practice among government agencies (Vallance-Jones, 2014, p. 2). Since the information was not provided in a searchable electronic format, it was challenging to analyze and organize the data. Such unworkable formats ultimately "defeat the purpose of requesting data because they can't be read by spreadsheet and data analysis programs and are useless for web development environments without error-prone, often technically difficult conversion" (Vallance-Jones, 2014, p. 2). Even though the format of information proved burdensome to organize, I read through all the documents, categorized them according to the themes above, and assembled an account of drones in Canada that will be related in the third chapter.

The formal request to CBSA proved successful in terms of receiving nearly 700 pages of information only lightly redacted and in a timely manner. However the agency opted to exclude certain information according to five sections of the *Access to Information and Privacy Act* (1985) that allows any "head of a government institution" to refuse any record that could "be injurious to the conduct of international affairs, the defence of Canada or any state allied or associated with Canada" (Section 15(1)); "that contains personal information" (Section 19(1)); that contains an account of consultations, deliberations, or negotiations involving officers,

employees or ministers of a government institution (Section 21(1)(b)(c)); and that contains material for purchase (Section 68(a)).

The formal request to Transport Canada on the other hand bore fruitless results other than discovering several tactics the agency employed in their effort to withhold and delay the release of information. The three tactics of obstruction and delay used included pointing to excluded materials on account of third party consultations, indefinite time extensions and cabinet confidences. When a record is classified as a cabinet confidence, or Section 69 of the *Act*, the requester has "no right of access" to any of the material (Vallance-Jones, 2014, p. 35). In addition to the use of Section 69, it turns out Transport Canada's lengthy time extension for my request is unremarkable. According to an audit by *Newspapers Canada*, of the 11 federal government departments that were issued requests to information, Transport Canada had "the longest time extension in the audit" adding over a year to the processing time (Vallance-Jones, 2014, p. 35). The challenges of receiving information from Transport Canada could very well be the result of what Monaghan and Walby describe as "the government's unwillingness to release 'dirty data' on contentious issues" (2012, p. 138). It could also be the result of structural issues within government such as a lack of human resources, time consuming internal approvals, and consultation processes (Treasury Board, 2012a). With respect to the latter point, third party consultations expose the fact that unelected people are influencing public policy without having to account to the public. This process is undesirable for a well functioning democracy, and also becomes a justification for Transport Canada to withhold access to information requests. Whether the reason for delay is due to the contentious nature of the materials sought or structural, the issue remains that the right to information was ultimately denied by Transport

Canada. The remaining section describes additional materials relied upon from the government, private sector and media about domestic drones.

1.3.7 Additional Materials

In addition to ATIP requests, policy reports by provincial and federal Privacy Commissioners, and also Senate and House of Commons hearings were relied upon for information about drones. Speaking notes from director generals at Transport Canada were also used; however, since publishing my first article about *Canada's Domestic Regulatory Framework for RPAS* (2013), those documents once made publically available on Transport Canada's website are no longer there. This reflects partially a problem with web-based materials, where the link can be broken at any time. It also points to the fact that Transport Canada appears to be thinking like an intelligence agency, as opposed to a public one. In the report *Building Resilience Against Terrorism* (2011) issued by former Public Safety minister Vic Toews, he describes Transport Canada as "the lead department for responding to transportation security incidents and for transportation related emergency preparedness" (p. 32). Hence, Transport Canada's secretive attempts to withhold previously available information could be the consequence of their role as a member of the national security community (Lannan, 2004; Toews, 2011).

Reports made available on industry websites also provided primary data for this thesis. However, Canada's largest drone lobby, Unmanned Systems Canada (USC), required that a membership be purchased to access the organization's reports. Hence, I paid the nominal fee of 30 dollars to USC. Media reports, notably within Canada, provided information on breaking news and interviews featuring the thoughts and voices of manufacturers or operators of drones (the latter being notably from law enforcement agencies). News stories were also used to

ascertain the perspectives of civil liberties organizations, as well as other critical voices about drone use in Canada. The culmination of information collected ultimately forms the basis of findings within the third chapter of this thesis. The next chapter, however, introduces key theoretical concepts that will frame the lens through which to understand the issue of domestic drones in Canada.

2 Chapter: Theoretical Foundations

As previously indicated, technologies like drones depend in large part on surveillance characteristics for their functionality. Surveillance as conceptualized in this thesis refers to "the use of technical means to extract or create personal data. This may be taken from individuals or contexts" (Marx, 2002, p. 12). This definition of what Gary T. Marx calls the "new surveillance," which is meant to distinguish between traditional forms, has two important components. The first is that modern forms of surveillance are increasingly carried out through digital technologies that serve to "extend the senses" – visual, auditory, touch and scent – in gathering information (Marx, 2002, p. 12). The second aspect of this definition is that digital technologies enable the discovery of new types of information through the joining up of computer databases and the use of algorithms to detect previously unknown associations. In the new surveillance, individuals are not the sole targets of interest, but "settings and patterns of relationships" increasingly matter (Marx, 2002, p. 12). It is through the establishment of these connections or associations that technologies create new threats or risks that in turn provide justification for the technologies themselves.

To complement Marx's notion of surveillance, another useful definition is found in *A Report on the Surveillance Society*, issued on behalf of the Surveillance Studies Network to the U.K. Information Commissioner in September 2006. Scholars Kirstie Ball, David Lyon, David Murakami Wood, Clive Norris and Charles Raab of the Surveillance Studies Network describe contemporary surveillance as involving the "purposeful, routine, systematic and focused attention paid to personal details, for the sake of control, entitlement, management, influence or protection" (Ball et al., 2006, p. 4). This definition is meant to encapsulate both human and automated forms of primarily institutional, but also individual, surveillance. It also draws our

attention to the ways in which surveillance is carried out. For instance, surveillance can take place for specific purposes, but it can also be a part of everyday life, or it can occur at scheduled intervals. Although aggregate data is collected, much surveillance today is of a focused nature and "refers to identifiable persons, whose data are collected, stored, transmitted, retrieved, compared, mined and traded" (Ball et al., 2006, p. 4). Personal data can take the form of images, biometrics, communication information (messaging and phone calls), transactional records, as well as other configurations. It is important to note that anything that can be measured can be turned into data; hence the possibilities for new types of data are countless.

A number of theoretical frames are particularly useful for thinking critically about technologically mediated surveillance at the institutional level. The theoretical standpoints of Langdon Winner, David Lyon (and the Surveillance Studies Network), and Ben Hayes are most useful to make sense of these definitions in relation to drone technologies. Winner (1980), for instance, enables us to examine surveillance drones as a political technology. This perspective generally views material forms as embodying the intentions of their creators that in turn affect social conditions. However, some technologies will also embody political properties that their designers never intended. Winner draws our attention to the particular characteristics of technologies, and locates these in the society within which they are embedded. In a similar vein, Lyon (2009; 2003a; 2003b; 2003c; 1994) examines the characteristics of technologies, particularly those that are electronic in form. These technologies have extended into the everyday realm, making social life pervasively digitized, and thus, deepening the "surveillance society."[9] Living in a surveillance society generates ambiguous results at best. A downside of inhabiting

[9] The concept of "surveillance society" was brought to the fore through the works of Gary T. Marx and Oscar Gandy, and then later was made more pronounced through the work of David Lyon (see, Murakami Wood, 2009).

such a society is that digital surveillance can strengthen methods of social discrimination, what Lyon in part calls "social sorting." Lyon's sociological perspective, and those within the Surveillance Studies Network (2006), will provide insight into the constraining but also enabling factors of modern forms of surveillance, as well as situating surveillance within the broader social context.

Hayes (2012) draws our attention to the political economy of surveillance. Hayes' concept of "surveillance-industrial complex" highlights the connections between technologies, corporate profit, and public policy. Surveillance today is big business. In the post 9/11 security environment, close partnerships between governments (in both their policing and population health management functions), and information technology and defence companies have emerged throughout North America and Europe. The notion of a "surveillance-industrial complex" is meant to draw attention to the political economy of surveillance technologies and to the various ways in which public policy across a variety of sectors can be driven by powerful corporate and political economic interests. These convergences pose challenges for democratic decision-making and can upend societal values. The sections below will provide an overview of these three theoretical insights, in turn enabling, within the chapters to come, a deeper understanding of the social, political, economic and technological factors in need of consideration with respect to the emergence of drones in Canada.

2.1 Political Technologies

There are a number of ways to understand technology. We can see technology as neutral, deterministic, or from the social constructivist view that sees technology as a consequence of human choices, decisions and forces. Many within media, business and policy groups, or among

civil society at large, tend to view technology as neutral. Those who belong in the neutral camp generally maintain that technologies in and of themselves cannot adversely impact society; rather, it is the uses that generate the social problems. There is certainly merit in the argument that the uses of technology will dictate the effect on society. However, taking the view that technology is neutral masks the way that technology influences society, and vice versa. Theorists of technology, Langdon Winner (1980) and Andrew Feenberg (2010), in contrast, reject the idea that technologies are neutral. They also cast aside the notion that technology is determining. The determinist view, often held in governmental and business circles, maintains that technology reflects the realm of "science and mathematics by its intrinsic independence of the social world" (Feenberg, 2010, p. 8). According to this perspective, technology, "unmediated by any other influence" (Winner, 1980, p. 122), steers society along an inevitable path of progress (Feenberg, 2010, p. 8). Such a perspective situates power within the technology and problematically removes the social, economic, and ethical factors shaping its design and use. A partial corrective "to naïve technological determinism" is the social constructivist approach (Winner, 1980, p. 122).

The social constructivist view of technology is well exemplified in the sociological work of Trevor Pinch and Wiebe Bijker (1987), who examine how social forces are embedded in the design of artifacts. In their example of the historical development of the bicycle, Pinch and Bijker reveal that the design eventually adopted – two low wheels "with rear chain drive, diamond frame, and air tires" – was the result of a nineteen-year conflict among the relevant social groups (Pinch & Bijker, 1987, p. 39). Hence, the modern bike is not simply a mechanical innovation divorced from culture. It is in fact made up of the many contested values that women, elites, engineers and "anticyclists" held over the years, culminating in the bike's final design.

The "social construction of technology," as referred to by Pinch and Bijker, thus offers a "method of describing technological artifacts by focusing on the meanings given to them by relevant social groups" (1987, p. 46). The merit of this constructivist approach is that it identifies the socio-historical processes, actors, and competing interests that influence the design of a technology. However, for Winner (1980), the social constructivist perspective does not go far enough. This perspective ultimately views humans as the sole shaper of technology. Hence, once the analyst uncovers the social dimensions of the technological design process, any further examination of the enduring effects of the technology in question is, in effect, cast aside. The constructivist approach, therefore, ends up implying "that technical *things* do not matter at all" (1980, p. 122). As a complement to the work of social constructivists, Winner develops another perspective known as "a theory of technological politics" (1980, p. 123).

The theory is based on the notion that technology has politics. Such a perspective views technology as possessing governing qualities that can organize society according to the properties embedded within it. Winner sets out two dominant ways in which technologies can contain politics. The first way describes "flexible political technologies," or, technologies that arrange society according to its unique properties, yet maintain a degree of flexibility in its effects. The second way describes "inherently political technologies" that carry intractable properties and arrange society according to a more determined path.

With respect to flexible political technologies, Winner takes the overpasses of Long Island, New York built by urban planner, Robert Moses, at some point between the 1920s to the 1970s to exemplify his point. These "two hundred or so" overpasses were designed intentionally low to deny busses and their "racial minorities and low-income" passengers entry to the roads connecting to Jones Beach, a predominately white, and middle, upper class destination (Winner,

1980, pp. 123-4). What this example begins to illustrate is that the Long Island overpasses carry a set of built-in politics that are variable in their effects. On the one hand, the design has, for decades, enabled automobile drivers to use the bridges and roads providing them with a useful service. Yet the same overpass was initially devised to "reflect Moses's social-class bias and racial prejudice" against those populations most likely to ride buses (Winner, 1980, p. 123). The point of emphasis for Winner is not simply the intentions behind Moses' inventions, or his business transactions and elaborate political networks that gave him much of his influence. Rather, it has to do with the long-lasting effects of his technologies that outlive the architect but continue to "give New York much of its present form" (Winner, 1980, p. 124). In other words, access to Long Island continues to "favor the use of the automobile over the development of mass transit" (Winner, 1980, p. 124). Those "structures of concrete and steel" situated on the coastal island of New York, ultimately "embody a systematic social inequality, a way of engineering relationships among people that, after a time, becomes just another part of the landscape" (Winner, 1980, p. 124).

In another example of flexible political technologies, Winner highlights a University of California invention, the tomato harvester machine. In this particular instance, those who were involved in the machine's development process were, from the outset, representing the interests of agricultural corporations. The machine was designed to gather and sort a large number of tomatoes, the intention of which was to cheapen the overall cost of production. In order for the electronic harvester to be effective, a new, "hardier, sturdier, and less tasty" variety of tomatoes was bred (Winner, 1980, p. 126). While increasing efficiency was the purpose for developing the machine, the end result was not only large-scale tomato production, but also a diminished quality of tomato and the loss of several thousand jobs. The mechanical tomato harvester helped to

replace the job of the human reapers and also lead to the decline of small-scale tomato growers throughout California. “By the late 1970s an estimated thirty-two thousand jobs in the tomato industry had been eliminated” in California as a result of the introduction of the mechanical harvester (Winner, 1980, p. 126).

What these two examples demonstrate is how some technologies encapsulate forms of social order and embody a set of politics prior to their use. Both the Long Island overpasses and the California mechanical tomato harvester helped to reconfigure, in varying degrees, the social system and lives of its inhabitants. Seen in this way, technologies are not wholly different from “legislative acts or political foundings that establish a framework for public order that will endure over many generations” (1980, p. 128). The examples thus far have focused on technologies with relative degrees of flexibility in comparison to the next set of technologies, those with inherently political properties.

The most illustrative case of an inherently political technology is the atomic bomb, which would appear to require a particular social system to manage its lethal properties. According to Winner, the atomic bomb “demand[s] that it be controlled by a centralized, rigidly hierarchical chain of command closed to all influences that might make its workings unpredictable” (Winner, 1980, p. 131). In other words, the political properties of the bomb encapsulate a social system that is more authoritarian than democratic. While Winner cautions that “nothing is “required” in an absolute sense[,]” the atomic bomb does appear to lend itself to certain kinds of power arrangements (1980, p. 134).

The main difference, therefore, between flexible and inherently political technologies is that in the case of the former, their technical properties are not so much internally, but externally political in their effects. For instance, adopting the corporate funded mechanical tomato harvester

and designing it with a built-in sorting mechanism helped to concentrate wealth in the hands of a few, leading to the loss of many Californian jobs and also to diminishing the taste of the vegetable. In this case, it is not inconceivable that the electronic tomato harvester built in a specific way within a given social context generates a particular result. However, it is also possible to "imagine how a roughly similar device or system might have been built or situated with very much different political consequences" (Winner, 1980, p. 128). By virtue of their design, inherently political technologies, such as the atomic bomb, "do not allow such flexibility, and that to choose them is to choose a particular form of political life" (Winner, 1980, p. 128).

The perspective I develop later suggests that drones are a political artifact with flexible properties. The objectives for employing this approach are three-fold. Firstly, the goal is to demonstrate the unique properties of drone technologies and discern some of the potential consequences for adopting its design. As Winner has demonstrated, this perspective complements an analysis rooted in the social and economic forces shaping technology as well. Secondly, by revealing the fundamental characteristics of the technology in question, informed policy decisions can be made. Meaningful regulatory controls for drones will only be enacted by knowing technology, and knowing it well. Thirdly, analyzing drones as flexible political artifacts help to demonstrate that once a technology is adopted by society, practices settle around it making change, or reversing course, hard to achieve. Introducing particular technologies into society also has the potential to order human behaviour within our various spheres of life – in work, travel, and recreation. A Winnerian theoretical perspective can therefore usefully demonstrate that decisions to adopt particular technological designs require careful thought and planning.

2.2 The Surveillance Society

Surveillance today is a central and ubiquitous feature of social life, however, as a practice its history is quite old. As Lyon puts it, humans "[s]ince time immemorial, … have 'watched over' others to check what they are up to, to monitor their progress, to organize them or to care for them" (1994, p. 22). Some of the earliest techniques of surveillance involved not only face-to-face observation, but relied on written texts such as censuses (Lyon, 1994, p. 22). Such surveillance methods carried out among ancient civilizations or during the Middle Ages were relatively limited in their capacity to monitor, manage, and store extensive records on populations. With the growth of the nation-state, military, and capitalist enterprises, new methods for keeping watch and record of human activities emerged, ushering the beginnings of the surveillance society (Lyon, 1994). The "paper file" enabled, for instance, large bureaucratic organizations to not only gather and store greater amounts of information, but to also efficiently manage and maintain more accurate records of citizens, workers, and clients for a whole slew of purposes (Lyon, 1994). The collection and use of personal information by these modern organizations occurs for taxation purposes, military conscription, selling products, distributing paychecks and benefits, police work, health care provision, spying, and so forth. Surveillance in its modern and also historical formation is, in other words, an enabling and constraining human practice, or as Lyon (1994) puts it, "exhibit[s] more than one face" (p. 219).

Since the 1970s, the potential for state surveillance has been totally transformed as a result of a new technological force: computerization. The "cumbersome system of bureaucratic rule in government offices, police departments, and human resources units of large corporations had … begun to undergo intensive computerization" (Lyon, 2003a, p. 82). The emergence of digital technologies ushered in subtle shifts in organizational practices and enabled the expansion

of surveillance systems. Such systems ultimately "represent a basic, complex infrastructure which assumes that gathering and processing personal data is vital to contemporary living" (Ball et al., 2006, p. 1). Hence for Lyon (1994), the history of modern governments, militaries and businesses along with their administrative practices and technologies steadily helped to build a society overtime that, for good and bad, revolves around routine and systematic surveillance for the purposes of bureaucratic population management. The following sections will delineate the digital dimensions of the surveillance society as examined through the work of David Lyon and the Surveillance Studies Network. Explored in particular are the broad characteristics of digital surveillance systems and the social processes that emerge from the mass adoption of these systems.

2.2.1 Digital Surveillance Systems & Emergent Social Processes

Digital technologies comprise a number of attributes that "increase the power, reach, and capacity of surveillance systems" (Lyon, 2009, p. 450). To speak of the digital dimension of surveillance is to refer essentially to information and communication technologies (ICTs) that have enabled the automation and mass transmission of personal data. There are several important components of digital surveillance systems, including computing power, searchable databases, software, as well as the telecommunications infrastructure (Lyon, 2009, p. 452; Ball et al., 2006, p. 17). Computers enable the storage of large amounts of data and permit the retrieval of data from databases. Together, the computer database allows "[m]ultiple data … [to] be gathered, tabulated and cross-referenced far faster and more accurately than with the paper files that were once the characteristic feature of modern bureaucracy" (Ball et al., 2006, p. 20). Computers also require software, or coded instructions, that specify the actions a computer will perform. Software, in other words, includes both the operating system as well as a variety of applications

and programs. Combining the computing component of digital surveillance systems with the telecommunications infrastructure enables the quick and worldwide transmission of data. Hence, all digital surveillance systems have the capacity to store, retrieve, and transmit data of all types, including "video images, text files, biometric measures, genetic information, and so on" (Lyon, 2009, p. 456). Depending on the software of the system, data can also be matched, analyzed, or mined to discover new patterns in datasets, distinguishing furthermore the digital from the paper format.

Digital technologies are many things. They have gone from computers that filled entire rooms, to desktops and portable devices, to wearables and implants on and within the body. Most technologies, industries, workplaces, and homes have a digital component to them, which will only increase in the future. The significance of digitization is that it touches all spheres of life and makes possible "unprecedented flows of data" (Lyon, 2009, p. 454). As numerous organizations and individuals operate or come in contact with digital systems, there is not only a constant growth in the volume of data captured, used, and shared, but the mechanisms are put in place to permit far-reaching surveillance (Ball et al., 2006). It is crucial to note, however, that the digital data amassed among organizations and individuals is not of equal weight (Lyon, 2009). Organizations, in comparison to individuals, have access to greater resources and can carry out large-scale surveillance, and make use of the acquired data, for their administrative goals. Such large-scale surveillance capabilities render "[o]rdinary citizens, workers and consumers … more visible to largely invisible 'watchers' who subject them to increasingly constant and profound monitoring" (Lyon, 1994, pp. 51-2). The surveillance that Lyon and the Surveillance Studies Network are concerned with is primarily at the institutional level.

At the institutional level, public and commercial organizations collect, trade, and access vast amounts of personal data through digital technologies they deploy and/or that individuals own. The personal data amassed by these organizations for a variety of purposes requires them to make sense of the content, and thus "produces a desire for classification" (Lyon, 2009, p. 456). Computers, along with their databases and human written codes, have enabled the sorting of large quantities of data into meaningful categories. This process, or what Lyon calls social sorting, "may be innocent and humanly beneficial, but it can also be the basis of injustice and inequity" (Lyon, 2009, p. 456). The negative aspects of this process are when data is slotted into distinct categories that generate discriminatory effects or reinforce pre-existing social divisions within society. There are a number of ways in which social sorting occurs.

Within the commercial context, Lyon (2009) describes how personal data is digitally mined to discover potential customers, to supply targeted advertisements, and to discern the groups of people who can afford products from those who cannot. Hence, digital surveillance in this context relies on social sorting processes, the outcome of which grants benefits to some customers through tailored ads or promotions, while other, less commercially advantageous groups, "are excluded from participation in the marketplace" (Lyon, 2009, p. 456). Within the context of security, Lyon (2009) illustrates how digital technologies permit the advanced screening of personal data in order "to identify and isolate groups" that may pose threats to society, or that fit particular profiles of interest (p. 456). Hence, according to Lyon, surveillance through social sorting may protect the public from violence, however it also accelerates the potential for watching and detaining anyone who fits a profile of interest, such as particular religious or ethnic groups.

What connects these two contexts, apart from the organization's use of digital technologies to extract personal data as well as to classify and identify populations, is their reliance on actuarial or risk management strategies (Lyon, 2009, p. 456). Assessing for risks are a key strategy among organizations in the delivery of services. While actuarial practices are not new, the accelerated use of "networked, searchable databases" since 9/11 for such purposes have ushered in important changes (Lyon, 2009, p. 456). Organizations have shifted their practices to a forward-looking form of planning or preemptive risk-based approach to protect society from harm (Ball et al., 2006, p. 11). According to Andrew Jordan and Timothy O'Riordan (1999, p. 18) these sorts of precautionary governance strategies defy uniform definition because risk perception reflects value positions that are deeply embedded in politics and culture. This digitally mediated shift has led to widespread profiling of the general population who are slotted by organizations into categories of risk "based on situations that have yet to occur" (Lyon, 2009, p. 456).

Automated social sorting when combined with pre-emptive risk calculations, intensifies and alters surveillance practices of organizations that seek not only to manage, monitor, and identify individuals and populations, but also to anticipate future scenarios for their intended goals (Lyon, 2003b, p. 14). Computer codes are thus required to automatically sort all types of digital data traversing a borderless and networked system. Sorting people through technical means and according to different sets of criteria – socioeconomic worth, ethnicity, dangerousness, etc. – for purposes in the immediate moment, or to be retrieved at a later date from the database, is far from a neutral and transparent process. It furthermore creates the conditions for social inclusion or exclusion (Lyon, 2009).

The negative effects of digital surveillance systems have generally been framed around the loss of personal privacy. Lyon, on the other hand, argues that privacy as conceptualized in the West is limited in its capacity to deal with issues of social justice that deep discrimination based on sorting processes involves (2003b, p. 1). In the West, privacy is defined around control of personal information, which largely places "the onus of responsibility to 'do something' about the inappropriate use of personal (and other) data" on individuals (Lyon, 2009, p. 455). Data protection laws built around such 'personal responsibility' assumptions are incommensurate with coded categories designed by organizations and institutions and implemented on a society-wide basis. The automated sorting of personal data into socially meaningful categories essentially creates "data doubles" that only loosely map onto specific individuals (Lyon 2003b, p. 22). The challenge is that organizations that trade, mine, collect, and make use of this data "has not ensured that the identities and data doubles are classified free from stereotypes or other prejudicial typing" (Lyon 2003b, p. 22). In this context, individuals as opposed to organizations have little awareness of how their data is compiled, shared, interpreted or used. The data double comes into being through the interpretive processes of state and commercial actors and can have very different and potentially discriminatory effects in different social contexts for different people. Privacy legislation in the West ultimately requires individuals "to know something's wrong, identify what it is and know where to the take the complaint and how to find redress" (Ball et al., 2006, p. 6). In contrast, Lyon (2009) argues that "[t]he politics of information in the twenty-first century will increasingly be about how to increase the accountability of those who have responsibility for processing personal data" (p. 459).

While Lyon demonstrates that contemporary surveillance societies are increasingly prone to digital profiling and discrimination, he also points our attention to the dominance of security

in the West that "requires more and more surveillance" (Lyon, 2009, p. 449). In the aftermath of both 9/11 and the global war on terror, state security policies rely on more "exclusionary and intrusive" strategies of social surveillance (Lyon, 2003c, p. 7). In this context, personal data is assessed according to categories of risk of harm to society or suspicion, and increasingly permeates a network of intelligence regimes comprising states and private agencies. In the quest for information on suspicious or terrorist-related activities, security agencies depend on pre-emptive risk profiling, which is a form of precautionary governance aimed at protecting society from harm. In this context, both risk and harm act as sort of wild cards for decision-making processes. In the process, all people are presumed guilty until the risk assessment proves otherwise (Ericson & Haggerty, cited in Lyon, 2009, p. 457).

Strengthening security measures, and by proxy surveillance systems and pre-emptive risk practices, in times of crisis often jostles uneasily with democratic processes such as the rule of law, transparency and a well-balanced system of checks and balances. Such measures also collide with privacy and civil liberties values, the latter of which were "the product of a considerable struggle in the modern era" (Lyon, 2003c, p. 43). Civil liberties took lots of work, sacrifice, and dedication to achieve, and will require a conscious effort to maintain. They "guarantee fair treatment for individuals before the law, and have to do with the freedom to live where you choose, to own property, and to hold religious beliefs and speak freely" (Lyon, 2003c, p. 43). Since security is now inextricably linked to technological forms of surveillance, when the two pervade all aspects of life, democratic processes are compromised. Furthermore, the longer security measures are in place, the greater the challenge of undoing them as they become normalized (Lyon, 2003c, p. 19).

David Lyon and the Surveillance Studies Network draw our attention to the taken-for-granted and pervasive status of large-scale surveillance systems underpinning the organizational practices of technologically advanced societies. While the era of "fixed filing cabinets" is an important stage in the history of surveillance societies (Lyon, 2003c, p. 110), the advent of digital surveillance systems crucially allowed organizations to link, aggregate, analyze, and transmit information globally. What might have previously taken years and hundreds of human resource hours to complete, now takes seconds. The digital dimension of surveillance, therefore, enables organizations to produce a particular version of social life. As we will come to see, drones form part of this digital system of mass surveillance. Their deployment in Canada must be understood within the broader social context of post 9/11 risk and security measures that rely on the use of surveillance technologies to manage, control, and sort populations for a host of public and commercial purposes. The impact of their deployment on society must also be situated within the automated social sorting processes that Lyon reveals as both socially valuable but discriminatory. The significance of automated social sorting is that the classified data remains largely invisible to populations yet increasingly determine their life-chances. Since electronic data files are compiled by numerous organizations, shared in ways that are unknown, and used to grant or deny access to services, people's life opportunities can be greatly impacted. Furthermore given the prominence of deploying surveillance systems for security purposes, I assess the challenges drone integration may pose to democracies that seek to uphold and promote fundamental rights and freedoms.

2.3 The Surveillance-Industrial Complex

There is a political economy surrounding the development of surveillance systems whereby the state and private sector cooperate and influence each other to achieve a set of shared interests. Historically, the state has provided resources to the military and universities to fund and procure new surveillance technologies for a range of social and economic purposes. The surveillance industry benefits financially, in turn, in the development, servicing, and lobbying of surveillance technologies for state purposes. The result has been the growth of the "surveillance-industrial complex", as Ben Hayes calls it. Hayes' concept of "surveillance-industrial complex" is a play on former US President Dwight Eisenhower's "military-industrial complex." Eisenhower coined the term in the 1960s to signal the close partnerships forming between the state, defence department, and military industry, resulting in domestic and foreign policy that favours the business of war. Others, such as Schlosser (1998) have used the term prison-industrial complex to highlight the vested interconnections between those corporations that build and produce the hardware for prison and punishment, and the state corrections bureaucracy that provides massive employment for the middle class, who both jointly depend and profit from the perpetuation of crime and punishment.

The surveillance-industrial complex, as developed by Hayes (2012), is primarily meant to draw attention to the post 9/11 domestic security environment in the West, and the desire of the private sector to sell surveillance as a solution to the state's multitude of alleged security issues. In this context, the surveillance industry has become a lucrative and global market that has increased its power to shape domestic state policy. It extends the existing prison-industrial complex and produces ever-increasing risks to society to be managed through surveillance technologies. Hence, "[t]he surveillance-industrial complex provides a framework for analyzing

this market and the wider implications of the burgeoning relationship between the state and the surveillance industry for governance and democracy" (Hayes, 2012, p. 167).

Hayes acknowledges that his theory is not a comprehensive examination of surveillance. The "two faces" of surveillance that Lyon has demonstrated as a key characteristic of modern societies is not what is considered here. Rather, Hayes' focus is "on the dark side of surveillance, the point at which it threatens the fabric of democracy or civil liberty" (2012, p. 168). Thus, the aim is to shed light on the coercive and controlling mechanisms of domestic surveillance as carried out by policing and intelligence agencies, and as bolstered by the surveillance-industrial complex.

In order to understand the surveillance-industrial complex, Hayes turns our attention to several trends underlying the contemporary security climate in the West. Security has found a home in many government departments and sectors, such that now public policy matters that are non-military and police are framed in security terms – "food security, energy security, transport security and so on" (Hayes, 2012, p. 169). This shift towards securitizing public policy in turn frames how democratic societies deal with these issues. Hence, greater demand for security and security-related solutions enter the arena of domestic policy and public life.

Security in the West is also increasingly privatized. The state's "legitimate" exercise of violence no longer solely belongs to the state but includes "partnership with the private sector" (2012, p. 169). In addition to the above, security has been revamped according to the logic of preempting crimes (Hayes, 2012, p. 169) Underlying the preemptive process is the reliance on surveillance technologies and mass collection of data. Furthermore, the line between security and defence, the respective domestic and foreign theatres for state legitimized violence, is blurring. Thus, national borders matter less in this changing security paradigm.

Within this contemporary security landscape, Hayes draws attention to the increasingly networked and interoperable system of security that functions more or less the same among public and private bodies across allied borders (Hayes, 2012, p. 169). Networked and interoperable security systems encompass the compatibility of technologies with technological systems from various countries using the same software and hardware for the purposes of interagency information collaboration. Information technology is thus increasingly important in this new security landscape and is being built to communicate in accordance with other security systems. The security environment of networked and interoperable systems is incompatible with democratic principles such as ensuring accountability as well as data protection laws (Hayes, 2012, p. 170). The "checks and balances" of a sovereign democracy are more difficult to achieve in the face of increasingly borderless, interoperable security systems (Hayes, 2012, p. 170).

Within the context of increasingly securitized policies among Western democracies, the surveillance-industrial complex has benefited, and has also had a part in shaping it. The surveillance industry is made up of information technology (IT) and defence companies, the latter of which saw an opportunity to diversify their markets into "homeland security" (Hayes, 2012, p. 168). Since the defence sector is part of the surveillance-industrial complex, they end up employing their "military logic, technology and experience squarely into the realm of policing and civil security" (Hayes, 2012, p. 168). The IT sector is also beneficiaries of the homeland security market, and have "enjoyed sustained growth as more and more functions are outsourced to private companies" (Hayes, 2012, p. 170). Public security agencies are increasingly outsourcing their work to private security and surveillance agencies which means the government workforce is increasingly obligated to shareholders rather than the public to which they serve (*Washington Post*, cited in Hayes, 2012, p. 171). The drive to increase profits replaces

concerns around rights and freedoms in favour of ever-expanding uses of surveillance technologies that are viewed as neutral sources of post-9/11 risk management.

Even as the traumatic event of 9/11 that led to the boom of security in the West fades from our collective memory, the surveillance-industrial complex remains entrenched (Hayes, 2012, p. 171). Hayes lists four factors as to why the surveillance-industrial complex has a permanent grip on society. Firstly, states and their departments are adopting in greater frequency "the techno-security paradigm" for advancing public policy (Hayes, 2012, p. 172). Secondly, the surveillance-industrial complex establishes a "revolving door" between governments, their departments, and the private sector (Hayes 2012, p. 167). In this context, ties are established between the corporations that build surveillance technologies and the governments that employ them. The end result is that corporate interests and profits are given higher value than the "public good" (Hayes, 2012, p. 167). In addition to this, the surveillance industries have influential lobbies that play a seminal role in guiding "both individual procurement decisions and the direction of the broader security agenda" (Hayes, 2012, p. 172).

Thirdly, Hayes demonstrates "the somewhat perverse political and economic model" established between the state and the surveillance industry, whereby the former outsources its services to, and subsidizes innovation and procures the end product of, the latter (2012, p. 167). This reinforces the economic and political interests of the state while also serving to bolster corporate profits, further binding the political economic relationship between the two. Fourthly, the mutually beneficial relationship established between the state and surveillance industry encourages the possibility of an endless and continually improving supply of surveillance products and services for security purposes that in turn create employment for the working and middle classes. Governments worldwide exaggerate internal and "external threats to maintain

and extend their grip on power[,]" while those in the surveillance and security industries depend on "the politics of fear" as a business model (Hayes, 2012, p. 172). For Hayes, there is no end to the system that is developing and, thus, the surveillance-industrial complex will continue to grow and undermine democratic decision-making. In part, this is because we have come to depend upon this economy of risk management and security as a major source of working and middle class employment.

In order to challenge the growth of the surveillance-industrial complex, Hayes recommends carrying out research that unmasks the enmeshed relations developing between governments and industry and the ways in which public policy are shaped to benefit this partnership (Hayes, 2012, p. 174). According to Hayes (2012),

> That challenge can only be strengthened by positioning research into the surveillance-industrial complex within debates about corporate responsibility and accountability; by considering not just the regulation of surveillance technology but the potential regulation of the homeland security industry (p. 174).

Of course this regulation will be made all the more challenging because it has become a major source of employment for so many people in North America.

The concept of the "surveillance-industrial complex" provides an analytical and complementary methodological approach to understanding the nature of the relationship between the state bureaucracy and private sector. In adopting such a framework, the established ties between the Canadian government, drone industry and supranational alliances can effectively be examined, exposing how these players work together to drive the emergence of drones in Canada and for what ends. In chapters ahead, the work of Hayes, along with Lyon and Winner will be used to understand current developments in Canadian drone activities once the domestic drone backdrop in Canada is introduced and the actors and policies are made clear.

3 Chapter: Canada's Drone Story

Canada was one of the first countries in the world to regulate commercial and public use of drones, doing so as early as 1996, when the term "non-piloted aircraft" was introduced into the official rules governing civil airspace, the *Canadian Aviation Regulations* (Transport Canada, 2012b, p. 35).[10] Unbeknownst to most Canadians, during this time the ministry of Environment Canada began negotiations with a US drone company to take part in their international Aerosonde program (Environment Canada, 1998). The goal of said company, The Insitu Group, was to build drones for "economical wide-scale weather reconnaissance over oceanic and remote areas" (Environment Canada, 1998, p. 1). The Canadian government's objectives were to determine the feasibility of flying miniature drones in isolated and cold regions, such as the Pacific Ocean or for future experiments in the Arctic. Environment Canada and The Insitu Group's plan eventually came to fruition in April of 1998 when four drones were launched off the coast of Tofino over Vancouver Island's military restricted airspace. This made The Insitu Group one of the first companies to operate drones commercially in the country.

Four months later, The Insitu Group embarked on another pioneering mission when they launched the Aerosonde Laima drone over the Atlantic Ocean beginning in Newfoundland, Canada and ending in South Uist, Scotland. While this event marked the first drone to successfully cross the Atlantic Ocean (McGeer, 1999), it is historic for another reason. The successful deployment of the Laima drone generated excitement in the commercial sector and helped to encourage the development of Canada's non-military market for drones (Carryer, 2008,

[10] Japan and Australia were among some of the first countries to legislate civilian use of drones, with Australia doing so as early as 2002 (Blackman, 2002). Other countries with civil drone regulations in place as of September 2013 include, the UK, Czech Republic, France, Ireland, Italy, Sweden, and Switzerland (Van Blyenburgh, 2013).

p. 10). By 2007, nearly a decade later, Canada was home to 220 drone-related companies in all sectors – military, commercial, and public (Transport Canada, 2007). In the same year, the industry generated an impressive $787 million in total sales (Healey, 2008).

Today, Canada has numerous manufacturers of drones, as well as research institutes and commercial organizations dedicated to furthering their technological development. There are companies in Canada offering their drone services for aerial filming, real estate, geo-surveying, agriculture, infrastructure inspection, law enforcement and private security, amongst other uses. Many post-secondary institutes in Canada are at the forefront of drone research and development. For example, Carleton University in Ottawa is designing drones for geological and multipurpose uses (Carleton University, 2014); at McGill University in Montreal, wildlife biologists deploy drones for ornithological research (Chabot & Bird, 2012; McDevitt, 2008); and Newfoundland's College of the North Atlantic and Vancouver's Langara College offer drone journalism courses (Ducharme, 2014; Fumano, 2014). Public agencies, such as Canada's police services are some of the most active users of the technology, with federal, provincial and regional police forces presently engaged in drone operations.

In order to unpack the implications of introducing these aerial sensors into Canada, we first need to understand the various mandates and intentions of key actors integrating and operating drones within the country's airspace. Moreover, the rules for deploying drones and the current and prospective uses of this technology for law enforcement and security purposes will need to be carefully analyzed. What follows is a description of the policy making process for integrating drones into Canada, the dominant actors shaping those airspace regulations, and also the rules currently in place permitting drone flights. In addition to this, the drone policies and

domestic operations among Canadian police services, border patrol, the military, and industry will be surveyed.

3.1 The Drone Policy Makers

Transport Canada established the first set of regulations in 1996 (Transport Canada, 2012b, p. 35), requiring that operators obtain a Special Flight Operations Certificate (SFOC) in order to fly drones in civilian airspace.[11] The purpose was to mitigate risks and address safety concerns for flight missions. In 2006, ten years later, the first of three government-industry working groups were established to assist Transport Canada in the rule making process. The first group convened in December 2006 when Transport Canada formed the Unmanned Air Vehicle (UAV) Working Group "to review existing legislation and make recommendations for a regulatory framework for UAV operations" (Transport Canada, 2010a, p. 1). Of the group's nearly 30 members, 20 were representatives of the UAV industry (Unmanned Systems Canada, 2013c). This original UAV Working Group issued a Final Report in September 2007 outlining "a 5-year strategic Work Plan to safely integrate unmanned air vehicles into Canadian domestic airspace" (Transport Canada, 2010a, p. 1). They also advocated the creation of a second working group to review the original certification process authorizing drone use in Canada. The tentative Work Plan "was approved in principle" and by February 2008, the new Special Flight Operations Certificate (SFOC) Review Working Group was established. The SFOC Working Group, in June

[11] Other Canadian agencies are also delegated regulatory responsibilities for drones; however, they are contingent on Transport Canada, the primary regulator. These additional agencies include Industry Canada that is in charge of allocating spectrum; NAV Canada deals with airspace coordination; 1 Canadian Air Division is responsible for search and rescue for downed UAVs, and in addition to Transport Canada is also an authorizer for civil drone flights in restricted military airspace; and the Transportation Safety Board is the reporting agency for UAV occurrences (Transport Canada, 2012a; Department of National Defence, 2012).

2008, amended the staff instruction booklet that Transport Canada inspectors follow as a guideline for issuing drone certificates (Transport Canada, 2010a, p. 1). Both the UAV and SFOC working groups have since been dissolved, but their contributions continue to shape existing regulatory development for drones. Replacing the aforementioned working groups was the UAV Program Design Working Group, current as of 2009, hereafter referred to as the "Working Group."

The Working Group involves collaboration between government and industry, and is spearheaded by Transport Canada and Unmanned Systems Canada (USC), a lobby organization made up of industry players (Eley, 2010). The Working Group is currently in the process of proposing new and amending old aviation regulations to permit the safe and routine integration of drones into Canadian airspace (Eley, 2010). Thirty-four out of the fifty-two working group members are affiliated with the drone or aviation industries (Gersher, 2013, p. 2). The rest are from Transport Canada, the Department of National Defence (DND), the Ontario Provincial Police (OPP), and the National Research Council of Canada (NRC).

The Working Group's priorities are ultimately to ensure the physical safety of the public, the national security of Canada, and the prosperity of the drone industry, while normalizing and standardizing drone operations within the country. Former Executive Director at USC, Wayne Crowe, describes the industry's involvement in the Working Group as an "issue of great importance to our membership" (Crowe, cited in Dixon, 2011). For Crowe and USC members, part of the aim of their participation is to see that "by the time the proposed regulations become law they will have already become everyday practice" (Crowe, cited in Dixon, 2011). Another drone lobby represented within the Working Group is the Canadian Centre for Unmanned Vehicle Systems (CCUVS), who are keen on the

> development of routine regulations for unmanned systems in all environments [that] will unlock the vast potential offered by the technologies involved. The key issue is safety and regulations should only be built on the foundation of a comprehensive and robust set of safety, performance and interoperability standards (Canadian Centre for Unmanned Vehicle Systems, 2010, p. 20).

Both these lobby organizations are building off the goal of the original 2007 UAV Working Group, which sought to "grow an industry while meeting mandates for national safety and security" (Transport Canada, 2007).

The prime concerns of Transport Canada are aligned with the industry players of the Working Group. In a speech delivered at the 2010 USC Conference, Director General of Civil Aviation Martin Eley expressed that in order "[f]or this industry to realize its potential, we need a regulatory framework that first ensures public safety and second enables the development of the UAV sector" (Eley, 2010). For the National Research Council of Canada, their interest in the Working Group is "assisting the industry and the regulator to implement permissive regulation" (Ellis, 2012, p. 7). The military and policing agencies, such as the DND and OPP, also have a seat at the Working Group table, however the intentions of their involvement will be made clearer in sections devoted to them below.

Membership in the Working Group is ultimately reserved for "government and the aviation community," such as operators, manufacturers, professional associations and consumer groups. Members of the public, however, can engage in the rulemaking procedure at the final stage through the government's online regulatory consultation website, the *Canada Gazette* (Transport Canada, 2010b). The public is given thirty days on average to review and make regulatory recommendations to products. So, what have been the results of these efforts?

3.2 Civil Drone Regulations

Transport Canada holds the final authority in permitting civil drone use. The main document required in order to fly a drone in Canadian civil airspace is the Special Flight Operations Certificate, or SFOC. The SFOC is required for all uses that are not considered military or recreational (*Canadian Aviation Regulations*, Section 602.41). Military uses of drones fall under the authority of the Department of National Defence, while recreational uses are considered model aircraft and exempt from regulation (*Canadian Aviation Regulations*, Section 102.01). Since "[i]t is Transport Canada policy that UAVs operating in Canada must meet the "equivalent" levels of safety as manned aircraft[,]" SFOCs are issued in an effort to minimize potential flight risks (Transport Canada, 2011a). The full requirements to operate a drone within civil airspace are detailed within the *Canadian Aviation Regulations* (*CARs*), pursuant to the *Aeronautics Act*.

The current regulatory framework for drones, including the certification process, is undergoing significant changes to "permit full integration of UAVs in Canadian air space" (Unmanned Systems Canada, 2012). Transport Canada's proposed regulations, under the guidance of the Working Group, aim to be completed in their entirety by 2017 (Eley, 2012). Once accepted, the rules will officially be integrated into the *CARs*. The new regulations are being developed in four phases, the first of which was approved in October 2012 (Unmanned Systems Canada, 2013a). The focus of the first phase was "small RPAs" (remotely piloted aircraft), the category for drones with a maximum take-off weight of 25 kg or less (roughly 55 lbs) and operating within the visual line of sight (Transport Canada, 2012a). Small drones were chosen as the priority of the Working Group since this class is likely to comprise 75-80% of the short-term public and commercial market (Ellis, 2012, p. 5; Transport Canada, 2007; Transport

Canada, 2010a). Subsequent phases will address drones with a maximum take-off weight under 25 kg operating *beyond* line-of-sight; drones with a maximum take-off weight between 25 kg and 150 kg (roughly 55-330 lbs), operating in all flight conditions; and finally, drones with a maximum take-off weight above 150 kg and operating in all flight conditions (Unmanned Systems Canada, 2012; Tarr & Wuennenberg, 2013, p. 3).

To sum up, the first phase of rule-making with respect to drones in Canada include technical revisions to the *CARs* so as to bring "small RPAs" that operate within the line of sight into the regulatory fold; the introduction of a new category of drones that are, at least for the time being, exempt from regulation; changes to the certification process; and a focus on cross-border operations. The following paragraphs provide greater insight into these developments.

3.2.1 Technical Revisions to the *Canadian Aviation Regulations (CARs)*

The Working Group reviewed each part of the *CARs*, making changes where applicable for the governance of small drones (Transport Canada, 2012b). Included among some of the technical changes were, generally speaking, proposals for new aircraft identification, marking and registration; updates to definitions; recommendations for personnel licensing and training; and new airworthiness standards for drones (Unmanned Systems Canada, 2012). One of the biggest changes to the current regulations was the introduction of a new category of drones called "low energy" – the details of which are provided in the next section.

3.2.2 Regulatory Exemptions for Drones

The Working Group was "tasked with identifying whether there was some sort of lower threshold, under which the RPA did not need to be regulated, or could be regulated to a very low extent" (Transport Canada, 2012a, p. 9). Director of drone company Accuas Systems Inc. and

member of the Working Group, Eric Edwards (2014), articulates the rationale behind the purpose of airspace regulation:

> Regulation primarily exists for the protection of the public and other airspace users. It stands to reason that if the UAV cannot do harm, then the regulatory thresholds can be lowered and the administrative burden for both applicant and government can be reduced (n.p.).

Hence the emergence of the novel category, "low energy RPA." This micro class of drone will not require any sort of operator certificate or notification to Transport Canada once all regulatory phases are official largely on the grounds that it poses minimal safety hazards. All that will be required to achieve compliance for low energy drones is an airworthiness document demonstrating that various safety conditions have been met.[12] Other than an airworthiness document, low energy drones will be dealt with in the same manner as model aircraft in Canada, meaning they cannot be flown into a cloud, harm persons, property and any other aircraft (Unmanned Systems Canada, 2013a, p. 10; Transport Canada, 2012a, p. 10). In addition to the introduction of this new category of drone, changes to the certification process are underway, as the following section illustrates.

3.2.3 Certification Changes

Transport Canada currently issues certificates (SFOCs) authorizing drone use on a case-by-case basis, either for short- or long-term uses (Office of the Privacy Commissioner, 2013a, p. 8; Edwards, 2014). While SFOCs are generally issued for short-term uses, long-term uses can be

---

[12] The RPA must demonstrate that in the case of an uncontrolled impact, it will "not impart a peak energy of more than 12J/cm^2 on a stationary person or object in the most unfavourable of circumstances" (Transport Canada, 2012a, p. 9). The characteristics contributing to this classification include RPAs that have no hard massive components; an energy-absorbing structure; fire-resistant materials; operated at low speeds; and ensuring a small footprint after crashing (Transport Canada, 2012a, p. 9). If these criteria are met, the RPA can be designated as low energy.

granted for up to a year to private and public entities, such as law enforcement, after trust and operational safety has been established with Transport Canada (Office of the Privacy Commissioner, 2013a, p. 8; Edwards, 2014). The certification process requires applicants to provide details of the operation, its purpose, how the plan will be carried out, the kind of equipment in use, and supporting documentation such as liability insurance (Transport Canada, 2008). Bypassing the requirement of an operator certificate carries a penalty of up to $5,000 for an individual and $25,000 for a corporation (Transport Canada, 2008).

Former Chair of Unmanned Systems Canada, Eric Edwards, has described the SFOC process as "onerous" for transport inspectors and civil operators, "and was only ever intended to be used for special cases, not routine operations" (2012). For the time being, SFOCs will be required for all drone uses that are non-recreational. Once the Working Group's regulatory amendments are official in approximately three years, the certificate will, however, only be required for temporary short-term purposes such as for flight tests (Transport Canada, 2012a, p. 19). When these rules are in place, all long-term operators will be subject to *either* a new certificate – not yet implemented; a notification requirement to the Transport Minister prior to commencing flight operations; or, if operating low energy drones, exempt from regulations apart from those governing model aircraft (Transport Canada, 2012a).

Although the first of the four regulatory phases is complete, it will not become official until the completion of the remaining three phases. The Working Group, nevertheless, is unofficially putting into practice some of the proposed changes through an update of the SFOC Staff Instruction booklet. The booklet serves as instruction for both Transport Canada inspectors issuing, and organizations wishing to apply, for SFOCs. The SFOC Staff Instructions themselves are yet to be released, however in the interim, the *Small Unmanned Air Vehicle (UAV)*

Definitions and Best Practices has been issued, hereafter referred to as the Best Practice Guidance. This guidance document, created by Unmanned Systems Canada under the approval of Transport Canada, promotes the changes in the SFOC Staff Instruction booklet and, hence, reflects various elements of the first phase of regulations. (Unmanned Systems Canada, 2013a; Unmanned Systems Canada, 2013b). Among the changes, the Best Practice Guidance will streamline the certification process for flying small drones within civil airspace. If applicants comply with the strict provisions in the document, they will have greater assurance of obtaining an operator certificate for longer periods of time, and may have a fast-tracked renewal process in the future (Unmanned Systems Canada, 2013a, p. 3).

3.2.4 Cross-Border Operations

The first phase of regulations also attends to "cross-border operations" for small drones (Transport Canada, 2012a, p. 5) and will allow persons from a foreign state to hold a future "RPAS operator certificate" (Transport Canada, 2012a, p. 23). This is in line with developments happening between Transport Canada and the US Federal Aviation Administration (FAA) under the *Regulatory Cooperation Council* (RCC).[13] The RCC was created in February 2011 to address "unnecessary regulatory differences" that stifle trade and investment while enhancing security across US and Canada borders (Government of Canada, 2011a, p. 3). One of the areas deemed worthy for mutual regulatory alignment is in emerging technologies, particularly unmanned aircraft systems for commercial and public uses. The impact of the RCC initiative in Canada is that it made aligning "small RPA" regulations with the US a greater priority (Transport Canada, 2011b, p.7).

---

[13] The RCC is part of the *Beyond the Border Action Plan* implemented on February 4 2011 between the U.S. and Canadian government, the details of which are covered in more depth in sections below (Government of Canada, 2011a).

As part of the plan for aligning drone regulations, the RCC Air Transport Working Group was established between the FAA, Transport Canada, and relevant stakeholders (Government of Canada, 2012b), who are in the midst of "developing future operator certificate and type certification parameters" (Government of Canada, 2012a, p. 16). The RCC Working Group's goal is for the aerial technology to operate seamlessly, safely and routinely in both countries' airspace, "with an eye towards the harmonization of unmanned aircraft systems regulations globally" (Government of Canada, 2011b). A more thorough discussion of drone developments along the border is fleshed out in sections below. While the second phase of rulemaking is currently underway (Edwards, 2014; Tarr & Wuennenberg, 2013, p. 4), there is almost nothing to report since Transport Canada has been tight-lipped about the Working Group's deliberations. The little that is known is that phase two attends to small drones that are operated beyond line of sight, thus a brief discussion is offered about how such flights are currently dealt with in Canada.

3.2.5 Beyond Line of Sight (BLOS)

Applications for flying beyond the visual range are dealt with by Transport Canada on a case-by-case basis (Transport Canada, 2010c). These operations require Detect-Sense-and-Avoid (DSA) capabilities "to perform those collision avoidance functions normally provided by a pilot in a manned aircraft" (Transport Canada, 2010c). Since "[t]he availability of reliable DSA technology is likely to be a significant number of years away[,]" Transport Canada advises applicants wanting to operate BLOS "that, depending on the mission and the operating environment, it may not be possible to find ways to safely integrate the operation with the manned aircraft" (Transport Canada, 2010c). The extent to which Transport Canada permits such flights remains unknown to the public.

Now that we have examined the rules surrounding civil drone use, let us look toward some of the active agencies that must abide by these rules, beginning with law enforcement.

3.3 Police Drones

Constable Marc Sharpe of the Ontario Provincial Police (OPP) pioneered the use of drones among Canadian police services. His hand-built model, the FIU-301, "embarked on the first operational mission at a homicide scene in the Ontario community of Fort Sevem" in October 2007 (Sharpe, 2008, p. 102). Since this time, a number of federal, provincial, and regional police units have utilized the technology for a variety of purposes. In addition to the OPP, drones are operated by the Saskatoon City Police, Vancouver Police Department, the police services of Regina, Prince Albert, Chatham-Kent, and Halton Regional, along with various divisions within the RCMP (Jewers, 2010, p. 3; Domoney, 2012; Pearson, 2012).[14] While the number of drones belonging to the entire Canadian police services is unknown, the RCMP fleet since September 2014 totals forty-five (*Canadian Aviator*, 2014, p. 41).

3.3.1 Police Use of Drones

Police agencies are subject to the same civil aviation legislation as commercial entities or individuals wanting to operate drones for non-recreational purposes in Canada. Hence they are required to obtain a Special Flight Operations Certificate (SFOC) from Transport Canada. According to RCMP Corporal Dave Jewers, these applications can "take months to receive approval" where "[s]ome requests may not be granted or may offer less freedom than requested"

---

[14] RCMP divisions operating drones include: D Division (Manitoba); E Division (B.C.); F Division (Saskatchewan); G Division (Northwest Territories); H Division (Novia Scotia); K Division (Alberta); and Tech OPS (Technical Operations – Ottawa) (Domoney, n.d.; Francoeur, 2013; *Canadian Broadcasting Corporation*, 2014a).

(2010, p. 10). However, it appears that police agencies are given some flexibility since "many of these restrictions can be "negotiated" on future applications as trust is developed between the pilot/agency and Transport Canada" (Jewers, 2010, p. 10). In fact Transport Canada will often issue "blanket SFOC approvals" for up to a year to police agencies, "who would utilize the UAV on an on-demand basis" (Office of the Privacy Commissioner, 2013a, p. 8). According to Cpl. Jewers, "in the eyes of the local Transport Canada inspector/supervisors" successful applicants must demonstrate "operator experience, competence and a track-record of safe operation" before the agency "will allow subsequent SFOC's to be issued with longer durations and less-stringent restrictions" (2010, p. 10). Therefore, safe operations and good ties with Transport Canada can ensure the success of future uses, as well as prolonged and fast-tracked certificates among police services.

Under the conditions of the operator certificate, Canadian police most frequently deploy drones in crash scene investigations, for search and rescue, major crimes and identification scenes, and Emergency Response Team (ERT) calls (Domoney, n.d.a). Police have also deployed the technology for more controversial uses such as for beach patrol (Jewers, 2010, p. 10; Smith, 2012, p. 5), monitoring protests (Bowman, 2014), and flying over private property in order to spot marijuana grow operations (Aeryon Labs, 2010; Robertson, 2012). It is unclear as to whether some of these latter uses were approved by Transport Canada since, "[u]ntil very recently, UAV's could not be operated above any person" (Jewers, 2010, p. 10). According to an internal RCMP report:

> Areas overflown had to be secured, vacated and bystanders prevented from re-entering to avoid potential risk should the machine fail and fall from the sky. Recently, some SFOC amendments have softened these restrictions allowing an operator to fly over person, provided the persons were "directly involved in the operation (i.e. police personnel on the scene at the incident) (Jewers, 2010, p. 10).

While it would appear some flights over persons are permitted by Transport Canada, the beach patrol operation was among those that were not approved.

Referred to as the debacle in Sylvan Lake, Alberta, the local RCMP detachment deployed a small drone over sunbathers for beach patrol without obtaining a certificate. When Transport Canada learned of this, they issued an "immediate cease and desist order", which led to the loss of the police detachment's drone (Jewers, 2010, p. 10). Hence lawful and safe operations are a prerequisite for acceptable police uses of drones, as are a good media coverage and a sound public relations strategy, especially in the case of police surveillance:

> Surveillance (even using the word) is an especially sensitive 'tripwire' for public backlash. UAS should NOT be used for surveillance unless the agency has conducted a comprehensive examination of the potential for a public backlash or media sensationalizing of the UAS and taken all steps to ensure such a risk is mitigated and does not jeopardize both their UAS program and that of the greater police community (Engele et al., 2012, p. iii, emphasis in the original).

The use of a police drone over peaceful protesters at Tyendinaga First Nation in March 2014 did spark public and media controversy online (Bowman, 2014). While Transport Canada did not publically express disproval of the incident, it is unclear as to whether the aviation regulator permitted this use. The OPP, on the other hand, responded to the controversy by issuing a response on Twitter in defence of their actions: "Unmanned Aerial Vehicles (UAV) are an economical way to take pictures. It is a tool used in investigations" (Ontario Provincial Police East cited, in Bowman, 2014). It is common among Canadian police to refer to drones as simply a tool or another type of investigative equipment. In a 2012 report written by Canadian police officers, Jerome Engele and Marc Sharpe, as well as John Evans from Defence R&D Canada, the co-authors state that "[t]he UAS simply serves as a platform for the camera and is really no different than using a tripod or standing on a ladder to take a photo" (p. 26). The next chapter

evaluates the technology and its uses in greater detail, for now, however, we turn to the mechanics of this new policing "tool."

3.3.2 Police Drone Capabilities, Advantages & Drawbacks

For the time being, police across Canada operate "small" drones weighing 25 kg (55 lbs) or less, the bulk of which are classified as "micro" – a subdivision within the small category. Small drones come in two forms, gas or battery powered, and fixed- or rotary-wing models. The gas helicopter, TREX 800, is among one of the small drones the RCMP operates. The advantages of this model are a long flight time (approx. 1.5 hrs); the ability to carry heavier equipment, including better cameras; and the ability to operate in strong winds (Domoney, n.d.b). The disadvantages include noisy operation, potential safety hazard, and the need for greater training (Domoney, n.d.b).

Micro drones tend to "weigh approximately two kilograms, have wing-spans of only a few feet, are electric or fuel powered, and have flight times ranging from 10-30 minutes" (Engele et al., 2012, p. ii). Commonly deployed micro drones in Canada include the Aeryon Scout and Draganflyer X4 and X6, which are rotor UAV helicopters (Sharpe, 2009). In his description of the Draganflyer X6, Cpl. Jewers explains how this model

> [a]llows the user to control the gimbaled 10 megapixel camera's tilt, lens zoom and shutter release to obtain high-quality images. The X6 and most other UAV's also have the capability of mounting other implements including video camera (allowing a live video feed to the operator on the ground), low light … and infra-red camera (often called "FLIR"). UAV's also have the ability to carry and drop light objects and to "perch" (fly and land at a location, maintaining a much longer period of video surveillance than if flying)… [Moreover t]he X6 is small enough to be flown indoors allowing a myriad of tactical uses... The rotor efficiency and lack of geared motors generates only 65 dB of sound at one meter, making it difficult to detect over ambient noise in many situations (Jewers, 2010, p. 7).

In short, the small size of micro drones, their ability to stream and capture up close videos or photographs, both indoor, outdoor, and while perched, as well as its quiet operation provide police with a number of advantages.

Both small and micro drones enable police forces "to very quickly and efficiently achieve a vantage point that would be impractical with conventional manned aircraft" (Jewers, 2010, p. 2). Other advantages include their potential for stealth operations, varied uses, adjustable payloads, and cheap costs after the initial investment. The initial investment of the Draganflyer X6 is approximately $50,000.00 (Domoney, n.d.b), however each time the X6 is used over a traditional aircraft, "it saves the department between $1,500 to $2,000" (Jewers, 2010, p. 3). There are some drawbacks to small and micro drones, such as deteriorating quality of photographs in rainy or snowy weather (Jewers, 2010, p. 8) and expensive repairs or replacement parts (RCMP n.d., p. 4). In the case of micro drones, they have limited navigability in inclement weather. While this is an obstacle for micro drones in general, the Aeryon Scout bucks the trend and is "capable of flying in winds up to 50 km/h" (Jewers 2010, p. 8).

3.3.3 Royal Canadian Mounted Police Policy for Drones

Despite the fact that drones are operated among all levels of police services across Canada, there appears to be no overarching policy guiding their use. In the works, however, is a UAS policy developed by and for the RCMP. In February 2012, the Saskatchewan RCMP F Division spearheaded the National Unmanned Aerial Systems Working Group (NUASWG) (Derksen, 2012). The group was officially established by April 2012 "to provide advice and recommendations regarding UAS use by the RCMP" (Derksen, 2012) and to develop a single national UAS policy for all divisions (Royal Canadian Mounted Police, 2012a). To date, the

policy is not available to the general public, and thus draft versions obtained from the RCMP through access to information requests are drawn upon.

The RCMP drone policy is made up of three parts. The first part is definitional and relies heavily on terms from the *Canadian Aviation Regulations*. The second part attends to general requirements and includes information about drone pilots, operators, training, and certification requirements. It also details the kind of payload policing drones can carry, including "cameras, video equipment, environmental or other sensors and objects providing that … it can be done safely" (Royal Canadian Mounted Police, 2012b). It furthermore includes an exceptional circumstance clause for conducting surveillance "where there is an imminent risk to life or safety that can be alleviated by using the UAS" (Royal Canadian Mounted Police, 2012b). Also included within part two is a media strategy provision "to ensure consistency in messaging[,]" the purpose of which "is to inform the public about the uses for the UAS and reassure that it is not being used for surveillance" (Royal Canadian Mounted Police, 2012b). Part three of the policy focuses entirely on safety, addressing the roles, responsibilities, and operation of drones.

While the majority of the RCMP policy focuses on technical specifications, there is mention of privacy in one of the draft versions. Principle 2.1.5 states that drones "[m]ay be used as an investigative aid when there is no expectation of privacy and judicial authorizations have been gained where required" (Royal Canadian Mounted Police, 2012c). The RCMP policy currently underway is meant to standardize RCMP operations across the country. At this point, however, it is uncertain if the policy is already in effect, or completed.

3.3.4 Future Aspirations

In October 2009, Constable Sharpe issued a warning to colleagues expressing that "[a]ny grand ideas about highway patrols, extensive large area search and rescue operations or

especially any form of surveillance should not be on any police radar (pun intended)" (p. 9). Of those three recommendations, two have already been dismissed. A search and rescue mission was carried out over the downtown of Wallaceburg, Ontario (Pearson, 2012), as has surveillance over people (e.g. Tyendinaga First Nation) and private property (e.g. marijuana searches), as mentioned previously. Moreover three divisions within the RCMP – Special "O", "Tech OPS", and Border Integrity (and their Integrated Border Enforcement Team) – are in the near future "seeking use of a UAS platform to conduct surveillance" (Derksen, 2012).[15] While highway patrols have not yet surfaced, it appears the RCMP has expressed interest to Transport Canada to "use the UAV for Traffic Enforcement" (Domoney, n.d.a). However, Transport Canada is presently not allowing it "as they feel this is an invasion of privacy" (Domoney, n.d.a).

Aside from these aforementioned operations, a number of suggested uses were offered within an internal RCMP report. Among the suggestions was deploying drones at major events for "[o]bserving crowd behaviour, flow of persons/traffic, [and] pre-planning"; or for the Marine Unit to conduct "[r]econnaissance of vessels prior to boarding" (Jewers, 2010, p. 4). Of all the suggested uses in the report, none included weaponizing drones. This sentiment is reflected among another RCMP officer in an attempt to acquire two small drones for his detachment. RCMP Commander Justin Smith emphasized the importance of "re-assur[ing] … clients and policing partners that the direction of progress towards arming UAVs will not be sought for the

---

[15] The "O" Division of the "RCMP is responsible for federal policing in Ontario, … and has primary law enforcement authority in federal matters" (Royal Canadian Mounted Police, 2012d). The Division has a specific "focus on organized crime, economic integrity, border enforcement and national security," and works "closely with police partners and other law enforcement agencies" (Royal Canadian Mounted Police, 2012). The RCMP "Tech OPS" gives "direct operational support, management, advice and policy in technical and specialized areas of policing to enable front-line members and partners working to enforce the law and prevent and investigate organized crime and terrorism" (Royal Canadian Mounted Police, 2008). Information about Border Integrity and IBETs are provided in sections below.

SouthEast District's specialized sections or detachments" (n.d., p. 6). While armed drones do not appear to be in the works among Canadian law enforcement, within the US, "non-lethal munitions such as tear gas" are of interest among some police services (Smith, 2012, p. 5).

There are however a number of technological developments catching the eyes of some police in Canada, including drones that can self-navigate; or "swarming" drones that "will communicate with each other not only to avoid collisions, but to cooperatively undertake tasks in teamwork" (Engele et al., 2012, p. 31). While future uses and technological advancements of drones remain uncertain, some police officers are confident the outcome will be prosperous. Corporal Jewers, for instance, expects UAS technology "will explode across the country" where "[e]very police force will want one and be working towards getting one" (Jewers, cited in Forber, 2012). Sergeant Dave Domoney's stated goal is to develop a "viable [UAS] project that is available to all sections of the RCMP" (n.d.b). Although other police officers see a future for drones in their operations, they err on the side of caution. Officer Sharpe predicts that if police services in Canada "keep to the basics" – search and rescue, forensic uses, traffic collisions, etc. – "and continue to operate safely and professionally, we can continue to creep forward" (2009, p. 9). Likewise Officer Engele et al. foresee that "[a]s the public and regulators become more accustom[ed and] the UAS and their safety and on-board intelligence becomes more proven[,] their use will grow at an exponential rate" (2012, p. 31).

3.4 Drones on the Border

Canada's border with the United States extends 8,893 kilometers in length (Hale, 2009, p. 3), and covers both land and maritime regions, making it "the longest border shared by 2 countries" (Department of Homeland Security, 2013a). Of that shared border, drones currently

patrol a 1,530 km stretch between Washington State and Minnesota, and an additional 320 kms along the New York and Lake Ontario border (Bersin, 2011; Hassibi, 2013). The earliest drone operation on the US border with Canada took place during a training exercise among various US security personnel in 2002 (Tancredo, 2004, p. 10219; Finn & Wright, 2012, p. 189). In this instance, US military surveillance drones helped US border agents catch "four people coming across on all terrain vehicles carrying 400 pounds of drugs" crossing near Idaho-British Columbia border (Tancredo, 2004, p. 10219). Six years later, the US Customs and Border Protection (CBP) announced the arrival of its own drone in support of border security efforts between Canada and the United Stated in December 2008 (General Atomics, 2008). This section details the agreements that permit drone operations over US-Canada maritime and land borders, and the extent of Canadian law enforcement involvement. In addition to this, the type of drones in operation, their capabilities, and associated policing strategies will be discussed.

3.4.1 Border Drone Initiatives

Canada and the US have a long history of cross-border agreements (Gilbert, 2012a; Canada, 2003), including more recent initiatives that have enabled the deployment of drones along the border for security purposes. One agreement of this kind is the Secure Border Initiative (SBI), established in Nov 2005 by the US Department of Homeland Security (DHS) and managed by the US CBP (Government Accountability Office, 2011; Bossenmaier, 2007). The aim of SBI is to secure America's borders and reduce illegal migration. An important component of SBI is the Secure Border Initiative-network (SBInet), a program that sought to develop "a single technology-based solution" for the entire length of the US southwest border (Government Accountability Office, 2011, p.1). Under the SBInet, CBP acquired a variety of technologies, including drones such as the RQ-5 Hunters and Hermes 450s that were succeeded by MQ-9

Predator Bs, to patrol the US border with Mexico (Koren, 2013, p. 78; General Atomics, 2008; Manson, 2006). The plan was to eventually extend these technologies northward to the US border with Canada "as one method for monitoring unmanned remote border locations" (Bossenmaier, 2007).

The perception that Canada lacked sufficient personnel and surveillance equipment for border security was partly the result of an investigation carried out by the US Government Accountability Office (GAO) from October 2006 through June 2007. The investigative findings, detailed in the 2007 GAO report *Border Security: Security Vulnerabilities at Unmanned and Unmonitored US Border Locations*, purported that the absence of an aerial presence along with other assets on the US-Canada border posed a security risk to Americans (Government Accountability Office, 2007; Attfield et al., 2007, p. 2). The study helped reinforce the need for drones and other SBInet technologies on the US-Canada border.

Within a month after the study's release, the CBP notified the Canada Border Services Agency (CBSA) – which is tasked with securing the country's ports of entry – that it was in the SBInet planning stage "to determine a future technology deployment for a Northern Border Demonstration Project in the Detroit/Windsor area in 2008" (Bossenmaier, 2007). The RCMP – who guard between ports of entry – was already involved with SBInet through its Integrated Border Enforcement Teams (IBETs). These teams are binational, multi-agency law enforcement groups from the RCMP, CBSA, US Immigration and Customs Enforcement, the US Coast Guard (USCG), and CBP (Canada, 2009b, p. 11). IBET partners can also include provincial and local law enforcement personnel, such as the Ontario Provincial Police (OPP) (Kelly, 2011; Customs and Border Protection, 2013b, p. 12). IBETs were the result of a small grassroots cross-border policing effort among Canadian and American law enforcement agents during the mid-1990s,

who worked together to prevent crime through information-sharing partnerships (Meyer, 2013; Gilbert, 2012a, p. 206). They were greatly multiplied after 9/11 under the 2001 Smart Border Declaration framework (Meyer, 2013; Gilbert, 2012a, p. 206).

In January 2008, the RCMP were in the process of posting an IBET officer in Washington to work with CBP agents for SBInet (Bossenmaier, 2007). The first northern expansion of SBInet was completed in December 2008, when CBP officially announced the acquisition of a Predator B drone for the US-Canada border (General Atomics, 2008). CBP's Air and Marine Assistant Commissioner, Major General Michael C. Kostelnik, offered the following explanation for the northern development of SBInet:

> The expansion of the UAS Program to the Northern Border represents a significant step forward in our border security efforts, using this proven, effective technology as a force multiplier for officers and agents along the border. This critical tool will enhance our valuable partnerships with Canadian and U.S. law enforcement entities alike by helping to identify and intercept potential terrorist or illegal cross-border activity (General Atomics, 2008).

By February 2009, CBP's Predator B drone began its first set of patrols along the prairie borders of North Dakota and Manitoba covering a 370 km area (White, 2009). The RCMP and CBP maintained collaboration in SBInet, and in March 2009, RCMP Deputy Commissioner Raf Souccar detailed the extent of the federal agency's involvement at a House of Commons Committee Meeting:

> We have had discussions with our U.S. counterparts … over how to improve border security, over technology, over how to work together to complement each other, as opposed to duplicating our efforts... We have one person seconded to them to ensure that all technology that's brought in, such as drones, for example, is done in a way that we can work together to complement each other. Any time a vehicle such as a drone enters Canadian airspace, we're notified before that happens (Canada, 2009a, p. 14).

While Dep. Com. Souccar indicated that US drones enter Canadian airspace, RCMP Inspector Mike Furey chimed in to explain that drones were only deployed "on the U.S. northern border

within their territorial area" since Transport Canada would "not authorize a certificate for air-worthiness" (Canada, 2009a, p. 14). Within a month of this meeting, the SBInet initiative expanded eastward to cover the Great Lakes region, where CBP spokesman Steve Sapp confirmed that a Predator B drone likely flew over the Canada-US Niagara area during a multi-agency training exercise called Operation Empire Shield (Robbins, 2009). The purpose of the operation was to test the feasibility of surveillance drones over maritime and coastal regions, and to evaluate the co-operative arrangement among Canadian and American law enforcement agencies (Robbins, 2009; General Atomics, 2009b). While the SBInet program was terminated in January 2011 (Government Accountability Office, 2011), it was replaced by a new "technology plan that will utilize existing, proven technology" such as drones for US border security (Department of Homeland Security, n.d., p. 8).

Another cross-border initiative permitting drone operations on Canada's border with the US is Shiprider, which occurred at the same time as SBI. Shiprider was initially established under the *Security Prosperity Partnership* (SPP), a trilateral border security initiative signed in March 2005 between the US, Canada and Mexico. A major component of the SPP was "[t]he harmonization of border security – including information sharing and interoperability of security forces" (Gilbert, 2012a, p. 199). While the SPP trilateral initiative was terminated in August 2009, agreements like Shiprider, as well as newer initiatives such as the 2011 *Beyond the Border Action Plan* – addressed in greater detail below – continue to carryout many of the objectives to those of the SPP (Gilbert, 2012a, p. 201).

Shiprider, officially titled Integrated Cross-Border Maritime Law Enforcement Operations (ICBMLEO), was an experiment started at the time of the SPP, around 2005. However as its official title hints, its origins stem from the partnerships developed within the

Integrated Border Enforcement Teams (IBETs) of the mid-90s that have flourished since 9/11 (US Coast Guard, 2013b; Canada, 2009b, p. 12). The Shiprider pilot project involves the RCMP and US Coast Guard (USCG) "teamed up on boats to enforce law along parts of the Canada-U.S. maritime border" (Canada, 2011a, p. 7). Over the years, Shiprider operations were predominately carried out at mega-events (Canada, 2011a, p. 9; Meyer, 2013, p. 16). In fact, the lead up to the Vancouver Olympics and Toronto G8/G20 meetings in 2010 helped to establish the permanence of the Shiprider pilot project (Gilbert, cited in White, 2013). In May 2009, the US secretary of Homeland Security and Canada's minister of Public Safety signed the Shiprider framework agreement, which Canada ratified into law in June 2012 (US Coast Guard, 2013a).

Shiprider effectively allows Canadian and American law enforcement officers to investigate and prosecute criminal offences on shared waterways, albeit with respect to the host country's domestic laws (Department of Homeland Security, 2009; Canada, 2011a, p. 76). The agreement also permits either country to operate aircraft, including drones, in cross-border maritime operations as long as a law enforcement agent from the host country is present (Canada, 2012b). Hence while SBInet made it possible for the US CBP to acquire and deploy drones on the US-Canada border, Shiprider made it lawful for American and Canadian law enforcement agents to fly drones on shared waterways and even carry out operations on either side, with respect to the host countries laws. The principles established under Shiprider might expand inland under Next Generation, an initiative that is part of the *Beyond the Border Action Plan*.

In February 2011, Canadian Prime Minister Stephen Harper and US President Barak Obama implemented the *Beyond the Border Action Plan*. It is two-parts and includes action plans for *Perimeter Security and Economic Competitiveness* and the *Regulatory Cooperation*

Council (RCC). The objectives of the *Perimeter Security and Economic Competitiveness* action plan are to enhance US-Canada "economic relations, particularly through trade, with a strong security component that includes early threat detection, integrated personnel, and joint initiatives on infrastructure and cybersecurity" (Gilbert, 2012a, p. 201). As part of the plan to ensure the security and economic prosperity of Canada and the US, the RCC was created to align regulations, and reduce the regulatory "red tape" around agriculture and food, transportation, health and consumer products within both countries (Government of Canada, 2011a; Government of Canada, 2011b, p.7). As discussed in a previous section, the RCC includes a plan for the regulatory harmonization of drones, which is progressing through a working group established between Transport Canada and the US Federal Aviation Administration.

Under the *Beyond the Border* framework, there is an initiative called Next Generation (NxtGen), which builds off of the Shiprider law, essentially expanding Shiprider "onto land crossings" (Gilbert, 2012b). NxtGen is "designed to facilitate cross-border intelligence and information-sharing at and between land borders … [and] will also, like Shiprider, authorize designated officers to enforce the law on either side of the border" (Gilbert, 2012b). The initiative has been met with substantial controversy in the Canadian Press since the release of an RCMP memo that indicates US law enforcement officers want to be exempt from Canadian law during NxtGen operations (Bronskill, 2013). At this point, little is known about NxtGen, other than it is in "legal limbo" (Meyer, 2013, p. 16) and that the CBSA is in collaboration with Public Safety Canada in the implementation of the initiative (Canada Border Services Agency, 2012a). What remains to be seen is whether NxtGen will be passed, and if the aerial provision within Shiprider will be extended to operations inland. The next section turns to the capabilities of these border drones, including the kind of enforcement tactics that adjoin such operations.

3.4.2 Border Drone Capabilities, Enforcement Tactics & Targets of Interest

Canada's border enforcement agencies such as the CBSA and RCMP IBETs do not as of yet operate their own fleet of drones (Canada, 2009a, p. 15; Freeze, 2012). Rather they do so in conjunction with their US counterparts that "are more than willing to share" their assets and equipment during joint operations (Canada, 2011a, pp. 12-3). As of September 2013, the CBP and US Coast Guard (USCG) own and operate ten large drones over their borders with Canada and Mexico (Department of Homeland Security, 2013b, p. 4). The USCG (2014) is, however, in the process of procuring smaller, cutter-based drones that will increase its overall fleet. Within the category of large drones, the CBP and USCG operate MQ-9 Predator B and Guardian unmanned aircrafts (Department of Homeland Security, 2013b, p. 4; Customs and Border Protection, 2012, p. 40). Of the two drones, the Predator B is most infamous as a result of its combat role throughout Southwest Asia and Africa. However as a repurposed civilian aircraft deployed for border control, the Predator B is apparently not armed (Department of Homeland Security, 2013b, p. 3).

According to the US Department of Homeland Security (DHS), the Predator B was chosen for northern border security operations as a result of its:

> unique capabilities that allow it to carry a variety of operational payloads and fly for extended periods of time without requiring the support systems and limitations of on-board pilots. It also has the flexibility and endurance to fly these long-leg surveillance missions while conducting both scheduled and unscheduled searches (Department of Homeland Security, 2008, p. 13).

Measuring 11 meters in length with a 20 meter wingspan (General Atomics, 2012), the Predator B can fly a maximum altitude of 50,000 feet for up to 30 hours undetected, and according to CBP's former UAS Director, Michael J Pitts, its suite of sensors can "detect what is in the back of a truck" (Pitts, 2007). The Guardian, jointly operated by CBP and USCG, is a modified

version of the Predator B drone developed for maritime operations, and enhanced with Marine Search Radar (Customs and Border Protection, 2013a). Both models carry electro-optical/infrared (EO/IR) sensors that can "take small-scale aerial video images of buildings, vehicles, and people" at any altitude using digital zoom software (Department of Homeland Security, 2013b, p. 7).

Small cutter-based UASs for maritime operations will soon accompany this large fleet of drones (US Coast Guard, 2014). Currently the USCG is in the "analyze/select phase," and while little is known about the drones under review, the agency has conducted demonstrations in the past using the ScanEagle (US Coast Guard, 2014), popular in military theatres. Measuring four feet in length, the ScanEagle is a long-endurance small drone, carrying either an electro-optical or infrared camera that "can provide more than 15 consecutive hours of "on-station" coverage and can operate in harsh weather environments" (Boeing, 2014). The capabilities of this family of border drones are diverse, however they are all designed with the ability to add new technological enhancements as they emerge. Within a 2013 internal CBSA report, the agency reveals that CBP's Predator B "may soon be outfitted with advanced ground radar that not only visually identifies individuals, day or night, but can also intercept multiple electronic signals**,** including telephone calls, text messages, and GPS signals emitted from cellular phones" (Canada Border Services Agency, 2013, pp. 23-4). Moreover, the US border agency has considered the possibility of upgrading the payload on its Predator drones with "nonlethal weapons designed to immobilize TOIs [Targets of Interest]" (Department of Homeland Security, 2010).

These border drones are ultimately part of a network of technological systems that work in tandem with satellites and ground-based sensors to provide extensive surveillance. When operational on the US northern border, "UAS respond to sensor activation, identify and track

subjects of interest, provide situational awareness to air crew and ground interdiction agents and monitor and capture video of interdiction" (Boulay, n.d.). In order for these mission objectives to be realized, a team of drone operators, technicians, image analysts, and the greater intelligence community are relied upon. In the case of joint operations among Canadian and American law enforcement agencies, CBP can provide authorized personnel with real-time video feeds that "are fed through the DHS firewall" to a video and image distribution network known as "Big Pipe" (Department of Homeland Security, 2013b, p. 6). This in fact occurred during Operation Empire Shield in the Great Lakes region, when the Predator B was "streaming … live video to select members of law enforcement, homeland security, and members of the U.S. Congress" (General Atomics, 2009b). The designated personnel can essentially connect to Big Pipe "anywhere there is an internet connection[,]" including with handheld devices such as smartphones to help carry out their operation (Customs and Border Protection, 2011).

While the quality of images transmitted to users become weaker the higher the aircraft's altitude, in lower altitudes, the electro-optical/infrared (EO/IR) cameras "may permit identification" (Department of Homeland Security, 2013b, p. 7). Under the conditions of CBP's operator certificate issued by the FAA, the Predator B and Guardian are confined to a minimum altitude of 19,000 feet, which apparently does not permit identification of "physical characteristics such as height, weight, eye color, hair style, or a facial image" (Department of Homeland Security, 2013b, p. 7). At 19,00 feet the operator may still be able to discern "whether an individual is carrying a long gun or wearing a back pack" (Department of Homeland Security, 2013b, p. 7). CBP's UAS Director, Michael J. Pitts, indicated to the CBSA in a 2007 bilateral meeting that "[w]hile on the northern border, UAS is looking at illegal conveyances, groups and not individuals" (Pitts, 2007, p. 4).

It appears that the US northern border drone operations involve "persistent, broad area surveillance" and also "respond to un-cued, cued, and intelligence-based missions" (Department of Homeland Security, 2008).[16] Thus when the RCMP and its American counterparts carry out a Shiprider or IBET mission, they not only rely on their surveillance technologies for the acquisition of intelligence, but also from "joint threat and risk assessments" (Canada, 2009b, p. 11). In Canada, national threats are assessed at RCMP headquarters in Ottawa where the federal agency along with US agencies "shar[e] intelligence and hel[p] identify targets for the IBET teams to go after" (Meyer, 2013, p. 16). According to a *Joint Border Threat and Risk Assessment* released by the CBP, CBSA and RCMP in 2011, bi-national security threats include:

> cross-border criminal organizations, drug trafficking and illegal immigration, the illicit movement of prohibited or controlled goods, agricultural hazards, and the spread of infectious disease. The assessment also further highlights the commitment of the two countries to identify and mitigate potential threats along our shared border, where there is a potential of terrorism and transnational organized crime (Bersin, 2011).

The US Department of Homeland Security, in 2012, maintains that the potential for terrorists and violent extremists "pose the single greatest security threat" along the northern border (Department of Homeland Security, 2012a, p. 6). In contrast to its American counterparts, the CBSA reported in a 2013 unreleased document, that the threat of terrorists entering Canada "persists at a low level" (Canada Border Services Agency, 2013, p. 17). This is further corroborated in the official 2013 *Police-Reported Crime Statistics* that demonstrates terrorism makes up only a small fraction of the crime in Canada. Of the approximately 1.8 million crimes reported, terrorism included 72 offences – a comparatively low number in comparison to

---

[16] It is worthy to note that in April 2016, the CBSA is expected to shift "from a transactional-based approach to border management, to one that is more evidence-based and intelligence-led" and also complete its "transition to an armed enforcement agency" (Canada Border Services Agency, 2013, p. 33).

cannabis offenses (58,965) and non-motor vehicle theft of under $5,000 (471,924) (Statistics Canada, 2014, p. 6).

Nonetheless, the CBSA maintains that the emerging trend of "domestic radicalization" is a continued concern (Canada Border Services Agency, 2013, p. 17). Domestic radicalization includes "'insider threats' from Islamist extremists" and "issue-based extremism" (Canada Border Services Agency, 2013, p. 16), the latter of which "revolv[es] around the promotion of various causes such as animal rights, white supremacy, environmentalism and anti-capitalism" (Toews, 2011, p. 9). As such, the CBSA affirms that "[t]he timely and early sharing of information pertaining to high-risk individuals amongst the intelligence and enforcement community will likely continue to be essential in identifying and intercepting national security threats at any point along the travel continuum" (Canada Border Services Agency, 2013, p. 17).

CBPs border drone operations have been the target of some scrutiny. Southern Manitoba legislature representative, Clifford Graydon indicated in a 2011 news report that since the time of the Predator B's arrival on the North Dakota-Manitoba border, he is unaware of any arrests connected to the aircraft. Rather, US officials informed him "the machine has had mechanical issues and doesn't perform well in bad weather" (Quan, 2011). Such issues were the focus of a 2012 US House of Representatives subcommittee hearing where concerns were expressed regarding the economical and mechanical inefficiency of border drones:

> There are concerns regarding the high accident rates of UAS', which have historically been multiple times higher than that of manned aircraft. Inclement weather conditions can also impinge on a UAS' surveillance capability. Also … the costs of operating a UAS are more than double the costs of operating a manned aircraft. A Predator-B UAS system, the plane, sensors, control consoles and antennas costs US$18.5 million (Canada Border Services Agency, 2012c).

In addition to the high-price and poor safety record, CBP's border drones have also had limited success in meeting its flight capacity. As of June 2011, CBP's drones flew "an estimated 238

days a year[,]" meeting only half of its scheduled flights (Department of Homeland Security, 2012b, p. 16). The US border drone program is still continuing, and as of 2013, the CBP reported an annual increase in flight hours and the creation of a new UAS operations centre in Florida slated to begin in 2014 (Customs and Border Protection, 2013b, p. 26). The CBP reported that in the 2013 fiscal year its northern border drone operations and other aircraft assisted in 55 apprehensions of unspecified persons (either drug traffickers, illegal migrants, or terrorists), and the seizure of 49,081 lbs of marijuana and 787 lbs of cocaine (Department of Homeland Security, 2013a). As the CBP's unmanned aerial technologies patrol parts of the Canada-US border, it appears Canada's military has plans to purchase a similar fleet of drones for domestic patrols on land and in maritime and Arctic regions.

3.5 Drones & the Military

Canada's military and manufacturing sectors were collaboratively developing drones as far back as the late 1950s (Carryer, 2008, p. 3), however these earlier systems "were very rudimentary" (Carryer, 2008, p. 3). Experiments with more advanced drones on domestic soil took place only at the end of the twentieth century (Carryer, 2008, p. 5). This section charts some of the military's most recent plans and operations for drones on Canadian soil, and will end with a discussion of the rules in place that permit such uses.

3.5.1 Domestic Military Drone Operations & Projects

One of the earliest domestic military drone missions – known as Operation GRIZZLY – occurred at the 2002 G8 Summit in Kananaskis, Alberta. The purpose of the Canadian Forces involvement was to lend support to the RCMP and also to enhance security at the summit.

Colonel David Barr, the Chief of Staff for the Canadian Forces Joint Task Force at the summit provided the following rationale for the military's involvement:

> Following the terrorist attacks of 11 September 2001, the security concerns surrounding the hosting of the G8 Summit increased dramatically… The anarchist was no longer the primary concern for the security forces. The terrorist threat, ranging from the lone sniper to bombs to weapons of mass destruction … was clearly beyond the capability of the Royal Canadian Mounted Police and local law enforcement agencies. The CF was now going to be a key partner in the effort to secure the G8 site from both ground and airborne threats (Barr, 2002, p. 39).

Part of the Canadian Forces $51.9 million dollar plan (Weltman, 2010, p. 5) to secure the summit included flying the "I-Gnat" reconnaissance drone (Carryer, 2008, p. 6; Department of National Defence, 2009, p. 27) – similar in design to the RQ-1 Predator B[17] – in addition to operating fighter jets (CF-18s) (Barr, 2003, p. 40). Ultimately, no terrorist threat surfaced at Kananaskis. Col Barr, however, pointed out that the personnel involved in the security operations claimed "interagency cooperation as being key to the success of the Summit' (2003, p. 42). He then went on to declare that "for the foreseeable future the CF, the RCMP and other agencies will be working together more often than ever" (2003, p. 45).

The use of the I-Gnat drone at the G8 Summit for Operation GRIZZLY, was part of a much larger project known as JUSTAS, or Joint Unmanned Surveillance Target Acquisition System (Carryer, 2008, p. 5). Approved by Canada's military Senior Review Board in October 2000 (Bond, 2011, p. 27), the early years of project JUSTAS included a series of domestic military experiments conducted between 2001-2004 (Carryer, 2008, p. 5). As explained by then Minister of Defense, Peter MacKay (2011), project JUSTAS will equip the Canadian Forces with

---

[17] The RQ-1 Predator B is purely a reconnaissance drone. In February 2002, the RQ-1 designation became the MQ-1 Predator B – previously discussed in the border drone section – "due to its added capabilities of laser designation and missile-firing" (Bone & Bolkcom, 2003, p. 21).

large Medium Altitude Long Endurance (MALE) drones in support of domestic and expeditionary (i.e. international) operations. With respect to domestic operations,

> JUSTAS will contribute to whole of government security by increasing the CF's capacity to provide persistent overland, maritime and limited arctic surveillance. This includes the provision of maritime and arctic domain awareness, along with support to special events (ie summits and international events), disaster relief, SAR [Search and Rescue], support to law enforcement and counter-terrorism ops (Tupper, 2010, p. 1).

In support of these missions, project JUSTAS will acquire a "[w]eaponized capability with Precision Guided Munitions" (Wuennenberg, 2012), and additional payloads that "will enable the operator to detect, identify, classify, track and strike targets of interest in either an overland or maritime role, both domestically and internationally" (Romans, 2010, p. 2).

The goal for project JUSTAS is to procure a "[f]leet of up to 18 medium altitude, long range UAVs" (Jaggi, 2009), with an endurance of 18 hours, a range of more than 1000km, and an altitude of 40,000 feet and beyond (Department of National Defence, 2011a, p. 7). While the Department of National Defence (DND) has not publically made known which drones they plan to acquire for JUSTAS, possible contenders include the weaponized Reaper drone (the armed variant of the Predator) operated by the US military in the Middle East, and also the Heron TP, manufactured by Israel and currently on lease by the DND (Royal Canadian Air Force, 2012, p. 2). Additional contenders could also include the not yet operational drones, Telemos – manufactured in the UK and France; Talarion – manufactured in Germany; and the Dominator III manufactured in Israel (Royal Canadian Air Force, 2012, p. 2). The cost of JUSTAS is expected to exceed 1.5 billion dollars (Hill, 2012). It appears the DND may even be willing to spend up to "$3.4 billion to buy and service military drones over 20 years" (Brewster, 2014). Thus far the project has encountered technical and regulatory challenges that have to do with bandwidth communications, flying in inclement weather, and integrating flights within civil

airspace (Department of National Defence, 2011a, p. 24; Meurling, 2010). As of December 2011, project JUSTAS was in the "Option Analysis" phase (Roberge, 2011, p.1), and will likely be operational in 2020 (Department of National Defence, 2013, p. 17).

In addition to JUSTAS, the domain of medium altitude drones, the military has another ongoing drone project known as the High Altitude Long Endurance (HALE) initiative, which seeks to purchase a strategic level Intelligence, Surveillance and Reconnaissance (ISR) capability (Wuennenberg, 2012). At this point the HALE initiative is "purely conceptual with no project established or resources assigned" (Wuennenberg, 2012). However, similar to JUSTAS, the HALE initiative will operate larger drones in both expeditionary and domestic operations in arctic, land, and maritime environments (Wuennenberg, 2011, p. 1; Wuennenberg, 2012). Currently, the only HALE platform that exists is the Global Hawk manufactured in the US (Royal Canadian Air Force, 2012, p. 2), which is capable of "surveil[ling] the entire Northwest Passage four times on a single mission" (*Defense News*, 2013). The approximate price tag for one Global Hawk ranges from $150-$170 million (Brewster, 2012) and has an endurance of 32 hours, a mission range of 3000 nautical miles, and can deliver "24/7 coverage" (Department of National Defence, 2011a, p. 30). It will primarily be used for domestic operations and will not be weaponized (Department of National Defence, 2011a, p. 30).

According to the DND, the maritime and Arctic regions comprise the "future security environment" in 2018 and beyond (Department of National Defence, 2011a, p. 35). Surveillance of the waterways will be critical to Canada's national security since the military expects growth in surface traffic in maritime regions and a "[s]hift in world center of maritime power" (Department of National Defence, 2011a, p. 35). With respect to the Arctic, the DND foresees

global warming and the newfound accessibility of natural resources as a key national security issue:

> It is estimated that about 20% of the world's remaining oil and gas reserves exist in the Arctic … and market pressures to develop those natural resources are greater than ever before. Furthermore, global climate change and the melting of ice will render the Arctic Ocean more accessible and navigable, which opens the entire region to international shipping, exploitation of minerals and hydrocarbon resources, and many other industrial activities… All of this interest in the Arctic implies a need for monitoring and surveillance, of the environment, of the process of climate change, and, of human activities, not only for environmental reasons but also jurisdictional and safety reasons (Department of National Defence, 2011b).

The military is therefore in favour of a layered technological solution in securing Arctic resources, addressing sovereignty issues, ensuring safe transport, monitoring climate change, and surveilling human activities. The technologies include a family of surveillance systems, from ground sensors and satellites, to underwater and aerial drones (Canada, 2012a; Department of National Defence, 2011b). The intention is that the "System of Systems" will be interoperable and synergetic, and projects like JUSTAS will "contribute to the act and sense capability domains" for securing land, marine and Arctic territories within Canada (Tupper, 2010 p. 1).

In addition to the JUSTAS and HALE projects, the military is presently engaged in annual training operations to establish their "presence in the Arctic," and to enhance cooperative arrangements and improve interoperability with a number of government departments and agencies, including international allies (Canada, 2013). Referred to as Operation NANOOK, the Canadian Forces have carried out northern training exercises since 2007 with the Canadian Coast Guard, Environment Canada, Public Safety Canada and the RCMP, as well as partners within the US and Denmark (Canada, 2013). In 2011, Operation NANOOK brought together Canada's security partners to test the capability of five ScanEagle drones in a mock search and rescue mission (McKenna, 2011). The small ScanEagle drones – previously discussed in the border

section – were successfully deployed in cold weather, delivering "real-time video to Canadian Forces during the largest military exercise to date in the far North" (Insitu, 2011). Given the sparse northern population and "broad expanse of the area," NANOOK helped confirm the "real benefit" of operating surveillance drones within a domestic capacity (Canada, 2011b, p. 6). The military's plans to operate a fleet of drones for domestic security purposes are subject to various legal and regulatory frameworks, the subject of which is the next section.

3.5.2 The Department of National Defence's Drone Regulations

Unlike public and commercial entities, the Canadian Forces does not require Transport Canada authorization to deploy drones domestically given that the "DND is the legal regulator for all military aircraft in Canada" (Wuennenberg, 2011, p. 1). However, in the event that a civil operator is deploying a drone in restricted military airspace, a Special Flight Operations Certificate will need to be obtained from Transport Canada (Department of National Defence, 2012; Eley, 2011, p. 119). Military research and educational facilities operating drones in military airspace are also subject to Transport Canada's rules (Department of National Defence, 2012). Therefore some level of coordination and cooperation is required between civil and military regulatory agencies in the operation of drones in military restricted airspace.

The DND is furthermore involved with Transport Canada in "efforts to establish a civil regulatory framework to allow the use of civil UAVs in non-segregated airspace" (Wuennenberg, 2011, p. 2). Non-segregated airspace is that which is not exclusively military domain. As a member of Transport Canada's Working Group, DND provides their "lessons learned" with respect to drones, and also aims to ensure that both agencies' "regulatory efforts are harmonized" (Wuennenberg, 2011, p. 2). By partaking in Transport Canada's regulatory effort for drones, the military also ensures its own "access to airspace when it is needed"

(Department of National Defence, 2009, p. 43).[18] Of particular benefit to the DND is the fact that its former Project Director of JUSTAS, Mark Wuennenberg, is now Transport Canada's Civil Aviation Inspector, responsible for "the regulation of civil UAS and the standardization of UAS access into Canadian Domestic Airspace" (Wuennenberg, 2014). In addition to his ties with DND, Wuennenberg also served as Chairman and member of NATO FINAS Working Group – described in more detail below – and worked in the Chief Flight Directives Branch within the US Air Force, where he was responsible for US military drone regulations (Wuennenberg, 2014).

Within the international arena, the DND is also working with NATO allies as Chair of the NATO UAV Flight in Non-Segregated Airspace (FINAS) Working Group, the purpose of which is to develop "guidelines to allow the cross-border operation of UAVs" (Wuennenberg, 2011, p. 2). Since 2003, the FINAS Working Group has been creating a set of standards that will ensure "military UAV systems approved for operation by a NATO country [will] … be acceptable for similar operations in other NATO nations" (Snow, 2007, p. 117). NATO member states are, in other words, creating NATO-wide guidelines that will allow non-segregated drone flights in each other's airspace and will ensure system interoperability.

At the present time, the DND is leading its own regulatory effort to enable the safe and routine operation of drones outside of the military's restricted airspace (Wuennenberg, 2011, p. 1). As such, the DND has developed

> [a] layered solution that builds on a hierarchy that starts with procedural flight requirements, then air traffic management, followed by traffic collision and avoidance systems (TCAS) and, finally, an autonomous "sense and avoid"

---

[18] When it comes to drone operations in Canada, DND also works closely with the air traffic controller, NAV CANADA, "which coordinates the safe and efficient movement of aircraft in Canadian domestic civil airspace and international airspace assigned to Canadian control" (Department of National Defence, 2009, p. 43).

> capability will be pursued to permit ever increasing access to Canadian Airspace (Wuennenberg, 2011, p. 3).

The DND does not foresee any "significant risks to the achievement of routine domestic operation" of drones flying beyond the line of sight in Canadian airspace (Wuennenberg, 2011, p. 3). However, out of concern for safety, the Canadian Forces' "UAVs currently do not routinely operate outside of restricted airspace in Canada" (Wuennenberg, 2011, p. 1).

Apart from airspace regulations, there are laws that currently prevent the Canadian Forces "use of UAVs within a civilian construct" (Canada, 2011b, p. 6). At the present time, the military is legally constrained from gathering information of criminal activity and providing it to the police (Canada, 2011b, p. 6). This jurisdictional issue has prompted the military and RCMP to collaborate and ensure "the right mechanisms [are] in place to be able to get … information [regarding criminal activity] where it needs to go" (Canada, 2011b, p. 6). Hence, a number of legal frameworks – from airspace to security laws – are undergoing changes that will enable the military to operate drones in Canada for its own benefit, as well as the benefit of law enforcement and its international allies.

As we have seen, the military, law enforcement agencies, and civil regulators are all major contributors to the way drones are integrated into Canada. Immersed in a symbiotic relationship with these organizations, the drone industry is the focus of the next section.

3.6 Canada's Drone Industry

Since the inaugural Insitu flight over the Atlantic Ocean in 1998, Canada's drone industry along with its lobbyist organizations have been busy building up the sector. This section highlights the industry's involvement in growing Canada's drone market through its advocacy associations that promote the activities and interests of their stakeholders. Also discussed in this

section are the few publically available statistics and surveys that provide insight into the domestic market for drones. This section ends with an overview of various commercial drone operations in three prominent sectors in Canada - the agriculture, energy, and security sectors. In addition to this, the unique contract services provided by the industry to the military, the police, and the private sector are outlined.

3.6.1 Canada's Drone Lobbies

Advocacy groups play an important role with respect to garnering support for the drone industry in Canada. There are two such groups in Canada: Unmanned Systems Canada (USC) and the Canadian Centre for Unmanned Vehicle Systems (CCUVS). Unmanned Systems Canada formed in 2010 from the merger of Unmanned Vehicle Systems (UVS) Canada (established in 2003) and The Association for Unmanned Vehicle Systems International-Canada (AUVSI-Canada, established in 2007) (see, Unmanned Systems Canada, 2013). CCUVS was built in 2006 with provincial and federal funding (Akkad & Cryderman, 2014; Western Economic Diversification, 2011). Both advocacy groups act as the unified voice for the industry and help to facilitate "sustained profitable growth in the Canadian UVS sector" (Transport Canada, 2007). In addition to promoting the expansion of the entire sector – aerial, marine and land-based systems – USC and CCUVS also compile market data; provide training and education; encourage research and development initiatives; and supply services to the industry, such as assistance with drone certification applications or to liaise with insurance companies (Transport Canada, 2007; Unmanned Systems Canada, 2013a).

USC and CCUVS furthermore work together to influence policy development, such as airspace regulations. As previously mentioned, members from both advocacy groups are leading participants in Transport Canada's regulatory Working Group for drones, with USC acting as co-

chair of the process. These groups are undertaking additional efforts to achieve the full integration of drones into domestic airspace. Since Transport Canada (TC) lacks the resources to develop "the RPAS pilot ground school course requirements … and to provide a TC-developed written exam" (Edwards, 2012), USC has created an industry standard that has yet to be released to the public, but which "is already being adopted by commercial ground schools" (Edwards, 2014).[19] CCUVS, on the other hand, is leading the effort in the development of beyond line of sight operations in Canada. As a testament to their commitment, the advocacy group is cordoning off "airspace of 800 square nautical miles in Foremost, Alta, as a training and development area, with the aim of encouraging Transport Canada to allow more people to use drones out of sight" (Santry, 2014).

In addition to collaborating closely with Transport Canada, other governmental departments are consulted to help promote the sector. USC works closely with the Canadian Trade Commissioner Service of the Department of Foreign Affairs, Trade and Development. This ministry assists the drone sector with market analyses and also facilitates "trade missions to target markets" (Unmanned Systems Canada, 2013a). A high profile case that demonstrates Department of Foreign Affairs, Trade and Development's facilitation of trade for the drone industry occurred in August 2011. The ministry helped Canadian companies Zariba Security and Aeryon Labs with the international sale of a micro drone (the Aeryon Scout) to the Libyan Transnational Council during the country's civil war (Aeryon Labs, 2011; *Global News*, 2013).

Drone advocacy groups maintain close consultation with Industry Canada for a number of reasons. First, Industry Canada is responsible for assigning radio frequencies for drone

---

[19] Transport Canada has been affected by budgetary reductions afflicting many federal government agencies. As of June 2012, Transport Canada had to lay off 370 employees (*Canada Newswire*, 2012).

operations that "are not license exempt" (Transport Canada, 2008). In addition to its important spectrum management role, Industry Canada will be working with USC "to establish a third-party liability insurance program to facilitate routine civil UAV operations" since "such insurance is mandatory under the Canadian *Aeronautics Act* but currently very difficult and expensive to obtain" (Unmanned Systems Canada, 2013a). Industry Canada furthermore allocates government funds to Canadian businesses through programs such as the Industrial Regional Benefits (IRB), of which the drone sector is a benefactor.

Additional federal ministries provide the drone industry and its sector associations with federal funding as well. For instance, the Economic Development Agency of Canada awarded the industry with non-repayable funds in the amount of $2.5 million to build a new Unmanned Aerial System Center of Excellence (Canada Economic Development, 2013). This new center, inaugurated in February 2014 (Canada Economic Development, 2014), offers a range of services to the commercial and public sector, including the space to develop and test "equipment and applications for drones" (Canada Economic Development, 2013). The ministry of Western Economic Diversification also contributed over $1.16 million for purchases that include a high-performance UAV launcher for CCUVS, unmanned systems equipment for Medicine Hat College, and investments that support the production of the USC Annual Conference (Western Economic Diversification, 2013a; Western Economic Diversification, 2013b; Western Economic Diversification, 2011).

The National Research Council of Canada (NRC) also contributes significant federal resources "to improve the adoption of unmanned aircraft systems (UAS) for civilian use" (National Research Council of Canada, 2013). Aside from the NRC's regulatory involvement in Transport Canada's Working Group, the agency is spearheading the Civil UAS Program that is

estimated to have "a long term impact of approximately $80M/yr of new economic activity in Canadian UAS sales and services by 2020" (Bellinger, 2012). One of the Canadian companies partnering with the NRC under its new program is Brican Flight Systems, which will work with the agency's "aerospace engineers over the next five years to solve specific UAS technical issues, such as flight safety, sense-and-avoid technologies, anti-icing, flight operation interfaces and data collection" (*UAS Vision*, 2013). The NRC has played a vital role with respect to helping the drone industry combat market barriers. In addition to the technical issues listed above, the agency also aims to close the "regulatory gaps" and reduce market place hesitancy surrounding the adoption of drones (Ellis, 2012, p. 4)

Canadian drone advocacy groups also recognize the importance of working with other governmental departments to advance the sector's interests. An illustrative list was compiled by the 2007 UAV Working Group, whose membership was largely made up of the drone industry and its sector associations. Thus in addition to the aforementioned agencies, other government departments that are of consultation interest include: Public Safety Canada (PSC) "and its portfolio departments and agencies" such as Canadian Security Intelligence Service (CSIS), RCMP and CBSA; Fisheries and Oceans (including Canadian Coast Guard); DND and Defence Research and Development Canada (DRDC); Environment Canada; Human Resources and Social Development Canada (HRSDC); Natural Resources Canada (NRCAN); and provincial and municipal governments (Transport Canada, 2007). Engagement with these agencies involve informing them

> of unmanned aircraft systems and the requisite enabling technologies to ensure that they use them to further their individual mandates in a coherent fashion that will benefit the optimum number of Government departments whilst growing a profitable national high tech sector. This is not an overly complex situation and can be accomplished with national industry group leadership (Transport Canada, 2007).

The industry's advocacy groups are thus relied upon to establish close ties with select government agencies.

In working with numerous government agencies, USC and CCUVS have been able to promote the domestic drone sector and seek out financial or non-financial support. The success of these advocacy groups in mobilizing help from the government is furthermore illustrated by the fact that public servants from key agencies have since gone on to work for the industry. For instance, in January 2014 former military and Transport Canada employee Robert Kendall became Executive Director of USC (Unmanned Systems Canada, 2014a, p. 2); and in November 2013, Stewart Baillie became USC Chairman (Baillie, 2014). Prior to his nomination as USC Chairman, Baillie served as Director of Research and Development of the Aerospace portfolio at NRC and was responsible for leading the development of its Civil UAS Program. He was also previously a Director of Aerospace at Industry Canada (Baillie, 2014). Such close collaborations between industry and government help foster the economic success of the sector. Provided in the next section is an overview of the domestic market for drones.

3.6.2 Domestic Drone Market

Statistical information about the domestic market for drones in Canada is difficult to assess since there has been little research done in the area. The majority of the research applies to only the year 2007, where Canada is said to have 220 drone-related companies in military and civilian sectors (Transport Canada, 2007). Within that same year, statistics compiled by UVS-Canada (now USC) reveal that the "industry generated $787 million in sales," with military sales accounting for the largest share of this revenue, followed respectively by commercial and public sectors (Healey, 2008). While the bulk of sales were in the military market, according to a 2007

sector association survey, many within the industry are expecting to generate revenue from non-military sales over the next 10 years (Healey, 2008).

To date, "more than 50 companies in Canada are solely involved in the business" (Jaggi, cited in Mackin, 2014). While there are no publically available industry or government statistics about Canada's current market for drones, the 2007 findings corroborate with prevailing expectations within the industry. Andrew Kondor, owner of Canadian company Aerovate Inc. and creator of a multi-purpose UAS propeller system for military and civilian markets, estimates that as of 2013 "the greater use for UAS remains military observation" (Kondor, cited in *UAS Vision*, 2013). However, he also anticipates growth within the civil market. According to Kondor, "statistics show that the greater use of UAS in the next five to 10 years will be in the high-value civilian applications areas and less will be actually used in the military sense" (Kondor, cited in *UAS Vision*, 2013). High-value civilian applications include "search and rescue, monitoring the migration of animals, harbour patrol, border patrol, disaster relief uses, observation for police companies, and security agencies, amongst other uses" (*UAS Vision*, 2013). It is worth noting that the examples listed all require the collection of data, and also heavily emphasize security applications.

According to another Canadian drone company, both military and civil markets are a source of revenue. In an interview, CEO Dave Kroetsch of Aeryon Labs indicates that from 2007 to 2014:

> Its biggest customers … are militaries and governments outside of North America, as well as government and police agencies in Canada, including the RCMP. But in the commercial space, the biggest customers for drones are in oil and gas … [While Kroetsch] would not divulge specific figures, … Aeryon Labs has seen 100% year over year sales growth in the last five years (Ligaya, 2014).

Hence Kroetsch's best clients appear to be those with the most sizeable budgets, notably in the military and civil defence sectors, as well as in the petroleum industry. A quick glance at the company's website reveals that its popular micro drone, the Aeryon Scout, is heavily marketed for military, law enforcement and industrial users, with offerings such as an "Automatic FollowMe" feature that "maintain[s] continuous visual observation of the subject and surrounding terrain or infrastructure" (Aeryon Labs, 2012). The company's products are thus tailored to its target markets, or as Kroetsch puts it, the Scout is "really designed for the backpack of the soldier and the trunk of the police car" (Kroetsch, cited in *Vanguard*, 2012).

More information about the drone market in Canada can be gleaned from the insurance sector. In 2013, USC collaborated with the Magnes Group and Canadian insurance underwriters to determine the "availability and adequacy of insurance products for the Canadian UAS industry" (Unmanned Systems Canada, 2013b). Part of the process included the drafting of an insurance form specific to the industry's needs in Canada (Unmanned Systems Canada, 2013b). Within the insurance form, nine categories of work related to drones were listed, including: Aerial Photography; Forestry; Mining (Oil/Gas); Power/Pipeline Patrol; Survey/Exploration; Spraying (Agricultural or Other); Traffic Patrol; Private (personal use); or Other (Unmanned Systems Canada, 2013b). Apart from drones carrying dispersants (or sprays) for agricultural purposes, the majority of uses rely on optics, with some applications focused on persistent monitoring such as in the case of patrols.

Assessing the size, growth, and key sectors of Canada's drone market is difficult to do based on such limited information; however, another way to measure the domestic market is through examining Transport Canada's Special Flight Operations Certificates (SFOCs). Between 1996 and 2011, Transport Canada issued approximately 200 certificates for civil drone

operations (Eley, 2011, p. 119). That number increased over six-fold within just two years, with Transport Canada issuing 1,292 certificates in 2012 and 2013 (Transport Canada, personal communication, May 29, 2014). While the surge in flight certificates indicates the market is growing, it is important to note that these certificates only represent those agencies or individuals authorized to deploy drones in civil airspace. They unfortunately do not reveal the number, or frequency, of flights carried out by the operators. For instance, some public or commercial agencies are granted a single "blanket" certificate for extended periods of time, such as up to a year, allowing them to engage in numerous flights limited to particular purposes (Edwards, 2014). The issuance of blanket certificates is how Canadian UAV land surveying company Accuas Systems Inc. "has done over 1000 commercial UAS flights" since 2008, which has all been "revenue-earning flights" (Edwards, 2014).[20]

Most recently, the Surveillance Studies Group at Queen's University conducted a content analysis of partially released SFOCs obtained from ATIP requests made to Transport Canada. The following conclusions were drawn from their analysis. Of the 618 certificates assessed from the period of 2007 to 2012, the majority of flights took place in Ontario, British Columbia, and the Prairie Provinces (Alberta, Saskatchewan and Manitoba) (Bracken-Roche, 2014, p. 23). The bulk of these flights consisted of "visual mediation tasks as well as research and development" (Bracken-Roche, 2014, p. 24). The category of visual mediation includes "aerial photography, remote aerial inspection, aerial survey, geophysical research, wildlife management, and aerial surveillance" (Bracken-Roche, 2014, p. 24). Curiously, the disclosed SFOCs reveal that drone applications in advertizing and agriculture only formed a small percentage of uses in Canada. It

[20] An example of a blanket certificate issued to Accuas can be found in ATIP request A-2012-00242 (Kidd, 2010, p. 1).

is interesting to point out that according to CCUVS, agriculture along with oil and gas "are the two biggest industries in Canada using drones" (Haessel, cited in Ligaya, 2014). Another interesting finding in the Surveillance Studies report is that the processing time for SFOCs decreased overtime, even though the number of certificates increased (Bracken-Roche, 2014, p. 26). These findings reveal important trends. Notably that the civil market for drones in Canada is on the rise, that the certification process is being expedited, and the sensory component of the technology is the main purpose for which they are deployed.

It should be noted, however, that the heavy redactions and only partial disclosure of certificates by Transport Canada, makes it difficult to determine the full results of the data. As the Surveillance Studies Group highlights, many of the names of agencies or individuals applying for SFOCs were concealed upon release (Bracken-Roche, 2014, p. 24). Withholding such information limits our understanding of which public and commercial sectors are the most frequent users of the technology in Canada. Moreover, the official number of certificates Transport Canada released to the Surveillance Studies Group in 2011 and 2012 substantially differs from the agency's own statistical record. Apparently, Transport Canada issued a total of 502 certificates in 2011 and 2012 (Transport Canada, personal communication, May 29, 2014), where as they only released 378 for academic analysis (Bracken-Roche, 2014, p. 23). This means that a significant amount of information was not made available. A potential reason for this discrepancy in numbers could be the fact that Transport Canada's certificates are issued in a "decentralized … manner" (Office of the Privacy Commissioner, 2013a, p. 10). In other words, there is no single repository for SFOCs; rather they are dispersed among regional transport inspector agencies, which "makes it difficult for the public to know who has obtained an authorization to operate a UAV at any given time or for what purpose" (Office of the Privacy

Commissioner, 2013a, p. 10). In short, the lack of a comprehensive set of statistics about the drone activities in Canada poses challenges to grasping the current state of the market. Nonetheless, it is clear that the domestic industry is expanding and that drones are desirable as result of their sensory capabilities – a point that is further substantiated within the next section.

3.6.3 Industry Operations, Contracts & "Turnkey Services"

Among some of the potentially more active users of drones in Canada are the security, oil and gas, and agricultural sectors. This section explores the operation of drones in these sectors, as well as the unique client services provided by Canada's drone industry.

The allure of small drones for farming has to do with the sensory and dispersant payloads, the mapping software, and the aerial vantage point previously too costly to obtain. Small drones have served farmers well for "locating drainage tiles to assessing crop-damage claims, as well as for in-season crop scouting" (Mcmenamin, 2013). The infrared cameras on drones also supply farmers with the ability to visualize any negatively affected or stressed areas of a crop (Mcmenamin, 2013). Farmers themselves can also make use of the mapping software. However some in the industry recommend farmers rely on specialized consultancy services for such complex tasks (Mcmenamin, 2013). For instance, Isis Geomatics in Alberta works with farmers to process and deliver the flight data within just a few hours (Mcmenamin, 2013). Drones for agricultural purposes also provide cost savings to farmers. At around $1,500 farmers can purchase drones equipped with a high-definition camera, to help them attain "a bird's-eye view … worth $1,000 per minute" (Weigum, 2014).

Small drones with sensors and mapping software such as those used for agriculture are also being deployed in the oil and gas sector, where consultancy services are made available too. Oil and gas companies, such as Royal Dutch Shell PLC, Syncrude Canada Ltd., and Cenovus

Energy Inc. deploy drones in Canada for purposes such as land surveying and pipeline monitoring (Akkad and Cryderman, 2014; Ligaya, 2014). Cenovus Energy has plans in fact "to build a fleet of UAVs, beginning with one $30,000 SenseFly eBee model" (Akkad and Cryderman, 2014), which has already been flying "regularly with the approval of Transport Canada" (Ligaya, 2014). The eBee drone provides Cenovus with "a flight time of up to 50 minutes, enabling it to cover up to 12 km2 in a single flight" (senseFly, n.d.). The eBee is also equipped with a 16-megapixel camera that can capture a maximum of 700 high-resolution images in one flight (senseFly, n.d.).

Energy firms are able to use drones not only to observe and record areas of land for surveys and map constructions, but also to carryout patrols. According to Peter Lidiak of the American Petroleum Institute, the "primary reason" for patrolling pipelines "is really to find out if there's anyone doing anything on the right of way that might be harmful for the pipeline" (Lidiak, cited in Stangler, 2013). Lidiak was careful to acknowledge that while "[t]he primary purpose wouldn't be monitoring for activists. You might be able to detect that activity as a result of doing your patrols, but that's not the primary reason for any kind of patrolling" (Lidiak, cited in Stangler, 2013). However, according to former USC Executive Director, Paul Drover, one of the benefits of drones flying over pipelines is in fact the ability to identify "folks setting up camp" (Drover, cited in Stangler, 2013). Thus some in the industry see drones as beneficial to energy firms for social surveillance purposes.

One of the challenges, however, in monitoring pipelines in Canada is the fact that drones are not yet authorized to fly out of sight (Santry, 2014). Sterling Cripps, the Chief Executive Officer of CCUVS, reveals how line of sight operations preclude energy firms from carrying out long range patrols: "If you have 30 kilometres of pipelines you can maybe only get five km at a

time. Some are taking small bites at a time. The day is coming where the regulatory bodies will allow us to fly beyond line of sight" (Cripps, cited in Santry, 2014). For Cripps, enabling beyond line of sight operations along pipelines could effectively help energy firms "spot any problems or potential leaks" (Cripps, cited in Ligaya, 2014). Even though flight conditions for drones in Canada are relatively limited at this time, Canadian military contractors MacDonald Dettwiler and Associates (MDA) and ING Robotic Aviation (formerly ING Engineering) are advertising their unique "turnkey" services to oil and gas companies, as well as other sectors (Mackin, 2014; Thatcher, 2013; *Vanguard*, 2014).

Companies like MDA and ING Robotic Aviation developed the "turnkey" service model initially for the military market. An illustrative case of this unique services model can be exemplified under Project Noctua, which helped to lay the groundwork for subsequent turnkey contracts (Government of Canada, 2009; MDA, 2011, p. 40). As part of the Industrial and Regional Benefits (IRB) policy, MDA was awarded a $95 million contract in August 2008 to lease their drone services to the military for a two-year period (Welsh, 2010, p. 19). The company leased the Israeli-made 'Heron' to the Canadian Forces and also provided them with services directly in Afghanistan (MDA, 2011, p. 40). MDA Vice President, David Hargreaves, explains the company's role in Afghanistan: "Fundamentally, on NOCTUA we held responsibility for everything including the maintenance and all the supply chains, everything in and out of Kandahar" (Bray, 2012, p. 11). The Canadian Forces on the other hand were in charge of the actual Heron operations in support of their Intelligence, Surveillance and Reconnaissance (ISR) missions (Welsh, 2010). Project Noctua's turnkey solution was deemed a success, and demonstrated "what can be achieved when … a truly integrated government/industry team comes together to realize a set of shared goals" (MDA, 2011, p. 40).

While there are numerous more Canadian examples of this turnkey approach used abroad for military missions (see Government of Canada, 2009; *Vanguard*, 2011; Waston, 2010), it is also found at home. ING Robotic Aviation has, for instance, taken part in the military's Arctic sovereignty exercises during Operation Nanook – described earlier – and Maple Resolve (Thatcher, 2013; *Vanguard*, 2014; Pugliese, 2014). During Maple Resolve the company provided the Canadian Forces in May and June 2014 with around the clock "eyes in the sky" (Pugliese, 2014). In addition to the military work, ING Robotic Aviation also provides their "mapping, inspection and monitoring services in key sectors such as oil and gas, mining, utilities, forestry and precision agriculture" (*Vanguard*, 2014). MDA also provides their third party drone services for use in Canada to "companies that want to monitor forests and oil and gas pipelines" (Mackin, 2014).

Once the domain of military contractors, turnkey services are also being offered by commercial drone companies in Canada. Within the arena of law enforcement, "[t]he price range of the "turn key" package system range from $10,000 to $50,000" and are provided by companies such as Draganfly Innovations and Aeryon Labs (Sharpe, 2009, pp. 8-9). The Saskatoon Police, for instance, sought out the services of Draganflyer Innovations in March 2009 (Draganfly, 2009a), to "perform basic aerial photography at selected scenes as required" (Sharpe, 2009, p. 9). Since this time, Draganfly Innovations has performed numerous services on behalf of the Saskatoon police (see Draganfly, 2009b; Draganfly, 2010). In fact, the company, "operating under approval of Transport Canada is able to provide assistance to police agencies with Draganflyer UAV helicopters day or night within a 250 km radius of the city of Saskatoon in rural or urban environments" (Draganfly, 2010).

Aeryon Labs also offers its services to law enforcement, such as to the Chatham-Kent police who had the company deploy the Scout in a search and rescue operation (Pearson, 2012). Another company providing drone services to law enforcement agencies is Westridge Security, which "is believed to be the first private security outfit in B.C. to receive a permit from Transport Canada" (Mackin, 2014). In the company's consultation with the Office of the Information and Privacy Commissioner of British Columbia regarding its drone services, they have indicated they will not be recording images "on-board." Rather Westridge Security will only be recording images "from the ground station if requested by authorities" (Mackin, 2014). Apparently, when police contract the services of drone companies such as these, the officers themselves "handl[e] all the evidence related to the operation, thereby relieving the civilian pilot of court attendance or security issues" (Engele et al., 2012, p. 30). These unique contract services provided among military contractors and commercial drone companies in Canada raise a whole slew of legal questions, one of which has to do with privacy. In the next chapter, we turn our attention to the legal responses of privacy advocates with respect to the emergence of drones in Canada.

4 Chapter: Privacy & the Politics of Drone Technology

Ontario's former Information and Privacy Commissioner, Dr. Ann Cavoukian was the first among her colleagues to publically issue a research report, in August 2012, examining the Canadian context of *Privacy and Drones: Unmanned Aerial Vehicles*. Following the release of the report, three additional research analyses emerged on the subject matter. The Office of the Privacy Commissioner of Canada (OPC) released in March 2013 the report *Drones in Canada: Will the Proliferation of Domestic Drone Use in Canada Raise New Concerns for Privacy?* The Ontario Office of the Information and Privacy Commissioner (OIPC) reexamined the issue in their June 2013 paper, *Surveillance, Then and Now: Securing Privacy in Public Spaces*. Lastly, the Surveillance Studies Group at Queen's University were commissioned on behalf of the OPC to carry out research in the area, releasing in April 2014 the report *Surveillance Drones: Privacy Implications of the Spread of Unmanned Aerial Vehicles (UAVs) in Canada*. Together, these reports offer an overview of the general privacy and civil liberty concerns driven by the domestic deployment of drones. These reports also examine privacy laws and previous court rulings that may apply in the context of law enforcement, private sector and civilian uses of drones in Canada. Provided in the first two sections is a general summary of Canadian legislation and jurisprudence as it relates to privacy and the civil use of drones. The final section introduces the idea of drone technology as political artifact.

4.1 Canadian Privacy Laws

This section draws on the above reports to focus the applicability of federal privacy legislation to civil drone operations. The two federal privacy laws protecting Canadians from unlawful collection, use, and disclosure of personal information by public or private agencies are

the *Privacy Act* and *Personal Information Protection and Electronic Documents Act* (*PIPEDA*) respectively (Office of the Privacy Commissioner, 2013a, p. 15). Both statutes are supplemented by regulations as well as a growing body of jurisprudence (Drapeau & Racicot, 2013).

With respect to the *Privacy Act*, federal government agencies listed under Schedule I of the *Privacy Regulations,* operating or intending to operate drones must ensure their conduct aligns accordingly to the principles within the *Act*. Under the Treasury Board Secretariat (TBS) *Directive on Privacy Impact Assessment* each program using drones would be required to undertake a Privacy Impact Assessment (PIA) (Treasury Board, 2010). The OPC, tasked with the responsibility of reviewing and providing recommendations based on a Privacy Impact Assessment, provides a succinct account of its purpose:

> Generally, when the public sector initiates new programs or activities impacting on privacy, there is an expectation that organizations carefully evaluate, and demonstrate, that the initiative is necessary to achieve a specific and legitimate purpose, that it is likely to be effective in achieving that purpose, that the intrusion on privacy is proportional to the benefit to be derived and that no other less privacy intrusive alternative would achieve the same purpose. This is particularly important in the case of covert or intrusive public safety initiatives (Office of the Privacy Commissioner, 2013a, p. 16).

Thus, Privacy Impact Assessments help ensure compliance with privacy laws, and that a level of accountability is maintained on the part of the UAV-using organization. Part of the PIA process is the requirement to post an executive summary of the PIA on the organization's corporate website.[21] However, to date, no such summary has been posted on any government website operating drones; leading to the conclusion that a PIA has not yet been conducted. And if any have been done, they have not been made publicly available, as required.

---

[21] See Section 6.3.14 of the Treasury Board's *Directive on Privacy Impact Assessment*. Retrieved from http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=18308&section=text

In fact, the RCMP has not disclosed any details about such assessments, even when prompted though access to information requests (Bracken-Roche, 2014, p. 49). David Fraser, one of Canada's leading experts on privacy law, has expressed concern about police use of drones and believes a public debate is necessary to discuss appropriate uses of this technology (Santry, 2014). In fact, he believes that current "[l]aws do very little to regulate how police agencies collect and disclose personal information … The provisions are so broad you could fly through them" (Fraser, cited in Santry, 2014). The *Privacy Act,* which was enacted in the early 1980's, contains a number of these gaps, as highlighted in the OPC's 2012-2013 *Annual Report to Parliament* (2013b). Further information regarding the exceptions permitted under the *Privacy Act* is provided below.

Most private entities are subject to *PIPEDA*, except in those provinces that have substantially similar legislation.[22] Section 4 of *PIPEDA* requires that any private sector organization capturing personal information in the course of a commercial activity obtain the consent of the individual. Hence, "[t]he privacy protections in *PIPEDA* are there to ensure that people know when their image is being captured for commercial reasons – whether by photograph or video - and what it will be used for" (Office of the Privacy Commissioner, 2013a, p. 15). If a commercial entity were to deploy a drone, they would have to ensure any collection or use of personal information is appropriate given the circumstances, and that less privacy-invasive means have been considered, in accordance with the provisions found within Schedule 1 of the *Act* (*PIPEDA*, 2000; Office of the Privacy Commissioner, 2013, p. 15-16). In an example of energy firms deploying drones, Fraser counsels that it is lawful for them to:

---

[22] British Columbia, Alberta, and Quebec have their own private sector privacy laws (Cavoukian, 2013, p. 57; Privacy International, 2006)

> monitor a pipeline on public land using a drone, and keep an eye out for potential protestors, or industrial saboteurs, just as it is entitled to employ a security guard. But information must not be recorded, and facial recognition software, or anything revealing individuals' characteristics, cannot be used in these circumstances (Santry, 2014).

The OPC suggests that organizations interested or operating drones review previous guidance on the private sector's use of video surveillance for overt and covert purposes (Office of the Privacy Commissioner, 2013a, p. 16).[23]

Both the *Privacy Act* and *PIPEDA* are subject to exemptions. In the case of the *Privacy Act*, section 8(2)(c) allows a public agency to disclose personal information without the consent of the individual as long a judicial authorization is sought (Bracken-Roche, 2014, pp. 50-1). In such an instance, the government agency is entitled to use "this information at their sole discretion, for any purpose they deem legitimate including, but not limited to, the sharing of this information internationally" (Bracken-Roche, 2014, pp. 51). The intention of 8(2)(c), and to a lesser extent 8(2)(m) (public interest disclosures),[24] provide law enforcement with wide discretion for collecting and disseminating information (*Privacy Act,* 1985). Cases such as *R v.*

---

[23] The following OPC web links provide both private and public sector guidance on video surveillance: https://www.priv.gc.ca/information/pub/gd_cvs_20090527_e.asp; https://www.priv.gc.ca/information/guide/vs_060301_e.asp; and, https://www.priv.gc.ca/information/guide/2008/gl_vs_080306_e.asp

[24] An example of a public interest disclosure includes a head of an institution – media or federal government – informing Canadian's of a criminal's release from a correctional institution if they pose a threat to the public. It is up to the head of the institution to determine what constitutes the "public interest" and whether public disclosure of the information outweighs the privacy of the individual. Under this provision, the Privacy Commissioner of Canada does not have authority to prevent the disclosure. However, the Privacy Commissioner may express concerns and notify the individual whose information will be released (*Privacy Act*, 1985, Subsection 8(2); Office of the Privacy Commissioner, 2006).

Tessling – discussed below – and *R. v. Spencer* demonstrate that the parameters of "acceptable" collection and disclosure exemptions are still in development.[25]

The exemptions under *PIPEDA*, in Division 1 under Section 7, may permit commercial organization to bypass consent requirements if the "organizations… are conducting surveillance in crime control operations" (Bracken-Roche, 2014, pp. 54). Moreover, bypassing consent may be permissible if the private agency can demonstrate their collection of personal information is reasonable under the circumstances (Bracken-Roche, 2014, pp. 54). Lastly, exemptions for commercial agencies do exist in the case of disclosing data to third-party entities, such as if law enforcement makes requests for information (Bracken-Roche, 2014, pp. 54).

The *Acts* are scoped to apply to personal information and hinge on the ability of the organization to find an "identifiable individual."[26] This definition clearly applies to law enforcement organizations, who deploy drones specifically for finding identifiable individuals and have the ability to identify an individual by cross-matching against other government databases. However, it is not clear that the *Privacy Act* can be applied if the footage does not identify an individual. Similarly, private entities that lack the ability to identify individuals may also not be subject to *PIPEDA*. Until this issue is worked out by the courts, the application of

---

[25] On June 13, 2014, the Supreme Court of Canada ruled in *R. v. Spencer* that internet users have a reasonable expectation of privacy and anonymity in their online activities (*R. v. Spencer*, 2014). The Court ruled that voluntary warrantless disclosures of subscriber information was unlawful under Section 7(3)(c.1) of *PIPEDA*, which allows an organization to disclose personal information without consent to a "lawful authority."

[26] In Section 3 of the *Privacy Act*, personal information includes, but is not limited to: race, national/ethnic origin, colour, religion, age, marital status; education, medical, employment or criminal history; identifying numbers or symbols assigned to an individual (e.g. Social Insurance Numbers, bank account numbers); address, fingerprints, blood type; personal opinions or views (Office of the Privacy Commissioner, 2008).

both *Acts* is limited to cases where it can be clearly demonstrated that the footage collected contains information about identifiable individuals.

Both federal privacy laws allow Canadians to issue complaints to the Privacy Commissioner's Office of Canada if they feel their privacy has been intruded upon. Under the current privacy complaint intake process, Canadians must be able to identify the person or organization they want investigated and must also specify the personal information collected.[27] However, the OPC cautions that in the case of drone-based surveillance, "it may prove challenging for individuals to produce sufficient evidence in support of their complaint under the *Privacy Act* or *PIPEDA*, particularly when dealing with unmarked or covert surveillance" (Office of the Privacy Commissioner, 2013a, p. 16). In fact, one Canadian citizen in Ottawa has already voiced concern to a city Councilor about "drones buzzing around" their home (Willing, 2014). Since aircrafts fall under the federal jurisdiction of Transport Canada, the City of Ottawa's lawyers "suggest[ed] residents with concerns about drones contact the federal Privacy Commissioner to file a complaint" (Willing, 2014). As indicated above, this option bodes ill for residents who might not be able to identify the drone operator and who cannot demonstrate that personal information has been collected, as discussed above.

4.2 Drone Legislation & the Courts

Currently, there is no legislation and limited jurisprudence in Canada that provides for a constitutionally sound regulatory framework for the domestic use of drones (Cavoukian, 2012, p. 24). According to Ann Cavoukian, "for the time being, Canadians may have to rely on the

[27] For further information on how to file a privacy complaint, see: (Office of the Privacy Commissioner, 2014).

prudence of law enforcement and the oversight provided by Privacy Commissioners and the Courts" (Cavoukian, 2013, p. 43).

Regulators, civil society, and drone operators must extrapolate court precedents that may apply on a case-by-case basis. As a general principle, Canadian Courts have based their verdicts on whether a reasonable expectation of privacy can be demonstrated in cases of police surveillance in accordance with Section 8 of the *Charter of Rights and Freedoms*. In the majority of previous rulings, the Courts in Canada generally agree that police use of surveillance technologies in both public and private spaces generally requires a warrant in keeping with Part VI of the Criminal Code (Drapeau & Racicot, 2013, 6-iii-6-v). There have been instances, however, where the Courts have ruled in favour of aerial surveillance carried out by police over private property without a warrant. In *R. v. Kwiatkowski*, the Courts of British Columbia in 2010 reasoned that aerial police surveillance is lawful if the aircraft is flown at a standard altitude of higher than "500 feet for rural areas, [and] over 1,000 feet for built-up areas" and "where … a commonly available zoom lens camera" is used (Cavoukian, 2013, p. 44). However, it is difficult to definitively state whether the Supreme Court of Canada would accept this test.

In 2004, the Supreme Court's decision in *R. v. Tessling* ruled in favour of warrantless aerial police surveillance and their use of an infrared camera to detect heat emissions from outside a home (Cavoukian, 2013, p. 44; Bracken-Roche, 2014, p. 50; *R. v. Tessling*, 2004). The Court rationale for this ruling lay in fact that the infrared camera was not of high quality and therefore was not able to distinguish out biographical information of residents within the home (Cavoukian, 2013, pp. 45; Bracken-Roche, 2014, p. 50; *R. v. Tessling*, 2004). The Courts, however, cautioned that if the technology improved, the privacy implications would have to be reexamined in the future (Cavoukian, 2013, p. 45). Ultimately, the jurisprudence that currently

exists does not, according to former Commissioner Cavoukian, "offer concrete guidance regarding law enforcement's potentially wide use of evolving UAV technologies" (Cavoukian, 2012, p. 24).

Beyond law enforcement's use of surveillance drones, another context where the Courts may be relied upon is with respect to recreational uses of drones. In the case where recreational users intrude on an individual's privacy, this matter will likely be taken up by provincial courts "on an *ad hoc* basis" under perhaps torts such as intrusion upon seclusion (Cavoukian, 2013, p. 25). Canada's federal privacy laws may ultimately be "beyond the scope" of recreational drone operations because neither the *Privacy Act* nor *PIPEDA* apply to individuals (Office of the Privacy Commissioner, 2013a, p. 16). However, there are a number of Criminal Code provisions, such as voyeurism (Section 162), which may apply in the criminal context.

A number of challenges for protecting Canadians privacy were raised in this discussion, such as the fact that drones are currently operated in Canada with only limited jurisprudence on aerial surveillance, with no specific drone legislation in place, and with privacy laws not easily applied to this new technology. The ways in which drones impact privacy in Canada will be further analyzed in the following chapter. What this preliminary discussion prompts for now is a deeper consideration of the technology at hand. It is essential that the fundamental properties of drones be analyzed in order to ascertain their impacts to society. Such an analysis, rooted in a theory of technological politics, could help promote wise policy choices in the protection of Canadians chartered rights and freedoms, including privacy.

4.3 Introducing Drone Technology as Political Artifact

Since drones are partly aircraft, it may seem logical to have a civil aviation regulator such as Transport Canada take charge of the country's regulatory framework for drones. After all, this is the common trend happening around the world. But when we stop a moment to think about what a drone actually is, we know they are much more than just aircraft. By virtue of their size and design, drones can venture into places traditional aircraft cannot. Some drones are able to crouch and maneuver in tight spaces, including indoors. With the latest scientific breakthroughs, others can stay aloft for extended periods of time, potentially for years, without the need to land, (Gallagher, 2013). Moreover, drones that operate beyond line of sight require the ability to observe and communicate in order to operate safely, effectively making these sorts of drones surveillance devices. In addition to collecting information necessary to operate safely, drones can be equipped with supplemental sensing devices for various uses.

Amongst the myriad uses of drones, there are few that do *not* require equipment that inherently takes in information regarding its environment. Apart from hobbyists flying small drones (or model aircraft) without the use of a camera and within the line of sight, most drone flights require information about their surroundings simply in order to fulfill their specific task. In short then, drones are a data gathering surveillance technology. They can capture information from various types of cameras, including night vision, infrared, and cameras with high power lenses. They can also capture signals from tracking devices, as well as intercept communication signals. Moreover, software can be used to augment these layers of sensory input, including programs such as license plate readers (Clarke, 2014a), or in the future, facial recognition software (Stanley and Crump, 2011, p. 5), as well as operating systems that are interoperable and increase the flow of information.

Drones collect significant quantities of data, potentially in a covert manner, and for long periods of time. Transport Canada, and civil aviation bodies elsewhere, are regulating the airplane characteristics of the technology, neglecting to address the computing and sensing portion of these devices. This has radical implications, not only for the creation of sound regulatory policy, but also for the protection of civil liberties and privacy. As Langdon Winner (1980) usefully reminds us, we must not ignore the technical object itself. After all, without surveillance there is no drone, and this makes the aerial sensor a political artifact.

In suggesting that drones are political artifacts as a result of their surveillance characteristics does not mean their every use is terrible for society. Rather, drones embody flexible political properties. We must recall that "[s]urveillance is always ambiguous" (Lyon, 2003c, p.11). Hence, when farmers operate drones to monitor the health of crops, such uses are generally benign and beneficial. Understanding drones, then, as flexible political artifacts implies that we should not treat the technology as neutral tools in the toolbox, such as Canada's police (as well as many others) currently do. In the same vein we should not accept when police officers say that drones are "really no different than using a tripod or standing on a ladder to take a photo" (Engele et al., 2012, p. 26). If this were the case, then police should be as keen to purchase stepladders and tripods as they are on procuring drones. Such conceptualizations effectively depoliticize the potentially enduring effects of how we adopt this technology into society, and also avert our attention to the ways drones differ from other sorts of technologies, and even from themselves. For instance, an autonomous killing drone is a separate political artifact from a camera-carrying drone, even if the drone is the same model. The former has far more intractable properties than the latter and far reaching implications for civil society.

People tend to look at this aerial technology without examining its unique properties that can vary from drone to drone. When we examine a drone, we have to examine the totality of the artifact, including payloads of tools, sensors, weapons, software, and so forth. As Winner (1980) reminds us,

> [i]f our moral and political language for evaluating technology includes only categories having to do with tools and uses, if it does not include attention to the meaning of the designs and arrangements of our artifacts, then we will be blinded to much that is intellectually and practically crucial (p. 125).

The political properties that drones embody can shape society in varying ways that impact human relations for generations to come if we lose sight of the meaning of designs, the ways in which they are used, and the impact they have on the everyday lives of citizens. Classifying a drone as merely an aircraft, means that only the flight technology is being considered. As important as safety is, we need not disregard the ways in which drone surveillance will impact civil liberties and privacy. The two dimensions are fundamentally important to human life. One dimension protects us from physical harm, while the other preserves our freedom and chartered rights.

If we are not attentive to the designs and uses of drones they may blend into the fabric of daily life in such a way that automatically diminishes our liberties or does so as an unintended consequence of poor regulatory schemes. In order to avoid this outcome, we need to analyze each design as a political artifact – or what their political potential is – and then decide, based on the potential impact of each political artifact, which impact we find acceptable for society and which ones are not. This is no easy task, since there is bound to be considerable disagreement amongst the various stakeholders. Once we decide whether or not to integrate a political artifact into society, we then need to examine what uses we find acceptable. For example, you could have two drones of the same model, equipped with the same cameras, the same political artifact,

and one could be used to surveil protesters and one could be used to locate a missing person. In relation to law enforcement it has been the case that these technologies have been justified in relation to one use (safety) but used for others (policing lawful civil disobedience). Thus you have a political artifact justified for use that have different implications depending upon ones' perspective or vested interest in its usage.

If drones are only regulated from the perspective of safety rather than civil liberties and privacy, then a vital and cherished aspect of our society, which will surely be impacted, is left dangerously ignored. In order to furthermore understand how drones may undermine civil liberties, requires situating the technology within the broader social, political, and economic environment from which they are emerging. The following chapter addresses this question.

5 Chapter: Unmasking the Undemocratic Integration of Drones in Canada

The consequences of drone integration into Canada will only be understood by examining the technological properties and analyzing the social dynamics of power within which technology is imbedded. Drone technology shapes, and is shaped by, human practices situated in a particular social, political, and economic system. This chapter exposes the players that benefit from a particular set of socio-technological arrangements, the broader context from which drones are emerging, and further teases apart the challenges for protecting legally enshrined democratic values.

5.1 Drones & the Surveillance-Industrial Complex

The Canadian government and drone industry have established strong ties resulting in a mutually beneficial relationship. The 90's were the start of a burst of commercial activity for the nascent industry in Canada. The drone industry only became more seriously organized in 2003 with the establishment of the first of three Canadian drone lobbies, UVS Canada, and followed by CCUVS and AUVSI-Canada. These three lobbyist organizations established ties with Transport Canada and other stakeholders which culminated into the first of a series of working groups for drones from 2006 to 2008. Since 2009, the current Working Group, made of primarily drone industry stakeholders and state security agencies, is drafting new and amending old drone regulations, submitting their efforts to Transport Canada for review. As benign as this working relationship between government and industry may sound, there are a number of developments that should serve as a warning to Canadians concerned with the establishment of fair and representative public policy, and democratic processes of accountability and transparency.

The first set of problems are found in the policy making process. The first problem is that no elected officials vote on whether to accept or reject product regulations, such as drones. This is standard practice for technology integration into Canada, although it is far from an ideal democratic process. In addition, unelected officials at Transport Canada have been given the sole responsibility for overseeing the policy-making process for drones. The agency, relying heavily on the private sector and select government departments, co-manages the development of regulations at a fundamental level. Absent from the list of invited stakeholders are privacy and civil liberties advocates that protect society from the potentially intrusive surveillance component of these devices.

Lastly, the general public can only engage in the process at the point of completion through the government's regulatory consultation website, *the Canada Gazette*. This is a well-worn political strategy for securing buy in from the public without having to change any existing regulations. By the time the Working Group is expected to have finished drafting the regulations they will have reviewed and discussed policies for close to eleven years. In contrast, the consultation process with the public lasts, on average, about 30 days. The opportunity for public engagement under this model seems purposively limited. Moreover, citizens must be aware of the fact that the regulations are posted on the website in order to engage. As if to add insult to injury, some regulations are being put into practice through Best Practice Guidance, even before the public gets its paltry chance for input. If Unmanned Systems Canada (USC) gets it their way then regulations will be in "everyday practice" before they even become law (Crowe, cited in Dixon, 2011). Clearly the public's invitation to engage is not authentic when the culture promoted by the industry is already established.

Canada's policymaking process for drones reflects one facet of the surveillance-industrial complex, whereby corporate, defence and law enforcement interests drive public policy. Since the surveillance-industrial complex is situated within a heightened security climate in the West, much public policy beyond national security is typically framed in security terms. Hence, when the industry, state security agents, and aircraft safety experts are the sole authors of regulations for drones, the legal framework ultimately reflects their limited interests.

To illustrate the problems of prioritizing capital and security interests in the context of a regulatory process that is largely without democratic input from the public, consider the decision of the Working Group to nearly deregulate the popular class of "low energy" drone such as the Aeryon Scout. This decision was based on the lack of harm low energy drones pose to the physical safety of airspace users and the public. It also is meant to effectively reduce "the administrative burden" of organizations authorizing and operating drones (Edwards, 2014). Nearly deregulating drones like the Scout may or may not be acceptable when examined from the lens of physical safety. The decision to deregulate low energy drones to a certain degree overlooks the fact that it will become easier for organizations to deploy drones as an instrument of social surveillance, for instance, during pipeline patrols or over protests and then use that data in ways that were unimagined by the regulators. The introduction of the "low energy" drone is clearly for the benefit of the Working Group stakeholders, and not necessarily in the common good. This will put more drones in the hands of organizations without a proper legislative framework that adequately accounts for civil liberties and privacy, in addition to the safety concerns addressed by the regulations.

The current rules being written for Canadians ultimately represent a handful of vested stakeholders that push their interests at the expense of others. The stakeholders from the

Working Group connect to a larger and global network of players that are keen on exploiting the technology for their organizational needs, such as within the civil defence arena. This has prompted the emergence of an increasingly networked and interoperable system of security that functions more or less the same amongst corporate and government bodies, including the military, across allied borders. This rests uneasy with the democratic notion of keeping civil and military powers separate, as well as implicates issues of sovereignty. There are three aspects to interoperability in this context. The first is that technological systems are being built to communicate with one another, and are in accordance with one another. For instance, designated Canadian personnel are able to tap into the live video feed of a US Predator B drone with simply a handheld device. This points towards the compatibility of technological systems across borders. The same system is developing in Canada's military where drones procured will be interoperable and synergetic with a whole suite of sensors, from ground sensors and satellites, to underwater drones. An interoperable security system also includes the sharing of information between organizations across and within borders. This is evidenced in cross-border policing efforts between Canada and the US, such as among IBETs and in Shiprider, where "bilateral information and intelligence-sharing" between a network of security personnel is common practice (Gilbert, 2012c).

My research has detected a third aspect of interoperability, that being the harmonization of laws and regulations within and across borders. This trend is widespread and occurring within numerous arenas, as evidenced in the fact that Canada's civil drone regulations are being harmonized with the US and international civil aviation agencies, as well as with Canada's own military. In addition, Canada's military is also collaborating with NATO allies to align regulatory standards, enabling drone flights and technological interoperability within each

other's public airspace. Thus civil and military drone regulations nationally and internationally are developing more or less in a homogeneous manner. Moreover, Canadian police and military are in the process of resolving jurisdictional issues around information-sharing practices. In the context of American and Canadian joint law enforcement operations, information-sharing protocols inland (i.e. "NxtGen"), on terrestrial borders, (IBETs), and on the water (Shiprider) have either been established, or are in progress. In some instances, even the prosecution of criminal offences occurs across border. The goal of these numerous efforts is, therefore, to ensure that regulations and legislation are similar enough that operating drones, or carrying out law enforcement missions, on either side of the border and in partnership with numerous agencies does not pose any problems for law enforcement or government.

Networked and interoperable security systems – from technology, to information-sharing, to legislation and regulations – pose challenges to Canadian privacy laws, accountability mechanisms, sovereignty, and the separation of powers. These networked and interoperable security systems reveal that security of the state is not simply the jurisdiction of police, but also belongs to the private sector and military. This is increasingly evidenced in the unique "turnkey" contract services provided by the drone industry for Canadian police and the military. Turnkey services, originally for defence contracts overseas, is based on "a truly integrated government/industry" model that has been adapted and replicated by defence and non-defence drone companies for surveillance and security needs at home (MDA, 2011, p. 40). One of the outcomes of these integrated government-industry contracts is that private defence companies bring home a military logic "into the realm of policing and civil security" (Hayes, 2012, p. 168). Canadian drone companies in general have benefited from these state contracts and are in effect cashing in on the "homeland security industry" (Hayes, 2012, p. 174), in turn solidifying

corporate-government partnerships and building jobs that revolve around a perpetual and increasing supply of surveillance.

While we have very few market indicators as to the frequency and range of domestic drone operations for security purposes, this points to a bigger problem, namely that drones are being integrated into Canada in a furtive fashion. The lack of market data obscures valuable information about who the major buyers and operators are at the detriment of the public, elected officials, and researchers. In the latter case, when the Queen's Surveillance Studies Group requested details about drone operations from Transport Canada, information was redacted and withheld, concealing some of the organizations operating drones. What is clear is that the surveillance-industrial complex has benefited from a heightened security landscape, which it helps shape in turn. Drone lobbies such as USC and CCUVS play a seminal role in guiding state procurement decisions and also influencing public policy that serves security and capital interests, in addition to safety. These lobbies establish strong ties with federal and provincial governments that in turn help the industry fund, for instance, state of the art drone experimentation centres through non-repayable grants. The government also creates programs to help the drone industry grow with hopes of generating $80 million in sales and services a year by 2020. The Government of Canada also does their part in purchasing the products from Canadian industry as mandated in policies like the Industrial Regional Benefits. Under this policy, a $95 million military contract, among others, was awarded to the Canadian drone company, MDA. This creates a situation in which profits are privatized and losses are socialized.

While the drone industry benefits massively through government funds and partnerships, their lobbies also spend resources to build up the domestic sector. This is evidenced through USC's sponsorship of a Transport Canada affiliated drone pilot ground school course. Likewise,

CCUVS is leading an effort to develop an experimental site for beyond line of sight operations, which is the focus of the Working Group's second phase of drone regulations. Amid all these close partnerships established between the drone industry and government – from contracts and funds, to policymaking – a revolving door is created. This is dangerous for democracies because these practical working relationships can lead to corporate interests and profits given higher value than the "public good" (Hayes, 2012, p. 167).

The revolving door was displayed when the former lead on the military's drone regulations and project JUSTAS went on to co-lead Transport Canada's civil aviation regulations. Additionally, the new USC Executive director was formerly a Transport Canada and military employee, and the latest USC Chairman formerly worked at the National Research Council of Canada and Industry Canada – all of which are key organizations essential to the success of the drone industry. A revolving door leads to a narrowing of interests at play.

The surveillance-industrial complex is burgeoning, borderless, militarized, promotes a narrow range of interests, and is becoming entrenched in civil society as it grows. The structure of the surveillance-industrial complex, made of government and industry players, challenges democratic principles such as accountability, transparency, the separation of powers, the rule of law, privacy, and liberty. When examining the domestic integration of drones through the lens of the surveillance-industrial complex, it could very well be the case that these technologies will integrate into the everyday affairs of government and the public without the latter's involvement and, potentially, awareness. In this case, drones will find their place alongside other digital systems that comprise the surveillance society. It is useful, to recall Lyon's statement that surveillance has "two faces" which are ambiguous in their effects. In other words, surveillance is necessary to fulfill the bureaucratic activities and administrative goals of modern nations and

organizations. Lyon nevertheless reminds us that digital technologies have prompted important changes for how modern organizations can collect, use, share, and analyze information, the focus of which is the next section.

5.2 Situating Drone Technology in the Surveillance Society

Drones are one more technology contributing to the growing digital dimension of the surveillance society. They are part of an entire infrastructure of digital surveillance that includes characteristics such as computing power, software, searchable databases, and networked telecommunications. Together, these characteristics permit mass storage, retrieval, analysis, and transmission of data. The types of data that drones can capture take the form of high resolution photographs and video footage, body heat (through infrared sensors), location data (through GPS signals), and digital communications data such as cell phone calls or text messages intercepted from WiFi networks. In the future, drones will be able to capture sophisticated biometric data through facial recognition software. Drones of various sizes, with varying capabilities, could reveal a variety of personally identifying information depending on the altitude at which they operate. When pieced together, this personal information on its own, and in conjunction with other information helps to form a more detailed picture of our increasingly digitized lives.

Although surveillance occurs at the individual level, it is important to keep in mind that an organization is far more powerful than a single person. As of late, Canadian media have fixated on sensational uses carried out by individual hobbyists flying drones outside condo windows in Vancouver (*Canadian Broadcasting Corporation*, 2014b), over a residential home in Ottawa (Willing, 2014), and dangerously near commercial aircrafts (Campion-Smith, 2014). While such instances are indeed jarring and point largely to problems in lax regulations, we must

not lose sight of the fact that larger organizations tend to operate far more advanced drones, with greater surveillance capabilities. These capabilities may be augmented in the near future with lethal and nonlethal weapons for domestic military and border security operations in Canada. As long as the drones have surveillance capabilities, bureaucracies will have much more power than individuals when it comes to collecting, storing and analyzing data.

The data collected from drones will vary according to the kind of operation carried out. In some instances, the data will be topographical (e.g. farms, conservation sites, pipelines, etc), in other instances, it can be personally identifying. It is the latter case that is most concerning since drones can operate with or without the awareness of those under surveillance, collecting automated forms of data without individual prior consent or access to the data. To paraphrase the words of David Lyon (1994), digital technologies help to make people's lives more visible to organizations, as they become more invisible to us.

Drones, as a result of their mobility and varied sizes, can be operated covertly, and for short or lengthy periods of time. Those operated by the Canadian military, or by the RCMP IBETs in partnership with US law enforcement agencies can stay aloft between 15 to "30 hours undetected" (Pitts, 2007). Such drones enable the gathering of large swaths of data, potentially personally identifying or aggregate in kind. The collection of possibly vast amounts of automated data requires sorting, categorizing, and interpreting. This process is far from neutral, and is carried out through specific computer codes carrying out the political objectives of any given organization. Such social sorting processes can be benign, beneficial, or the source of injustice.

In a post 9/11 security environment, drones on the border are put to use to carryout "persistent, broad area surveillance" and to "respond to un-cued, cued, and intelligence-based missions" (DHS, 2008). So-called "intelligence-led policing" operations are guided by a logic of

preemptive risk management that assumes all activity is suspicious and poses a risk of harm to society. Acquiring data before crimes are committed necessitates persistent, broad area surveillance, profiling for patterns of what are deemed potentially dangerous, and the collection, sorting, and analysis of large amounts of data. The discrimination present in society, in individuals, and institutions, is reflected in automated social sorting and risk management processes. Those caught under the gaze of the drone do not know what information has been gathered, how it has been classified, or how it has spread across the digital, and increasingly interoperable, surveillance infrastructure.

Everyone is the target in "intelligence-led policing" because preemptive risk management is about identifying threats before criminal acts are committed. Who then fits the criminal profile that justifies persistent, targeted surveillance of everyone along the border? The discourse of terrorism and extremism features prominently within national security operations along the border, and within domestic military operations at political summits (e.g. 2002 G8 Summit). The US Department of Homeland Security in 2012 saw "[the] potential for terrorists and violent extremists" as posing "the single greatest threat along the border" (2012a, p. 6). Terrorism in Canada and along the border, however, comprises only a small fraction of crimes committed. Violent extremists, or "domestic radicalization" to use the words of the Canada Border Services Agency (CBSA), classifies extremists under the sweeping categories of "Islamist" and "issue-based" extremism. The latter category consists of animal rights, environmentalist, anticapitalist, and other groups opposed to government. These groups may also bear the brunt of future drone surveillance operations in maritime and Arctic regions, where the military sees, in part, "a need for monitoring" the activities of people (Department of National Defence, 2011b). Surveilling the political activities of citizens, therefore, appear to be one justification for expanding the use

of drones in Canada. “As a result, citizens now risk being enveloped in the ever-expanding definition of what constitutes a security “threat”’ (Gersher, 2013, p. 3).

Another justification for the use of drones on Canada’s shared border with the US is “to identify and intercept … illegal cross-border activity” such as drug trafficking and the movement of migrants (General Atomics, 2008). Marijuana and cocaine drug smugglers did in fact comprise the bulk of apprehensions on the border, as opposed to migrants, extremists, of terrorists. Hence, “[c]ross-border law enforcement is thus being brought under the purview of national security, even though the majority of illegal activities at the border are criminal activities such as smuggling” (Gilbert, 2012b). The justification of persistent and widespread deployment of drones for national security operations is framed around catching the illusive terrorist, domestic “extremists,” protesting citizens, migrants, and ordinary criminal activities. Elevating national security and terrorist discourse in Canada not only justifies widespread drone use, but also ends up undermining constitutional rights and freedoms that guarantee freedom of thought, press and peaceful assembly, and democratic, legal, and equality rights, among others. Democratically minded citizens should be on guard about the potential erosion of civil liberties as they “are easy to demolish, difficult to repair” (Lyon, 2003c, p. 42). It should also be noted that the gaze of border drones will likely intrude upon Canadians in greater proportion than Americans since nearly 68 percent of Canadians live within 200 kilometers of the border as opposed to 5 percent of Americans living “within a two hour drive of the Canadian border” (Hale, 2009, p. 3).

Drone-based social surveillance in the context of preemptive policing and national security escalates the drive of sorting individuals according to categories of suspicion based on criminal, migrant, political, and other undisclosed profiles. We already see that activists are

likely the targets along industrial pipelines, while Indigenous people of Canada were among the first targets of social surveillance, in addition to protesters at the 2002 G8 Summit. Thus far, this confirms Finn and Wright's (2012) argument that police drones for social surveillance purposes are disproportionately targeting the marginalized populations, such as migrants and protesters. The legislative controls around social surveillance in Canada revolve around privacy laws. However, as Lyon has made clear, privacy laws, while important, are limited in their capacity to deal with issues of social justice, and for that matter the protection of personal information in numerous contexts.

Applying Canada's privacy laws at both provincial and federal levels in the case of drone-based surveillance are going to be very challenging. In the case where a Canadian suspects that their privacy has been violated, they can issue a formal complaint to the Federal Privacy Commissioner's Office. Under the current privacy complaint intake process, Canadians must be able to identify the organization they want investigated and must also specify what of their personal information was collected. Identifying the drone operator or an unmarked drone for that matter, as well as the type of information that was collected, poses almost insurmountable challenges to Canadians seeking recourse. Placing the onus on the individual to complain about the potential loss of privacy during invisible surveillance operations is also not an effective mechanism for redress. Additionally, the collection or use of personal information captured by recreational drone users is likely beyond the jurisdiction of Canadian privacy laws (Office of the Privacy Commissioner, 2013a, p. 16).

There are numerous other problems with Canadian privacy laws in relation to drone operation by organizations. Most private entities are subject to *PIPEDA*, and Section 4 of the *Act* requires that any private sector organization capturing personal information in the course of a

commercial activity obtain the consent of the individual. Obtaining meaningful consent may prove difficult in the case of aerial drone operations that capture large swaths of ambient and potentially personally identifying data. Privacy laws for both the public and private sector are subject to a number of exemptions that could further limit the protection of Canadians personal information in the face of drone-based surveillance. Additionally, public and private sector agencies are only subject to Canada's privacy laws where it can be clearly demonstrated that the footage collected contains information about identifiable individuals. However, as the Surveillance Studies Group notes, challenges will "persist regarding whether the capture of data by UAV surveillance constitutes a collection of 'core' biographical detail or otherwise 'extraneous' information" (Bracken-Roche et al., 2014, p. 54).

The Canadian legal framework is also poorly positioned for interpreting the use of drones in the context of Section 8 of the *Charter* that protects against unreasonable search and seizure. As with all emerging technologies, it may be some time before jurisprudence can work its way through the legal system. This is not to say that current mechanisms cannot be adapted to effectively counter the privacy intrusive aspects of aerial surveillance. However it is likely more effective to ensure that privacy protective clauses are built into civil aviation regulations and legislative frameworks to avert routine institutional (and individual) surveillance.

In the face of increasing use of drones by organizations in Canada, there needs to be appropriate controls in place to limit the intrusion of surveillance on people's lives. Drone technologies will collect data for a host of purposes, some of which are benign, others more intrusive. In the case where the data identifies individuals either directly or in conjunction with other datasets, a potentially revealing picture of one's life can form. The catch is the data collected is automated, and the picture formed is done through the biased coded categories of

organizations. What this points to is the need for greater accountability on the part of UAV-using organizations, transparency and access to information, input from citizen's oversight bodies on privacy and civil rights issues, and built in measures that limit the use and collection of information.

5.3 Conceptualizing an Alternate Path for Drones

Drones of the future will be smarter than those of today. They will have increasing autonomy, and be equipped with evermore more advanced sensors and weaponry. Some near future developments are already catching the eye of Canadian police officers, such as swarming drones. Considering that drone activity is already occurring in Canada, it is important that we understand the build and design of these technologies, as well as the uses, in order to properly regulate them. Enacting appropriate legal controls is essential since we are in the formative years that will shape future practices where drones will play a larger role in society with even greater technological sophistication.

Transport Canada's joint government-industry regulatory philosophy is not currently configured to address the social and political circumstances in which the technology is embedded. When drones become an every day affair in Canada, it will be uncertain how inappropriate designs and uses by current UAV-using organizations will be curbed. We must keep in mind that drones are political artifacts that have surveillance built in which is why need to get the regulations right in the immediate moment. Do we want to see surveillance amplified or instead appropriately regulated and ensured the context of use will not enable unchecked surveillance? Transport Canada's Working Group is only attending to one part of the regulations: safety. Physical safety is important in the context of flying sensing technologies, but privacy and

civil liberties are issues of equal importance. Hence, we need privacy and civil liberties advocates to oversee the political surveillance properties of the technology, in addition to aviation safety experts.

A regulatory focus on civil liberties may at first glance seem prohibitive to growing a competitive industry. However it is a winning formula for the nascent industry in Canada in terms of overcoming the stigma of drones as malicious surveillance (or weaponized) technologies. If Canada's industry and government concern themselves with regulating the drone uses that generate public *unease*, the industry can build and bank on public *trust*, and then we have a chance for a healthy democracy. One way to start building public trust and improving democratic processes is by broadening the range of perspectives writing policy and separating the military from civilian affairs.

Not all drone uses will pose problems. There are, in fact, many useful and legitimate applications that will include surveillance, such as search and rescue operations, among others. The most problematic uses of drones, however, will take place without the knowledge or consent of the surveilled. Groups likely to be most affected in the near future are those of low socioeconomic status, those with political and economic views contrary to the dominant discourse, and Muslim and migrant populations. These targeted groups will change and expand as the surveillance-industrial complex grows.

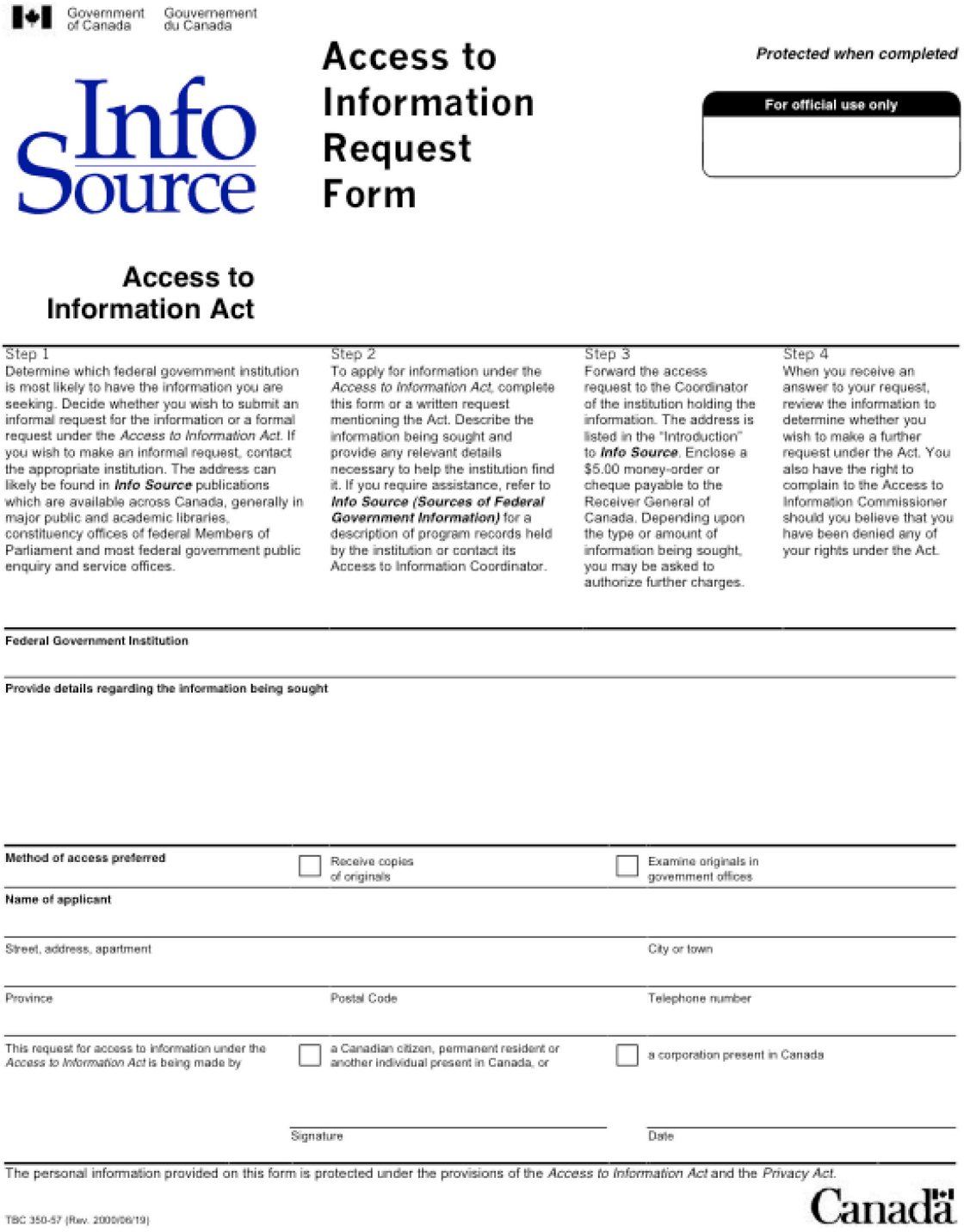
The emergence of drones in Canada is a social and political matter and will necessitate parliamentary debate by elected officials and an adequate venue for public consultation. We need to govern democracy through a proper and representative process; we need to govern drones in an open and just way. Without adequate debate and greater legal protection, we risk, drawing on

the words of Constable Marc Sharpe, “creeping forward” into a state where citizen’s rights and freedoms are diminished in pursuit of security and profit.

In reflecting on the original question posed at the start of this thesis, of whether or not there is a likelihood that the integration of drone technologies into Canada’s airspace will generate a series of social harm. If the current state of affairs as described in this chapter continues on, where issues of ethics, civil liberties, and privacy are ignored in favour of profit and national security, then the outcome will indeed generate a series of harms. Domestic drone practices and rules are in the crucial formative stages that will set the path for how they are adopted into Canada. Now is the time for Canadians to speak out and place pressure on elected officials, so that the desirable uses of the multi-faceted technologies can be harnessed, before unwanted practices and policies become routine.

Appendices

Appendix A - Access to Information Form



Government of Canada / Gouvernement du Canada

Info Source

Access to Information Request Form

Protected when completed

For official use only

Access to Information Act

Step 1
Determine which federal government institution is most likely to have the information you are seeking. Decide whether you wish to submit an informal request for the information or a formal request under the *Access to Information Act*. If you wish to make an informal request, contact the appropriate institution. The address can likely be found in ***Info Source*** publications which are available across Canada, generally in major public and academic libraries, constituency offices of federal Members of Parliament and most federal government public enquiry and service offices.

Step 2
To apply for information under the *Access to Information Act*, complete this form or a written request mentioning the Act. Describe the information being sought and provide any relevant details necessary to help the institution find it. If you require assistance, refer to ***Info Source (Sources of Federal Government Information)*** for a description of program records held by the institution or contact its Access to Information Coordinator.

Step 3
Forward the access request to the Coordinator of the institution holding the information. The address is listed in the "Introduction" to ***Info Source***. Enclose a $5.00 money-order or cheque payable to the Receiver General of Canada. Depending upon the type or amount of information being sought, you may be asked to authorize further charges.

Step 4
When you receive an answer to your request, review the information to determine whether you wish to make a further request under the Act. You also have the right to complain to the Access to Information Commissioner should you believe that you have been denied any of your rights under the Act.

Federal Government Institution

Provide details regarding the information being sought

Method of access preferred ☐ Receive copies of originals ☐ Examine originals in government offices

Name of applicant

Street, address, apartment — City or town

Province — Postal Code — Telephone number

This request for access to information under the *Access to Information Act* is being made by ☐ a Canadian citizen, permanent resident or another individual present in Canada, or ☐ a corporation present in Canada

Signature — Date

The personal information provided on this form is protected under the provisions of the *Access to Information Act* and the *Privacy Act*.

TBC 350-57 (Rev. 2009/06/19)

Canada

Appendix B - Access to Information & Privacy Request Summaries

AGENCY	REQUEST INFORMATION	PAGES, REQUEST #
1. Canada Border Service Agency (CBSA) **Formal request*	**1.** All information since 2001 regarding unmanned aerial vehicles (unmanned aircraft systems, remotely piloted aircraft systems, or drones). Including email correspondence, briefing notes, and any exchange between Canadian or foreign governmental bodies.	697, (disclosed in part), A-2013-08870
2. Department of Foreign Affairs, Trade and Development Canada (DFTD)	**2.** Records related to the purchase, export and/or use of a drone or unmanned aerial vehicle to Libya in 2011	193, (disclosed in part), A-2012-01139
3. Department of National Defence (DND)	**3.** Briefing notes, memos or discussions papers that mention or address the use of flying drones in Canada by the military for the period 1 Sept 11 to 31 Dec 11	141 (disclosed in part), A-2012-00014
	4. Briefing notes, memos or discussions papers that mention or address the use of flying drones in Canada by the military. For the period 1 Jan 12 to 1 Apr 12	65 (disclosed in part), A-2012-00015
	5. Briefing notes, memos or discussions papers that mention or address the use of drones in Canada by civilians or private sector operators, for the period 1 Sept 11 to 31 Dec 11	7 (disclosed in part), A-2012-00016
	6. Briefing notes, memos or discussions papers that mention or address the use of drones in Canada by civilians or private sector operators. For the period 1 Jan 12 to 1 Apr 12	5 (disclosed in part), A-2012-00017
	7. Briefing notes, reports, including drafts, related to the use of drones in the Arctic for the period 2 Sept 10 to 1 Sept 11	201 (disclosed in part), A-2011-00650[28]
	8. Briefing notes, reports, including drafts, related to the use of drones in the Arctic for the period 1 Sep 08 to 1 Sep 10	211 (disclosed in part), A-2011-00658
	9. 'Briefing Note – MCU2011-05071 "Rapid Procurement of UAV Support for OP Mobile Issue"'	5 (disclosed in part), A-2011-01356
	10. Briefing Note CCM 1148611 – Procurement of a Shipborne UAV Capabilitiy	2 (disclosed in full), A-2011-01475
	11. Reports, Briefing Notes, memos presented to the Honourable Peter Gordon MacKay and/or to the Honourable John Baird for the period 01 December 2011 to 31 December 2011 on the JUSTAS program	8 (disclosed in part), A-2011-01160
	12. All powerpoint presentations and briefing notes and memos on the progress of the JUSTAS project for the period September 1, 2011 to December 31, 2011	49 (disclosed in part), A-2012-00269
	13. All powerpoint presentations and briefing notes and memos on the progress of the JUSTAS project for the period January 1, 2012 to May 15, 2012	67 (disclosed in part), A-2012-00270
	14. Records related to the purchase, export and/or use of a drone or unmanned aerial vehicle to Libya in 2011	4, (disclosed in part), A-2012-01094

[28] Access to Information request A-2011-00650 includes 10 files: 00001-A0336123; 00008-A0336124; 00009-A0336125; 00011-A0336126; 00074-A0337412; 00127-A0337413; 00131-A0337414; 00156-A0337512; 00161-A0337517; 00192-A0337518.

	15. Briefing Notes, memos or discussion papers that mention or address the use of marine drones (pilotless boats) in Canada by the military, for the period 1 Sep 11 to 31 Dec 11	104, (disclosed in part), A-2012-00018
	16. Briefing Notes, memos or discussion papers that mention or address the use of marine drones (pilotless boats) in Canada by the military for the period 1 Jan 12 to 1 Apr 12	9, (disclosed in full), A-2012-00019
	17. All powerpoint presentations and briefing notes and memos on the progress of the JUSTAS project. For the period January 1, 2012 to May 15, 2012	52 (disclosed in part), A-2012-01795
4. Public Safety Canada	**18.** Domestic use of drone aircrafts by law enforcement and government run security organizations in Canada	3 (disclosed in full), A-2011-00279
	19. All briefing notes and memoranda, ADM [Assistant Deputy Minister] and above concerning the Shiprider program, from January 1, 2009 to October 11, 2012	315 (disclosed in part), A-2012-00237
5. Royal Canadian Mounted Police (RCMP) **Joe B. request*	**20.** All information from the last three years regarding any current or future plans to use Unmanned Aerial Vehicle (UAV) for Law Enforcement purposes. This could include the sharing of information with foreign agencies etc	336 (disclosed in part), A-2012-04038
6. Transport Canada **Joe B. request*	**21.** Unmanned Aerial Vehicles used by Law Enforcement	111 (disclosed in part), A-2012-00144
	22. The development of regulations for unmanned aircraft systems	144 (disclosed in part), A-2012-00419
	23. Documents regarding the use of drones by civilians or private sector operators from September to April 2012	26 (disclosed in part), A-2012-00008
	24. Special Flight Operations Certificate (SFOC) from 2007 – 2012	2,728 (disclosed in part), A-2012-00239, A-2012-00240, A-2012-00241, A-2012-00242, A-2012-00243, A-2012-00244
**Formal request*	**25.** 1. Seeking all information, excluding email, pertaining to the "UAV Systems Program Design Working Group" from 2012 to October 24, 2013, especially recommendation 106 on RPAS (remotely piloted aircraft system). 2. All information, excluding email, pertaining to the "Regulatory Cooperation Council (RCC) Air Transport Working Group" from its inception to October 24, 2013.	0 (not yet disclosed), A-2013-00591

Bibliography

Access to Information Act, R.S.C., c. A-1 (1985). The Department of Justice. Retrieved from http://laws-lois.justice.gc.ca/eng/acts/a-1/

Adey, P., Whitehead, M., & Williams, A. J. (2011). Introduction: Air-target: Distance, reach and the politics of verticality. *Theory, Culture & Society*, 28(7-8), 173-187. doi:10.1177/0263276411424759

Aeryon Labs. (2010, July). Marijuana Grow-Op Search. Retrieved from http://www.aeryon.com/applications/missions/175-growopsearch.html

Aeryon Labs. (2011, August 22). Aeryon Scout Micro UAV Helps Libyan Rebels in March to Tripoli. Press Release. Retrieve from http://www.aeryon.com/news/pressreleases/271-libyanrebels.html

Aeryon Labs. (2012). Scout Micro-UAV: Aerial Intelligence in the Palm of Your Hand. Brochure. Retrieved from Aeryon Labs Inc. Web site.

Aeryon Labs. (2013). *Can drones be used for good? Yes, says this Waterloo company*. Retrieved from http://www.aeryon.com/news/latest-news/inthenews/604-can-drones-be-used-for-good.html

Akkad, O. E. & Cryderman, K. (2014, April 6). Canadian technology and the flight of the drones. *The Globe and Mail*. Retrieved from http://www.theglobeandmail.com/technology/tech-news/canadian-technology-and-the-flight-of-the-drones/article17849259/

Association for Unmanned Vehicle Systems International. (2013). Reference Section: RPAS Terminology. 2013 RPAS Yearbook. Retrieved from http://uvs-info.com/index.php?option=com_flippingbook&view=book&id=16&page=1&Itemid=731

Attfield, Boudreau, & Li. (2007, November 1). Meeting with David Walker Washington Visit. Retrieved from CBSA Access to Information (A-2013-08870).

Baillie, S. (2014). Website Profile. *LinkedIn*. Retrieved from http://ca.linkedin.com/pub/stewart-baillie/19/947/327

Ball, K., Lyon, D., Murakami Wood, D., Norris, C., & Raab, C. (2006). A Report on the Surveillance Society. The United Kingdom Information Commissioner. http://ico.org.uk/~/media/documents/library/Data_Protection/Practical_application/SURVEILLANCE_SOCIETY_FULL_REPORT_2006.PDF

Bauman, Z. & Lyon, D. (2013). *Liquid Surveillance: A conversation*. Polity Press: Cambridge, UK; Malden, MA.

Barr, Col. D. (2003). The Kananaskis G8 summit: A case study in interagency cooperation. *Canadian Military Journal*, 4, 39-46. Retrieved from http://www.journal.dnd.ca/vo4/no4/operatio-eng.asp

Bellinger, N. (2012, August 15). NRC Aerospace Overview. Powerpoint presentation. Retrieved from National Research Council of Canada: http://www.atlanticalliance.ca/userfiles/file/APEI%20Conference%202012/1_NRC_N_Bellinger.pdf

Benjamin, M. (2012). *Drone Warfare: Killing by Remote Control*. OR Books: New York and London.

Bersin, A. (2011, May 17). Testimony of Alan Bersin, Commissioner, U.S. Customs and Border

Protection, before the Senate Judiciary Committee, Subcommittee on Immigration, Refugees and Border Security: Improving Security and Facilitating Commerce at America's Northern Border and Ports of Entry. Retrieved from US Department of Homeland Security Web site http://www.dhs.gov/news/2011/05/17/testimony-alan-bersin-commissioner-us-customs-and-border-protection-senate-judiciary

Black, J. T. (2013). Over your head, under the radar: An examination of changing legislation, aging case law, and possible solutions to the domestic police drone puzzle. *Washington and Lee Law Review*, 70(3), 1829.

Blackman, S. (2002, November/December). Attack of the drones. *Flight Safety Australia*. Retrieved from http://www.southampton.ac.uk/~jps7/D8%20website/Australian%20UAV%20safety%20rules.pdf

Boeing. (2014). ScanEagle Unmanned Aerial Vehicle. Retrieved from Boeing Web site http://www.boeing.com/boeing/history/boeing/scaneagle.page

Bond, L. (2011). JUSTAS and Project Epsilon: Integrated intelligence, surveillance, and reconnaissance of the Canadian Arctic. *Canadian Military Journal*, 11(4).

Bone, E. & Bolkcom, C. (2003). Unmanned Aerial Vehicles: Background and Issues for Congress (Order Code RL31872). Report for Congress. Retrieved from http://www.fas.org/irp/crs/RL31872.pdf

Bossenmaier, G. (2007, February 7). Secure Border Initiative (SBI). Retrieved from CBSA Access to Information (A-2013-08870).

Boulay, N. (n.d.). Invitation Recommendation for the President. Retrieved from CBSA Access to Information (A-2013-08870).

Bowman, J. (2014, March 5). Ontario police defend use of drone cameras over protests. *CBC*. Retrieved from http://www.cbc.ca/newsblogs/yourcommunity/2014/03/ontario-police-defend-use-of-drone-cameras-over-protests.html

Bracken-Roche, C., Lyon, D., Mansour, M. J., Molnar, A., Saulnier, A., & Thompson, S. (2014, April 30). Surveillance Drones: Privacy Implications of the Spread of Unmanned Aerial Vehicles (UAVs) in Canada. A Report to the Office of the Privacy Commissioner of Canada. The Surveillance Studies Centre. Retrieved from http://www.sscqueens.org/sites/default/files/Surveillance_Drones_Report.pdf

Bray, R. (2012). FWSAR & ASD. *FrontLine Defence*. 10-11

Brewster, M. (2012, May 30). Ottawa considers high-altitude drones for Arctic surveillance. *The Globe and Mail*. Retrieved from http://www.theglobeandmail.com/news/politics/ottawa-considers-high-altitude-drones-for-arctic-surveillance/article4219537/

Brewster, M. (2014, August 17). Military drone plan grounded amid continuing debate over fleet needs. *The Globe and Mail*. Retrieved from http://www.theglobeandmail.com/news/politics/military-drone-plan-grounded-amid-continuing-debate-over-fleet-needs/article20088860/

Bronskill, J. (2013, July 20). U.S. wants exemption from Canadian law for cross-border officers, RCMP memo says. *Toronto Star*. Retrieved from http://www.thestar.com/news/canada/2013/07/30/us_wants_exemption_from_canadian_law_for_crossborder_officers_rcmp_memo_says.html

Calo, R. (2011, December 12). The Drone as Privacy Catalyst. *Stanford Law Review Online*, 64(29), 29-33.

Campion-Smith, B. (2014, July 15). Drones pose new risk for aircraft in Canadian skies. *The Toronto Star*. Retrieved from http://www.thestar.com/news/canada/2014/07/15/drones_pose_new_risk_for_aircraft_in_canadian_skies.html

Canada. Parliament. The Standing Senate Committee on Foreign Affairs. (Feb 21, 2003). Citizenship and Immigration Canada. Retrieved from http://www.parl.gc.ca/Content/SEN/Committee/372/fore/witn.d.aniel1-e.htm

Canada. Parliament. House of Commons. Standing Committee on Public Safety and National Security. (Issue No. 10, March 12, 2009a) 40th Parliament, 2nd Session. Retrieved from http://www.parl.gc.ca/content/hoc/Committee/402/SECU/Evidence/EV3741346/SECUEV10-E.PDF

Canada. Parliament. Senate Committee. Proceedings of the Standing Senate Committee on National Security and Defence. *Evidence*. (Issue No. 7, June 8, 2009b). Retrieved from http://www.parl.gc.ca/Content/SEN/Committee/402/defe/pdf/07issue.pdf

Canada. Parliament. Senate Committee. Standing Committee on National Security and Defence. (Issue No. 11, Feb 14, 2011a) 40th Parliament, 3d session. Retrieved from http://www.parl.gc.ca/Content/SEN/Committee/403/defe/pdf/11issue.pdf

Canada. Parliament. House of Commons. Standing Committee on National Defence. *Evidence*. (Issue No. 016, Nov 29, 2011b) 41st Parliament, 1st Session. Retrieved from http://www.parl.gc.ca/HousePublications/Publication.aspx?DocId=5286400&Language=E&Mode=1

Canada. Parliament. Senate Committee. Proceedings of the Standing Senate Committee on National Security and Defence. *Evidence*. (Issue No. 4, Feb 27 2012a.). Retrieved from http://www.parl.gc.ca/content/sen/committee/411%5CSECD/04EVB-49351-e.HTM

Canada. Parliament. Senate Committee. Proceedings of the Standing Senate Committee on National Security and Defence. *Evidence*. (Issue No. 7, May 14, 2012b). Retrieved from http://www.parl.gc.ca/content/sen/committee/411%5CSECD/07EVA-49556-e.HTM

Canada. Parliament. House of Commons. Standing Senate Committee on National Security and Defence. *Evidence*. (March 25 2013). Retrieved from http://www.parl.gc.ca/content/sen/committee/411%5CSECD/50054-e.HTM

Canada Border Services Agency . (2012a, January 25). The State of the Union: Analysis of Obama State of the Union Address, January 24, 2012. Retrieved from CBSA Access to Information (A-2013- 08870).

Canada Border Services Agency . (2012b). Analysis of the Draft US Department of Homeland Security Northern Border Strategy. Canada-US Relations Division. Retrieved from CBSA Access to Information (A-2013-08870).

Canada Border Services Agency . (2012c, May 8). Report on the US House of Representatives Homeland Security Subcommittee Hearing "Measuring Border Security: U.S. Border Patrol's New Strategic Plan and the Path Forward." Canada-US Relations Division. Retrieved from CBSA Access to Information (A-2013-08870).

Canada Border Services Agency. (2013, May). CBSA Environmental Scan. Final Draft. Retrieved from CBSA Access to Information (A-2013-08870).

Canada Economic Development. (2013, May 17). Government of Canada funds development of Unmanned Aerial System Center of Excellence. Retrieved from CED Web site

http://www.dec-ced.gc.ca/eng/media-room/news-releases/2013/05/3427.html?utm_campaign=flux&utm_medium=rss&utm_source=commn&utm_content=commn-20130517-3427-fra

Canada Economic Development. (2014, February 27). Inauguration of Unmanned Aerial System Center of Excellence attended by Minister Lebel. Retrieved from CED for Quebec Regions Web site http://www.dec-ced.gc.ca/eng/media-room/news-releases/2014/02/3630.html

Canada Newswire. (2012, June 27). Transport Canada continues to show its disregard for safety with latest round of layoffs. Retrieved from http://www.newswire.ca/en/story/1000389/transport-canada-continues-to-show-its-disregard-for-safety-with-latest-round-of-layoffs

Canadian Aviation Regulations (CARs), SOR/96-433 (1996). The Department of Justice. Retrieved from: http://www.tc.gc.ca/eng/acts-regulations/regulations-sor96-433.htm

Canadian Aviator. (2014, September/October). UAV's At Work. 38-43. Retrieved from http://canadianaviator.com/digital-sept-2014/html5/?bookmarks=38

Canadian Broadcasting Corporation. (2014a, July 22). Novia Scotia RCMP's new drones a 'game changer'. Retrieved from CBC Web site http://www.cbc.ca/news/canada/nova-scotia/nova-scotia-rcmp-s-new-drones-a-game-changer-1.2714804

Canadian Broadcasting Corporation. (2014b, August 20). Youtube video shows drone buzzing Vancouver apartment. Retrieved CBC Web site from http://www.cbc.ca/news/canada/british-columbia/youtube-video-shows-drone-buzzing-vancouver-apartment-1.2740004

Canadian Centre for Unmanned Vehicle Systems. (2010). Advancing Unmanned Systems in Canada: Canadian Centre for Unmanned Vehicle Systems 2007-2010. Retrieved from http://www.albertacanada.com/AERO-AIS_CCUVS-overview.pdf

Canadian Centre for Unmanned Vehicle Systems. (2014). About Us. Retrieved from The Canadian Centre for Unmanned Vehicle Systems Web site http://www.ccuvs.com/about/

Carleton University. (2014, April 3). Carleton UAV Research. Mechanical and Aerospace Engineering Department Web site. Retrieved June 25 from http://uav.mae.carleton.ca/

Carryer, A. (2008). A History of Unmanned Aviation in Canada. *MacDonald, Dettwiler and Associates Ltd* (*MDA)*. Retrieved from http://www.uavs.ca/outreach/HistoryUAVs.pdf

Customs and Border Protection. (2011, August 9). CBP Unmanned Aircraft Aid Response to Red River Flooding. Press Release. Retrieved from US CBP Web site http://www.cbp.gov/archived/xp/cgov/newsroom/news_releases/archives/2011_news_releases/april_2011/04092011.xml.html

Customs and Border Protection . (2012). Performance and Accountability Report: Fiscal Year 2012. Retrieved from US CBP Web site http://www.cbp.gov/sites/default/files/documents/perform_account_rpt_2013_3.pdf

Customs and Border Protection. (2013a, January 5). Guardian UAS Maritime Variant Predator B. Fact Sheet. Retrieved from US CBP Web site http://www.itds.gov/linkhandler/cgov/border_security/am/operations/oam_vessels/aircraft/uas/guardian_b.ctt/guardian_b.pdf

Customs and Border Protection. (2013b). Performance and Accountability Report: Fiscal Year 2013. Retrieved from US CBP Web site http://www.cbp.gov/sites/default/files/documents/FY%202013%20Final%20PAR_0.pdf

Cavoukian, A. (2013, June). Surveillance, Then and Now: Securing Privacy in Public Spaces. Retrieved from Office of the Information and Privacy Commissioner of Ontario. 1–57. http://www.realprivacy.ca/content/uploads/2013/07/pbd-surveillance.pdf

Cavoukian, A. (2012, August). Privacy and drones: Unmanned aerial vehicles. Retrieved from Office of the Information and Privacy Commissioner of Ontario. 1–27. http://www.ipc.on.ca/images/Resources/pbd-drones.pdf

Chabot, D. and Bird, D. M. (2012). Evaluation of an off-the-shelf Unmanned Aircraft System for Surveying Flocks of Geese. *Waterbirds*, 35 (1), 170-174.

Chauhan, C. (2013, June 25). Uttarakhand: Drones in rescue act. *Hindustan Times*. Retrieved from http://www.hindustantimes.com/India-news/NorthIndiaRainFury2013/Uttarakhand-Drones-in-rescue-act/Article1-1081843.aspx

Clarke, R. (2013, December 14). What Drones Inherit from Their Ancestors. Xamax Consultancy Pty Ltd. Retrieved from http://www.rogerclarke.com/SOS/Drones-I.html

Clarke, R. (2014a, January 9). The Regulation of Civilian Drones' Applications to the Surveillance of People. Xamax Consultancy Pty Ltd. Retrieved from http://www.rogerclarke.com/SOS/Drones-BP.html

Clarke, R. (2014b, January 4). Understanding the Drone Epidemic. Xamax Consultancy Pty Ltd. Retrieved from http://www.rogerclarke.com/SOS/Drones-E.html#Impl

Clarke, R. & Moses, L. B. (2014, January 4). The Regulation of Civilian Drones' Impacts on Public Safety. Xamax Consultancy Pty Ltd. Retrieved from http://www.rogerclarke.com/SOS/Drones-PS.html#T2

Chris Hables Gray on Singularity 1 on 1: We need strong citizenship! [Video File]. (n.d.). *Singularity Weblog*. Retrieved from http://www.singularityweblog.com/chris-hables-gray-on-cyborg-singularity-citizenship/

Culver, K. B. (2014). From Battlefield to Newsroom: Ethical Implications of Drone Technology in Journalism. *Journal of Mass Media Ethics*, 29(1), 52-64.

Defense News. (2013, May 2). Canada Wants UAS to Supply Arctic Missions. Retrieve from UAS Vision Web site http://www.uasvision.com/2013/05/02/canada-wants-uas-to-supply-arctic-missions/#sthash.i8iiya8q.dpuf

Delmont, M. (2013). Drone encounters: Noor behram, omer fast, and visual critiques of drone warfare. *American Quarterly*, 65(1), 193-202. doi:10.1353

Department of Homeland Security. (2008, February 29). U.S. Customs and Border Protection: Report to Congress on Ongoing DHS Initiatives to Improve Security along the U.S. Northern Border. Retrieved from the US DHS Web site https://www.hsdl.org/?view&did=483993

Department of Homeland Security. (2009). Framework Agreement on Integrated Cross-Border Maritime Law Enforcement Operations between the Government of the United States of America and the Government of Canada, 1-17. Retrieved from the US DHS Web site http://www.dhs.gov/xlibrary/assets/shiprider_agreement.pdf

Department of Homeland Security. (2010, June 29). Concept of Operations for CBP's Predator B Unmanned Aircraft System: Fiscal Year 2010 Report to Congress. Retrieved from Electronic Frontier Foundation Web site https://www.eff.org/files/filenode/cbp_uas_concept_of_operations.pdf

Department of Homeland Security. (2012b, May). CBP's Use of Unmanned Aircraft Systems in the Nation's Border Security (No. OIG-12-85). Retrieved from DHS Office of Inspector General. http://www.oig.dhs.gov/assets/Mgmt/2012/OIG_12-85_May12.pdf

Department of Homeland Security. (2012a, June). Northern Border Strategy. Retrieved from US DHS Web site http://www.dhs.gov/xlibrary/assets/policy/dhs-northern-border-strategy.pdf
Department of Homeland Security. (2013a, December 5). CBP Introduction. Overview brief, powerpoint presentation. Retrieved from US DHS Web site http://www.dhs.gov/sites/default/files/publications/CBP-Brief-Dec-5-2013.pdf
Department of Homeland Security. (2013b, September 9). Privacy Impact Assessment for the Aircraft Systems. Retrieved from US DHS Web site http://alea.org/assets/pressReleases/assets/1914/privacy-pia-cbp-aircraft-systems-20130926.pdf
Department of Homeland Security. (n.d.). Report on the Assessment of the Secure Border Initiative-Network (SBI*net*) Program. Retrieved from http://www.globalexchange.org/sites/default/files/DHS_Report.pdf
Department of National Defence. (2009, June). Canadian Forces UAS Campaign Plan. Draft Edition 2.2. Retrieved from DND Access to Information (A-2011-00658), 1-67.
Department of National Defence. (2011a, September 28). DAR UAV In-Brief. Powerpoint presentation, Retrieved from DND Access to Information (A-2012-00269), 1-45.
Department of National Defence. (2011b, November 18). Underwater situational awareness in the Arctic is improved using autonomous systems. Retrieved from DND Access so Information (A-2012-00018).
Department of National Defence. (2012, February 15). Use of Military Airspace for Civil or Military UAVs. Retrieved from DND Access to Information (A-2012-00015).
Department of National Defence. (2013, July 27). Canada First Defence Strategy. Retrieved from DND Web site http://www.forces.gc.ca/assets/FORCES_Internet/docs/en/about/CFDS-SDCD-eng.pdf
Derksen, Cpl K. (2012, September 17). Briefing Note to the Director General. Retrieved from RCMP Access to Information (A-2012-04038).
Digital Aerials. (n.d.). Home page. Retrieved from http://www.digital-aerials.ca/
Domoney, D. (2012). Economics of Policing Template: Emerging & Innovative Practices. Retrieved from RCMP Access to Information (A-2012-04038). 1-5.
Domoney, D. (n.d.a). F Div UAV Project: Collision Reconstruction Program. Powerpoint presentation. Retrieved from RCMP Access to Information (A-2012-04038).
Domoney, D. (n.d.b). F Div UAV Project: Collision Reconstruction Program. Handout material. Retrieved from RCMP Access to Information (A-2012-04038).
Draganfly. (2009a, March 26). Draganflyer X6 Unmanned Aerial Vehicle Takes Flight in OPP Police Applications. Press Release. Retrieved from Draganfly Innovations Web site http://www.draganfly.com/news/2009/03/26/draganflyer-x6-unmanned-aerial-vehicle-opp-police-applications/
Draganfly. (2009b, December 7). Draganflyer VTOL UAV Helicopter used for Urban Traffic Police Investigation. Press Release. Retrieved from Draganfly Innovations Web site http://www.draganfly.com/news/2009/12/15/draganflyer- uav-vtol-helicopter-used-for-urban-traffic-police-investigation/
Draganfly. (2010, January 27). Draganflyer VTOL UAV Helicopter Used for Urban Traffic Police Investigation with Controlled Airspace. Press Release. Retrieved from Draganfly Innovations Web site http://www.draganfly.com/news/2010/01/27/draganflyer-vtol-uav-helicopter-used-for-urban-traffic-police-investigation-within-controlled-airspace/

Drapeau, M. W. & Racicot, M. (2013). *Federal Access to Information and Privacy Legislation Annotated 2013.* Carswell: Toronto.

Ducharme, J. (2014, June 9). College of the North Atlantic develops drone journalism code of conduct. *J-Source*. Retrieved from http://j-source.ca/article/college-north-atlantic-develops-drone-journalism-code-conduct

Dunlap, T. (2009). We've Got our Eyes on You: When surveillance by Unmanned Aircraft Systems constitutes a Fourth Amendment search. *South Texas Law Review*, 51(1), 173.

Edwards, E. (2012). Unmanned Systems Canada. Powerpoint presentation. Retrieved from http://www.aeromontreal.ca/content/uploads/files/11102012/GSCS-%20EricEdwards_Final.pdf

Edwards, E. (2014) Professional Operations in Canada. AUVSI Powerpoint presentation. Retrieved from http://www.nwuav.com/auvsi/AUVSI-2014-PPT/Professional-Operations-in-Canada.pdf

Eley, M. (2010). Speaking Notes for Martin J. Eley Director General, Civil Aviation to Deliver at the Unmanned Systems Canada Conference 2010. Transport Canada Web site. Retrieved January 5, 2014 from http://www.tc.gc.ca/eng/civilaviation/opssvs/directorgeneral-speeches-1208.htm

Eley, M. (2011). Certification & airspace integration: UAS regulatory situation in Canada. In 2011–2012 UAS Yearbook. UAS: The Global Perspective. 9th ed. Blyenburgh & Co., 119-120. Retrieved from http://www.uvs-info.com/phocadownload/05_3a_2011/P119-P120_C&AI_UAS-Regulatory-Situation-Canada.pdf

Eley, M. (2012). Speaking notes for the Director General Civil Aviation, Martin J. Eley, at the Unmanned Systems Canada conference 2012. Transport Canada Web site. Retrieved January 5, 2014 from http://www.tc.gc.ca/eng/civilaviation/opssvs/directorgeneral-speeches-1722.htm

Ellis, K. (2012, September). NRC Civil UAS Program. Powerpoint Presentation. Retrieved from The National Research Council of Canada. 1-11. http://www.aeromontreal.ca/content/uploads/files/11102012/GSCS-%20Kris%20Ellis.pdf

Engele, J., Sharpe, M., & Evans, J. (2012, October). Guidebook for Integrating a Micro Unmanned Aerial System (UAS) into Police and Emergency Operations (Contract Report 2012-012). Defence R&D Canada (DRDC) Centre for Security Science (CSS). Retrieved from http://lgdata.s3-website-us-east-1.amazonaws.com/docs/1314/785668/micro.pdf

Environment Canada. (1998, May 14). Aerosonde Weather Reconnaissance off Tofino, BC, April 1998 (No. KM054-606074/001/XSA). The Insitu Group: Bingen, Washington. Retrieved from http://aerovelco.com/papers/AerosondeTofinoReport.pdf

Feenberg, A. (2010). Democratic Rationalization: Technology, Power, and Freedom. In A. Feenberg, *Between Reason and Experience: Essays in Technology and Modernity* (pp. 5-31). MIT Press.

Feldman, K. (2011, December). Empire's Verticality: The Af/Pak frontier, visual culture, and racialization from above. *Comparative American Studies*, 9(4), 325-41.

Finn, R. L., & Wright, D. (2012). Unmanned aircraft systems: Surveillance, ethics and privacy in civil applications. *Computer Law & Security Report*, 28(2), 184.

Forberg, S. (2012). Taking to the skies: New tool facilitates investigations. *The Gazette*, 74(1). Retrieved from http://www.rcmp-grc.gc.ca/gazette/vol74n1/trends-dernierestendances-eng.htm

Foucault, M. (1988). Madness and civilization: A history of insanity in the age of reason. New York: Vintage Books.
Foucault, M. (1995). Discipline and punish: The birth of the prison. New York: Vintage Books.
Fox News. (2013, Aug 21). Canada uses drones to drive away geese. Retrieved from http://www.foxnews.com/world/2013/08/21/canada-uses-drones-to-drive-away-geese/
Freeze, C. (2012, February 12). Sky is the limit for use of mini, unmanned planes. *Globe and Mail*. Retrieved from http://www.theglobeandmail.com/news/national/sky-is-the-limit-for-use-of-mini-unmanned-planes/article2335856/
Freeze, C. (2012, May 21). Privacy czar sounds alarm on drones patrolling U.S. border. *Globe and Mail*. Retrieved from http://www.theglobeandmail.com/news/politics/ottawa-notebook/privacy-czar-sounds-alarm-on-drones-patrolling-us-border/article610512/
Francoeur, R. (2013, June 3). Yellowknife RCMP recruit first 'Draganfly'. *Northern Journal*. Retrieved from http://norj.ca/2013/04/yellowknife-rcmp-recruit-first-draganfly/
Fumano, D. (2014, February 25). Langara College journalism students learn to gather news using drones. *The Province*. Retrieved from http://www.theprovince.com/news/Langara+College+journalism+students+learn+gather+news+using+drones/9550781/story.html
Gallagher, S. (2013, August 19). Almost orbital, solar-powered drone offered as 'atmospheric satellite'. *Wired*. Retrieved from http://www.wired.co.uk/news/archive/2013-08/19/solar-powered-drone
Galliott, J. C. (2012, Summer). Uninhabited Systems in the Civilian Realm: Some ethical concerns. *IEEE Technology & Society Magazine*, 13-15. doi:10.1109
General Atomics. (2008, December 6). UA Arrives in North Dakota. Press release. Retrieved from http://www.ga-asi.com/news_events/index.php?read=1&id=179&page=1
General Atomics. (2009a, December 7). CBP Launches the New Predator B Guardian UAS. Press Release. Retrieved from http://www.ga-asi.com/news_events/index.php?read=1&id=280
General Atomics. (2009b, July 7). CBP Completes Unmanned Aircraft Surveillance in Great Lakes Region. Press Release. Retrieved from http://www.ga-asi.com/news_events/index.php?read=1&id=261
General Atomics. (2012). MQ-9 Reaper/Predator B: Persistent Multi-Mission ISR. Retrieved from http://www.ga-asi.com/products/aircraft/pdf/Predator_B.pdf
Gersher, S. (2013, December). Canada's Domestic Regulatory Framework for RPAS: A call for public deliberation. *Journal of Unmanned Vehicle Systems*, 2(1).
Gersher, S. (2014, April 10). Drone Surveillance is Increasing in Canada. *Ottawa Citizen*. Retrieved from http://ottawacitizen.com/news/drone-surveillance-is-increasing-in-canada
Gibb, A. (2012, March 29). Privacy concerns hover over RCMP drones in British Columbia. *The Thunderbird*. Retrieved from http://thethunderbird.ca/2012/03/29/privacy-concerns-hover-over-rcmp-drones-in-british-columbia/
Gilbert, E. (2012a). Borders and Security in North America. In J. Ayers & L. Macdonald (Eds.), *North America in Question* (pp. 197-217). Toronto: University of Toronto Press.
Gilbert, E. (2012b, Fall). The Canada-US Border Deal. *Perspectives*. Retrieved from https://www.uc.utoronto.ca/magazine/canada-us-border-deal
Gilbert, E. (2012c, February 1). Harper's border deal expands the national security state. *Rabble*. Retrieved from http://rabble.ca/news/2012/02/harpers-border-deal-expands-national-security-state

Global News. (2013, February 5). Watchful Eye. Retrieved from Global News Toronto Web site http://globalnews.ca/news/388822/watchful-eye-preview/

Gogarty, B. & Hagger, M. (2008). The Laws of Man over Vehicles Unmanned: The Legal Response to Robotic Revolution on Sea, Land and Air. *Journal of Law, Information and Science*, 19, 73-145.

Government Accountability Office. (2007, September 27). Border Security: Security Vulnerabilities at Unmanned and Unmonitored US Border Locations. Testimony before the U.S. Senate Committee on Finance. Retrieved from US GAO Web site http://www.gao.gov/new.items/d07884t.pdf

Government Accountability Office. (2011, May). Secure Border Initiative: Controls over Contractor Payments for the Technology Component Need Improvement. Report to Congressional Requesters. Retrieved from US GAO Web site http://www.gao.gov/new.items/d1168.pdf

Government of Canada. (2009, April 6). New contract for small unmanned aerial vehicles (SUAV) will boost economy. Retrieved from http://news.gc.ca/web/article-en.do?crtr.sj1D=&mthd=advSrch&crtr.mnthndVl=12&nid=441429

Government of Canada. (2011a, February 4). PM and U.S. President Obama Announce Shared Vision for Perimeter Security and Economic Competitiveness Between Canada and the United States. Retrieved from Canada's Economic Action Plan Web Site http://actionplan.gc.ca/en/news/bap-paf/pm-and-us-president-obama-announce-shared-vision-perimeter-security-and-economic

Government of Canada. (2011b). Regulatory Cooperation Council: Joint Action Plan (Cat. No. BT22-123/2011E-PDF). Retrieved from Canada's Economic Action Plan Web Site http://actionplan.gc.ca/sites/default/files/japlan_eng.pdf

Government of Canada. (2014a, June 12). Completed Access to Information Requests. Retrieved from Open Government Web site http://data.gc.ca/eng/search/ati

Government of Canada. (2014b, June 2). Sources of Federal Government and Employee Information 2013. Retrieved from Info Source Web site http://www.infosource.gc.ca/emp/emp05-eng.asp#chapters

Gregory, D. (2011). From a view to a kill: Drones and late modern war. *Theory, Culture & Society*, 28(7-8), 188-215. doi:10.1177/0263276411423027

Hale, G. (2009, February). In Search of Effective Border Management. *A Changing World: Canadian Foreign Policy Priorities*, 3, 1-34. Retrieved from Canadian International Council (CIC) Web site http://opencanada.org/wp-content/uploads/2011/05/In-Search-of-Effective-Border-Management-Geoffrey-Hale.pdf

Hassibi, N. (2013, May 6). Breakdown of Resources by the US Department of Homeland Security on the Southern and Northern Borders. Retrieved from CBSA Access to Information (A-2013-08870).

Hayes, B. (2012). The Surveillance-Industrial Complex. In K. Ball, K. Haggerty & D. Lyon (Eds.), *Routledge Handbook of Surveillance Studies*, (pp. 167-175). Taylor and Francis: New York and Abingdon, Oxon.

Healey, A. (2008, September). Unmanned Systems: A Statistical Overview. *Frontline Defence*, 5.

Hill, J. (2012, February 15). Canadian Air Force Plans to Issue UAV Fleet Upgrade Contracts this Summer. *Satellite News*.

Insitu. (2011, October 6). ScanEagle streams live, stable video to tactical operations center, troops in arctic exercise. *Technology & Business Journal*.
International Civil Aviation Organization. (2011). Unmanned Aircraft Systems (UAS) (ISBN 978-92-9231-751-5). Montreal: ICAO. Retrieved from http://www.icao.int/Meetings/UAS/Documents/Circular%20328_en.pdf
Jaggi, Maj. (2009, March 9). U. Joint UAV Surveillance and Target Acquisition System (JUSTAS) Project. Retrieved from DND Access to Information (A-2011-00658).
Jarnot, C. (2012). History. In R. K. Barnhard, S. B. Hottman, D. M. Marshall, & E. Shappee (Eds.), *Introduction to Unmanned Aircraft Systems* (pp. 1-16). CRC Press.
Jewers, Cpl. D. (2010, November). Unmanned Aerial Systems (UAS): Operational Feasibility within the Lower Mainland District. RCMP Lower Mainland ICARS. Retrieved from RCMP Access to Information (A-2012-04038).
Joe B., (n.d.). About Paroxysms. *Paroxysms* Web site. Retrieved April 30, 2014, from https://paroxysms.ca/about/
Joe B., (2012, March 25). How to request information from the Canadian Government. *Paroxysms* Web site. Retrieved August 25, 2013, from https://paroxysms.ca/2012/03/25/how-to-request-information-from-the-government/
Jordan, Andrew and Timothy O'Riordan. (1999). The precautionary principle in contemporary environmental policy and politics. In Carolyn Raffensberger and Joel Tickner (Eds.), *Protecting Public Health and the Environment: Implementing the Precautionary Principle*. Washington, D.C.: Island Press.
Kelly, Cpl. B. (2011, June 7). RCMP, CBSA, OPP and U.S. Border Patrol intercept human smuggling operation on St. Lawrence River. *Canada News Wire (CNW)*. Retrieved from http://www.newswire.ca/en/story/784397/rcmp-cbsa-opp-and-u-s-border-patrol-intercept-human-smuggling-operation-on-st-lawrence-river#
Kidd, B. (2010, December 10). Special Flight Operations Certificate: Unmanned Air Vehicle (No. 5812-15-17-2010-4). Transport Canada (Ontario Region). Retrieved from Transport Canada Access to Information (A-2012-00242). 1-4.
Koren, E. (2013, February). Border Patrols Between Ports of Entry: A Discussion Paper (Report No. 039). Retrieved from Public Safety Canada Web site http://www.publicsafety.gc.ca/lbrr/archives/cn63314180-eng.pdf
Lannan, Maj. T. (2004, Autumn). Interagency Coordination within the National Security Community: Improving the response to terrorism. *Canadian Military Journal*, 49-56.
Ligaya, A. (2014, June 14). From toy shelves to the oil sands, drones are taking off in Canada. *National Post*. Retrieved from http://business.financialpost.com/2014/06/14/from-toy-shelves-to-the-oil-sands-drones-are-catching-on-in-canada/?__lsa=4fbe-9e33
Lin, P., Bekey, G., & Abney, K. (2008, December 20). Autonomous Military Robotics: Risk, ethics, and design. US Department of Navy, Office of Naval Research. (N00014-07-1-1152). Retrieved from http://ethics.calpoly.edu/ONR_report.pdf
Loomba, A. (1998). Colonialism/Postcolonialism. New York; London: Routledge.
Lyon, D. (1994). *The Electronic Eye: The rise of surveillance society*, University of Minnesota Press: Minneapolis, 1-281.
Lyon, D. (2003a). Fear, Surveillance, and Consumption. *The Hedgehog Review*, 5(3), 81-95.
Lyon, D. (2003b). Introduction & Surveillance as social sorting: Computer codes and mobile bodies. In D. Lyon (Ed.), *Surveillance as Social Sorting: Privacy, risk, and digital discrimination*, (pp. 1-30). Routledge: London and New York.

Lyon, D. (2003c) *Surveillance after September 11*. Polity Press, 1-197.
Lyon, D. (2009). Surveillance, Power, and Everyday Life. In C. Avgerou, R. Mansell, D. Quah, & Roger Silverstone (Eds.), *The Oxford Handbook of Information and Communication Technologies*, (pp. 449-461). The Oxford University Press.
MacKay, P. (2011, March 29). Letter to Minister of Intergovernmental Affairs – Newfoundland and Labrador. Retrieved from DND Access to Information (A-033-6125).
Mackin, B. (2014, June 4). Drones poised to fill Canadian skies: Will the benefits of the eyes in the skies outweigh the costs? *Straight.com*. Retrieved from http://www.straight.com/news/657296/drones-poised-fill-canadian-skies
Madrigal, A. (2009, September 16). Video: Scientific Drones Take Flight at Earth's Icy Poles. *Wired*. Retieved from http://www.wired.com/2009/12/scientific-uavs/
Magnes Group. (2014). Unmanned Aerial Vehicles. Retrieved from The Magnes Group Inc. Web site http://www.magnesgroup.com/index.php?option=com_content&view=article&id=112&Itemid=112
Manson, T. M. (2006, November/December). Border Security Technology. *Public Safety IT*. Retrieved from http://www.hendonpub.com/resources/article_archive/results/details?id=3478
Marx, G. T. (2002). What's new about the "new surveillance"?: Classifying for change and continuity. *Surveillance & Society*, 1(1), 9-29.
McBride, P. (2009). Beyond orwell: The application of unmanned aircraft systems in domestic surveillance operations. *Journal of Air Law and Commerce*, 74(3), 627.
McDevitt, N. (2008, May 29). Avian research project takes off. *McGill Reporter*, 40. Retrived from http://www.mcgill.ca/reporter/40/18/chabot/
McGeer, T. (1999, February 25). *Laima*: The First Atlantic Crossing by Unmanned Aircraft. The Insitu Group: Bingen, Washington. Retrieved from http://www.aerovelco.com/papers/LaimaStory.pdf
McKenna, P. (2011, September 1). Canada's Arctic Military Footprint. *Charlottetown Guardian*. Retrieved from http://research.upei.ca/blogs/2011/09/06/guest-post-canadas-arctic-military-footprint
Mcmenamin, H. (2013, July 3). These drones are strictly for peaceful purposes. *Alberta Farmer Express*. Retrieved from http://www.albertafarmexpress.ca/2013/07/03/these-drones-are-strictly-for-peaceful-purposes/
MDA. (2011). MDA: Project Noctua Unmanned Paradigm. *Frontline*, 2, p. 40.
Meurling, Maj. J.R. (2010, May 18). SCOND Prep: Joint UAV Surveillance and Target Acquisition System (JUSTAS) Project. Briefing Note. Retrieved from DND Access to Information (A-2011-00658).
Meyer, C. (2013, April 24). RCMP grapples with questions of FBI authority in Canada. *Embassy*, 449, p. 14.
Monaghan, J. & Walby, K. (2012). Making up 'Terror Identities': security intelligence, Canada's Integrated Threat Assessment Centre and social movement suppression. *Policing and Society: An International Journal of Research and Policy*, 22(2), 133-151.

Murakami Wood, D. (2007, Summer). Securing the Neurocity. *Criminal Justice Matters*, 68(1), 37-38. doi:10.1080/09627250708553286
Murakami Wood, D. (2009). The 'Surveillance Society': Questions of History, Place and Culture. European Journal of Criminology, 6(2), 179-194.
National Research Council. (2013, June 18). Five new NRC programs to support Canadian aerospace industry with innovative technologies. News Releases. Retrieved from NRC Web site http://www.nrc-cnrc.gc.ca/eng/news/releases/2013/aviation_five_bg.html
Neocleous, M. (2013a, November/December). Police power, all the way to heaven: *Cujus est solum* and the no-fly zone. *Radical Philosophy*, 182, 5-14.
Neocleous, M. (2013b). Air power as Police Power. *Environment and Planning D: Society and Space*, (31), 578-593. doi:10.1068/d19212
Newcome, L. R. (2004). Unmanned Aviation: A brief history of unmanned aerial vehicles. Reston, Va: American Institute of Aeronautics and Astronautics; London.
Office Information Commissioner. (2014, April 7). Lodging a Complaint. Retrieved from OIC Canada Web site http://www.oic-ci.gc.ca/eng/lc-cj-logde-complaint-deposer-plainte.aspx
Office of the Privacy Commissioner. (2006, April 11). The *Privacy Act*: Not an excuse to promote secrecy. Fact Sheet. Retrieved from OPC Web site http://www.priv.gc.ca/resource/fs-fi/02_05_d_29_e.asp
Office of the Privacy Commissioner. (2008, April). Process and Compliance Manual: Access to Information and Privacy. Prepared by ATIP Unit. Retrieved from OPC Web Site https://www.priv.gc.ca/au-ans/atip-aiprp/manual_chap6_e.asp
Office of the Privacy Commissioner. (2013a, March). Drones in Canada: Will the proliferation of domestic drone use in Canada raise new concerns for privacy? Retrieved from OPC Research Reports http://www.priv.gc.ca/information/research-recherche/2013/drones_201303_e.pdf
Office of the Privacy Commissioner. (2013b, October). Securing the Right to Privacy. Annual Report to Parliament 2012-2013, Report on the *Privacy Act*. Retrieved from OPC Web site. 1-102. http://www.priv.gc.ca/information/ar/201213/201213_pa_e.pdf
Office of the Privacy Commissioner. (2014b, June 26). How to file a Privacy Complaint. Retrieved from OPC Web site https://www.priv.gc.ca/complaint-plainte/index_e.asp
Weltman, P. (2010, June 23). Assessment of Planned Security Costs for the 2010 G8 and G20 Summits. Ottawa: Canada, Office of the Parliamentary Budget Officer. Retrieved from http://www.parl.gc.ca/PBO-DPB/documents/SummitSecurity.pdf
Pearson, C. (2012, January 12). Police use drone helicopter in search. *The Windsor Star.* Retrieved from http://www.aeryon.com/news/inthenews/314-2012policesearch.html
Pinch, T. J., & Bijker, W. E. (1987). The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each other. In W. E. Bijker, T. P. Hughes, & T. J. Pinch (Eds.), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, (pp. 17-50). The MIT Press: Cambridge and London.
PIPEDA, S.C., c. 5, 2000. Principles Set Out in the National Standard of Canada Entitled Model Code for the Protection of Personal Information. Schedule 1 (Section 5). The Department of Justice. Retrieved from http://laws-lois.justice.gc.ca/eng/acts/P-8.6/page-19.html#h-25
Pitts, M. J. (2007, May 18). Summary of Discussion/Record of Decisions. CBSA-CBP Bilateral Meeting and Shared Border Accord Coordinating Committee (SBACC). Retrieved from CBSA Access to Information (A-2013-08870).

Privacy Act, R.S.C., c. P-21 (1985). Protection of Personal Information, Subsection 8(2). The Department of Justice. Retrieved from http://laws-lois.justice.gc.ca/eng/acts/P-21/page-3.html#h-6

Privacy International. (2006, December 12). Canada: Country Report, Part I. Legal Framework. Retrieved from Privacy International Web site https://www.privacyinternational.org/reports/country-report-canada-2006/i-legal-framework

Pugliese, D. (2014, May 28). Scan Eagle Flying at Maple Resolve 2014. *Ottawa Citizen*. Retrieved from http://ottawacitizen.com/news/national/defence-watch/scan-eagle-flying-at-maple-resolve-2014

Quan, D. (2011, January 27). Eyes in the sky: Unmanned plane patrolling stretch of Canada-U.S. border. *ipolitics*. Retrieved from http://www.ipolitics.ca/2011/01/27/eyes-in-the-sky-unmanned-plane-patrolling-stretch-of-canada-u-s-border/

Rapp, G. C. (2009). Unmanned Aerial Exposure: Civil Liability Concerns Arising from Domestic Law Enforcement Employment of Unmanned Aerial Systems. *North Dakota Law Review*, 85(3), 623.

Ravich, T. (2009). The Integration of Unmanned Aerial Vehicles into the National Airspace. *North Dakota Law Review*. 85(597), 597-622. Retrieved from http://web.law.und.edu/LawReview/issues/web_assets/pdf/85-3/85NDLR597.pdf

Ravich, T. (2013, June 25). Anti-drone Law Unlikely to Promote Privacy, Security. *Daily Business Review*.

Royal Canadian Air Force. (2012, February 1). JUSTAS/HALE COA Analysis. Concept of Operations Presentation. Retrieved from DND Access to Information (A-2012-01795), 1-13.

Royal Canadian Mounted Police. (2008, April 16). Technical Operations. Retrieved from RCMP Web site http://www.rcmp-grc.gc.ca/tops-opst/index-eng.htm

Royal Canadian Mounted Police. (2012a, April 4). Terms of Reference: National Unmanned Aerial Systems (UAS) Advisory Working Group. Retrieved from RCMP Access to Information (A-2012-04038).

Royal Canadian Mounted Police. (2012b, April 20). Operational Manual: 5.11. Unmanned Aerial System (UAS). Draft Copy. Retrieved from RCMP Access to Information (A-2012-04038).

Royal Canadian Mounted Police. (2012c, November 14). Operational Manual: 25.7 Unmanned Aerial System (UAS). Draft Copy. Retrieved from RCMP Access to Information (A-2012-04038).

Royal Canadian Mounted Police. (2012d, August 9). "O" Division Fact Sheet. Retrieved from RCMP Web site http://www.rcmp-grc.gc.ca/on/about-apropos/fs-fd-eng.htm

Royal Canadian Mounted Police. (n.d.). Unmanned Aerial Vehicles (UAV) (RDIMS_F-#191931-v1-UAV_PPTX.PDF). Powerpoint Presentation. Retrieved from RCMP Access to Information (A-2012-04038). 1-7.

Robertson, I. (2012, September 13). Police use drones to spot grow-ops in Halton Region. *Toronto Sun*. Retrieved from http://www.torontosun.com/2012/09/13/police-use-drones-to-spot-grow-ops-in-halton-region

Robbins, J. (2009, June 27). U.S. tries unmanned planes to patrol border. *Niagara Falls Review*. Retrieved from http://www.niagarafallsreview.ca/2009/06/27/u-s-tries-unmanned-planes-to-patrol-border

Roberge, Maj. J. (2011, December 9). Polar Hawk and JUSTAS Relationship. Briefing note for DFAIT. Retrieved from DND Access to Information (A-2012-00269).
Romans, Maj. E. (2010, May 12). Prep for SCONSAD 31 May 10 – Projects NOCTUA and JUSTAS. Briefing Note, Retrieved from DND Access to Information (A-2011-00658).
R. v. Spencer, SCC 43 (2014). Retrieved from http://scc-csc.lexum.com/scc-csc/scc-csc/en/item/14233/index.do
R. v. Tessling, 3 S.C.R. 432, SCC 67, (2004). Retrieved from http://scc-csc.lexum.com/scc-csc/scc-csc/en/2183/1/document.do
Salter, M. (2014). Toys for the boys? drones, pleasure and popular culture in the militarisation of policing. *Critical Criminology*, 22(2), 163-177. doi:10.1007/s10612-013-9213-4
Santry, C. (2014, February 3). Droning on. *Canadian Lawyer and Law Times*. Retrieved from http://www.canadianlawyermag.com/4989/Droning-on.html
Schlosser, E. (1998, December 1). The Prison-Industrial Complex. *The Atlantic*. Retrieved from http://www.theatlantic.com/magazine/archive/1998/12/the-prison-industrial-complex/304669/
Schobesberger, R. (2007, December 11). Special Flight Operations Certificate (Number 5812-15-7). Transport Canada. Retrieved from Access to Information (A-2012-00239).
Schoenhoff, S. & Tribe, L. (2014, June 13). Canada Continues to Struggle in Newspapers Canada's Annual FOI Audit. *Canadian Journalists for Free Expression*. Retrieved from https://cjfe.org/blog/canada-continues-struggle-newspapers-canada%E2%80%99s-annual-foi-audit#.U5sa6b0vyKc.twitter
senseFly. (n.d.). About eBee and FAQs. Retrieved from senseFly Web site https://www.sensefly.com/drones/ebee.html
Sharpe, M. (2008, April). North America's 1st Operational Police UAS. *Blue Line Magazine*.
Sharpe, M. (2009, October). Moving ahead with a pilotless project: The OPP aerial program is maturing. *Blue Line Magazine*.
Singer, P. W. (2011, July). Drones Don't Die. *Military History*, 66-69.
Singer, P. W. (2012, December 11). The Robotics Revolution: What it means and what to watch for next. *Canadian International Council*. Retrieved from http://opencanada.org/features/the-think-tank/essays/the-robotics-revolution/
Smith, C/M J. (2012, June 26). SouthEast District RCMP: UAS Proposal. *SouthEast District RCMP*. Retrieved from RCMP Access to Information (A-2012-04038). 1-6.
Smith, C/M J. K. (n.d.). *SouthEast District MCU*. Retrieved from RCMP Access to Information (A-2012-04038). 1-12
Snow, M. (2007). NATO FINAS: Necessity is the Mother of Invention. Unmanned Aircraft Systems: The Global Perspective, Yearbook. *UVS-Info* Web site. 117-8. Retrieved from http://uvs-info.com/phocadownload/05_3e_2007/117_NATO-FINAS.pdf
Stangler, C. (2013, August 22). Tar Sands Drones Are on Their Way. *In These Times*. Retrieved from http://inthesetimes.com/article/15501/tar_sands_drones_are_on_their_way/
Stanley, J. & Crump, C. (2011, December). Protecting Privacy from Aerial Surveillance: Recommendations for Government Use of Drone Aircraft. Retrieved from American Civil Liberties Union Web site: https://www.aclu.org/files/assets/protectingprivacyfromaerialsurveillance.pdf
Statistics Canada. (2014, July 23). *Police-reported crime statistic*, 2013. *The Daily.* Statistics Canada Catalogue no. 11-001-X. 1-8.

Tancredo, T. G. (2004, May 19) Congressional Record. US House of Representatives. 150(8), 10219-22.
Thatcher, C. (2013, June 23). The civil-military partnership: Integrating disruptive technology. *Vanguard Magazine*. Retrieved from http://vanguardcanada.com/the-civil-military-partnership-integrating-disruptive-technology/
Toews, V. (2011). Building Resilience Against Terrorism: Canada's Counter-Terrorism Strategy (Cat. No.: PS4-104/2011E-PDF). 1-38. Retrieved from Public Safety Canada Web site http://www.publicsafety.gc.ca/prg/ns/_fl/2012-cts-eng.pdf
Transport Canada. (2007, September). Unmanned Air Vehicle Working Group Final Report. 1-73. Retrieved from Transport Canada Web site http://www.tc.gc.ca/eng/civilaviation/standards/general-recavi-uavworkinggroup-2266.htm
Transport Canada. (2008, November 27). Staff Instruction (SI): The review and processing of an application for a Special Flight Operations Certificate for the Operation of an Unmanned Air Vehicle (UAV) System (No. 623-001). Retrieved from http://www.tc.gc.ca/eng/civilaviation/opssvs/managementservices-referencecentre-documents-600-623-001-972.htm
Transport Canada. (2010a, March 3). Terms of Reference: Unmanned Air Vehicle (UAV) Systems Program Design Working Group (RDIMS No. 5705889(E)). Retrieved from http://www.h-a-c.ca/UAV_Terms_of_Reference_2010.pdf
Transport Canada. (2010b, March 31). Canadian Aviation Regulation Advisory Council (CARAC) Notice. Retrieved from Transport Canada Website http://www.tc.gc.ca/eng/civilaviation/regserv/affairs-carac-more-100.htm
Transport Canada. (2010c, May 3). Unmanned Air Vehicle (UAV). Retrieved from Transport Canada Website https://www.tc.gc.ca/eng/civilaviation/standards/general-recavi-brochures-uav-2270.htm
Transport Canada. (2011a, April 13). Unmanned Aerial Vehicle – UAV. Retrieved from Transport Canada http://www.tc.gc.ca/eng/civilaviation/standards/general-recavi-uav-2265.htm
Transport Canada. (2011b, September 19). CARAC Technical Committee Working Groups Status Report. Retrieved from Access to Information (A-2012-00144).
Transport Canada. (2012a, March). UAV Systems Program Design Working Group Phase 1 Final Report (RDIMS No. 7355871). 1-30. Retrieved from http://www.h-a-c.ca/UAV_REPORT.pdf
Transport Canada. (2012b, March). UAV Systems Program Design Working Group: Phase 1 Regulatory Recommendations. Retrieved from Access to Information (A-2012-00144), 1-104.
Treasury Board. (2010, April 1). Directive on Privacy Impact Assessment. Retrieved from Treasury Board of Canada Secretariat Web site http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=18308&section=text
Treasury Board. (2012a, March). Reducing Delays in the Processing of Access to Information Requests. Report of the Access to Information Study Group. Retrieved from Treasury Board of Canada Secretariat Web site http://www.tbs-sct.gc.ca/atip-aiprp/tools/reduction/reduction01-eng.asp#toc16
Treasury Board. (2012b, June 14). Best Practices for Posting Summaries of Completed Access to Information Requests. Retrieved from Treasury Board of Canada Secretariat Web site

http://www.tbs-sct.gc.ca/atip-aiprp/tools/bppscair-pepsdaic-eng.asp
Treasury Board. (2014a, March 18). Access to Information. Retrieved from Treasury Board of Canada Secretariat Web site http://www.tbs-sct.gc.ca/atip-aiprp/tools/administration-application-eng.asp
Treasury Board. (2014b, June 6). Access to Information and Privacy Coordinators. Retrieved from Treasury Board of Canada Secretariat Web site http://www.tbs-sct.gc.ca/atip-aiprp/apps/coords/index-eng.asp
Tupper, LCol. (2010, February 3). JUSTAS Operational Capability Overview. Briefing Note for Minister of National Defence (MND). Retrieved from DND Access to Information (A-2011-00658).
UAS Vision. (2013, July 31). UAS Variable-Pitch Propeller Ready for Flight Testing. Retrieved from *UAV Vision* Web site http://www.uasvision.com/2013/07/31/uas-variable-pitch-propeller-ready-for-flight-testing/
UAS Vision. (2013, November 7). Brican Flight Systems Partners with National Research Council of Canada on Civilian UAS Programme. Retrieved from *UAV Vision* Web site http://www.uasvision.com/2013/11/07/brican-flight-systems-partners-with-national-research-council-of-canada-on-civilian-uas-programme/
Unmanned Systems Canada. (2012, September). Development of UAV Regulations: A Transport Canada – Unmanned Systems Canada Joint Program: An Update. Retrieved from USC https://www.unmannedsystems.ca/content.php?doc=193
Unmanned Systems Canada. (2013*a*, December). Small Unmanned Air Vehicle (UAV) Definitions and Best Practices. 1-32. Retrieved from USC https://www.unmannedsystems.ca/index.php
Unmanned Systems Canada. (2013b, July 30). Insuring the Canadian UAS Industry. Retrieved from USC http://www.unmannedsystems.ca/media.php?mid=3931
Unmanned Systems Canada. (2013c, April 17). History of UVS Canada. Retrieved from USC https://www.unmannedsystems.ca/content.php?doc=16
Unmanned Systems Canada. (2014, February). Unmanned Systems Canada Newsletter (Issue 1). Retrieved from USC Web site https://www.unmannedsystems.ca/media.php?mid=4247
US Coast Guard. (2013a, September 16). U.S., Canadian crews conduct joint law enforcement operation along shared border. News Release. Retrieved from 9th District Public Affairs USCG Web site http://www.uscgnews.com/go/doc/4007/1905117/U-S-Canadian-crews-conduct-joint-law-enforcement-operation-along-shared-border
US Coast Guard. (2013b, November 19). Written testimony of USCG Operations, Deputy for Operations Policy & Capabilities RADM William Lee for a House Committee on Homeland Security, Subcommittee on Border and Maritime Security hearing titled "What Does a Secure Maritime Border Look Like?" Retrieved from US Department of Homeland Security Web site http://www.dhs.gov/news/2013/11/19/written-testimony-us-coast-guard-house-homeland-security-subcommittee-border-and
US Coast Guard. (2014, April 29). Unmanned Aircraft System. Acquisition Directorate. Retrieved from http://www.uscg.mil/acquisition/uas/default.asp
Vacek, J. J. (2009). Big Brother Will Soon Be Watching - Or Will He? Constitutional, regulatory, and operational issues surrounding the use of unmanned aerial vehicles in law enforcement. *North Dakota Law Review*, 85(3), 673-692.
Vallance-Jones, F. (2014). National Freedom of Information Audit 2014. *Newspapers Canada*. Retrieved from http://www.newspaperscanada.ca/sites/default/files/FOI2014-FINAL.pdf

Van Blyenburgh, P. (2013, September 10). RPAS: The European Approach. Presentation, 54th Photogrammetry Week, Stuttgart Germany. Retrieved from http://www.ifp.uni-stuttgart.de/phowo/2013/presentations/140vanBlyenburgh.pdf

Vanguard. (2011, November 1). An Eagle Over Afghanistan: Unmanned aircraft opens new business model. Interview with Ian Glenn. Retrieved from *Vanguard Magazine* Web site http://vanguardcanada.com/an-eagle-over-afghanistan-unmanned-aircraft-opens-new-business-model/

Vanguard. (2012, May 1). From robotics to waste disposal: Innovative solutions. Retrieved from *Vanguard Magazine* Web site http://vanguardcanada.com/from-robotics-to-waste-disposal-innovative-solutions/

Vanguard. (2014, May 30). ING, Canadian Army operating ScanEagle over Maple Resolve. Retrieved from *Vanguard Magazine* http://vanguardcanada.com/ing-canadian-army-operating-scaneagle-over-maple-resolve/

Villasenor, J. (2013). Observations from Above: Unmanned Aircraft Systems and Privacy. *Harvard Journal of Law & Public Policy*, 36, 457.

Villasenor, J. (2014). "Drones" and the Future of Domestic Aviation. Proceedings of the IEEE 102(3), 235-8.

Wall, T. & Monahan, T. (2011, August). Surveillance and Violence from Afar: The politics of drones and liminal security-scapes. *Theoretical Criminology*, 15 (3), 239-254.

Watson, B. (2010, November). Unmanned Aerial Systems: Training & Operation," *FrontLine Defence Magazine.* 15-17.

Weigum, S. (2014, July 21). Drone earning their keep on the farm. *Alberta Farmer Express*. Retrieved from http://www.albertafarmexpress.ca/2014/07/21/drones-earning-their-keep-on-the-farm/

Welsh, Cap. K. (2010, Spring). Task Force Erebus: Providing essential support to Canada's Mission in Afghanistan. *The Canadian Air Force Journal*, 3(2). Retrieved from http://www.rcaf-arc.forces.gc.ca/v2/nr-sp/index-eng.asp?id=10640

Western Economic Diversification. (2011, December 14). Technological Innovation. Retrieved from Western Economic Diversification Canada Web site http://www.wd.gc.ca/eng/11239.asp

Western Economic Diversification. (2013a, March 13). Harper Government Supports Unmanned Systems Development in Southeast Alberta. Retrieved from Western Economic Diversification Canada Web site http://www.wd.gc.ca/eng/77_14512.asp

Western Economic Diversification. (2013b, November 14). Harper Government Supports the Growth of the Unmanned Vehicle Systems Industry. Retrieved from Western Economic Diversification Canada Web site http://www.wd.gc.ca/eng/77_14980.asp

White, P. (2009, February 18). US/Canada Border Increasingly Militarized: Unmanned drone prowls over the lonely prairie. *Globe and Mail*. Retrieved from https://www.commondreams.org/headline/2009/02/18-3

White, K. (2013, September 4). BTBObserver Q&A—Emily Gilbert, Pt. 1. Retrieved from Woodrow Wilson Center Web site http://beyondtheborderobserver.org/2013/09/04/qa-with-emily-gilbert/

Whittle, R. (2013, August 14). Don't Say 'DRONES,' Beg Drone Makers. *Breaking Defense*. Retrieved from http://breakingdefense.com/2013/08/dont-say-drones-beg-drone-makers/2/

Williams, A.J. (2011). Sharpening Boundaries/Blurring Borders: Analysing the Use of Military Technologies to Secure International Boundaries since 9/11. In D. Wastl-Walter (Ed.) *The Ashgate Research Companion to Border Studies* (pp. 283-298). Burlington, VT; Farnham, Surrey: Ashgate.

Willing, J. (2014, May 29). City of Ottawa investigates drone aircraft powers. *Ottawa Sun*. Retrieved from http://www.ottawasun.com/2014/05/29/city-of-ottawa-investigates-drone-aircraft-powers

Wilson, J. R. (2006). UAVs for Homeland Security. The Year in Homeland Security 2006-2007 edition. Web site. Retrieved on June 25, 2014 from http://www.mydigitalpublication.com/article/UAVs_for_Homeland_Security/38269/4155/article.html

Winner, L. (1980). Do artifacts have politics? *Daedalus*, 109(1), 121-136.

Wuennenberg, Maj. M. (2011, September 7). UAV Operations in Canadian Domestic Airspace. Briefing Note to DCAF. Retrieved from DND Access to Information (A-2012-00269); (A-2012-00014), 1-3.

Wuennenberg, Maj. M. (2012, January 12). Project JUSTAS/HALE UAS Backgrounder. Point form briefing note for MGEN Blanchette. Retrieved from DND Access to Information (A-2012-00270).

Wuennenberg, M. (2014) Website Profile. *LinkedIn*. Retrieved from http://ca.linkedin.com/pub/mark-wuennenberg/27/aa6/b3b