

The Personification of Political Ideologies within Drones

STS Research Paper
Presented to the Faculty of the
School of Engineering and Applied Science
University of Virginia

By

Ryan Remias

May 1, 2020

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

Signed: _____

Approved: _____ Date _____
Rider Foley, Department of Engineering and Society

Introduction

Thermal imaging cameras, advanced telecommunication technologies, and data collecting sensors are all found within the innovative framework of drones due to the driving desire to meet ever-evolving needs (Cavoukian, 2012). Drones allowed journalists to take aerial shots of Typhoon Haiyan and its aftermath in the Philippines (Jarvis, 2014). Ecologists use drones to gather data samples in difficult terrains with little disturbance to the ecosystem (Ivosevic et al., 2015). With an ever-growing number of enhancements, drones are rapidly growing in popularity, and society is finding new and intriguing ways to use them.

With this in mind, it is important to dive into the relationship between this technology and society. Just as society has determined the way drones have been modified, drones in turn have altered the way society lives and interacts with each other. In the military, drones embody a new age of warfare tactics used to subdue threats with merciless precision, gearing risk more towards machine than to troops (Franke, 2014). Mass production and delivery companies like Amazon revel at the opportunity for drones to deliver products at the doorsteps of customers, decreasing delivery times and increasing quality of life (Jarvis, 2014). Drones can even aid in protective surveillance for venues ranging from small playgrounds to large sporting events, increasing public safety (Lin, 2011).

While clearly promising many positive impacts, drone usage has several noticeable drawbacks that leave society questioning whether the technology should be accepted and if so, for what. Drones used for surveillance could lead to violations of citizens' rights and invasions of privacy, while drones in the military may represent an unnecessary and excessive use of force (Wilson, 2014). These negative drawbacks may tarnish how society perceives drones and possibly put at stake their ability to be used in the future (Franke, 2014).

Therefore, the benefits and drawbacks of drone usage needs to be understood to better explain the relationship between this technology and society. Doing so now is more critical than ever as drones appear to be evolving as rapidly as new uses for them appear. With this in mind, the following discussion and resulting research question on the relationship between drones and society aim to identify how drones have begun to embody the political ideologies of their users in how they are used to carry out goals. This evaluation will be completed by looking at its usage through four specific case studies: military weaponry, surveillance, commercialization, and scientific discovery. This discussion will shed light to several dilemmas that both drones and drone users face. Addressing these issues will show the intricate connection they have and how both influence the development of the other. Through this research, I will investigate the personification of different political ideologies within drones has in turn influenced its overall adoption within society. Thus, in order to preserve its usage in the future, any forms of misuse need to be identified and preventative measures against exploitation need to be put into place.

Case Context

Ann Cavoukian (2012), an expert on privacy-related technology dilemmas, explains that drones go by many names: unmanned aerial vehicles (UAVs), robot planes, pilotless aircraft, etc. With a ground control state and operator overseeing movements, a drone is capable of accomplishing almost any task that it is programmed for. Depending on the drone, these operators can be anyone from the most skilled team of drone pilots to the casual drone enthusiast. The ground control state can consist of the latest, cutting edge monitoring equipment or simply be a small, handheld device. When it comes to carrying out complex missions, drones have become extremely valuable. With the large amounts of research and development over the

past decade, this technology is now regarded as both a safer and cheaper alternative to manned technological aircraft. Without an onboard pilot, drones are able to take advantage of reduced weight that would come from having a cockpit. They can also sustain greater g-forces during flight, travel farther distances during a single flight session, and reach higher altitudes. Overall, with these boosted mechanics, drones are capable of taking on more complex or difficult tasks that normal manned aircrafts may not be able to complete with the same level of efficiency due to human constraints (Cavoukian, 2012).

Michael et. al (2010) states that there are many types of drones. The most common type of drone seen for recreational use are designed in a cross shape with four motors that turn propellers on each branch. Two internal controllers, the position and attitude controllers, aid in the overall motion of the drone. The position controller determines the translational motion in 3D-space, while the attitude controller determines orientation and the angle it travels. By computing a set of instructions or by controlling the drones manually, quadrotors utilize these two types of controllers to maintain stability and accurate paths of motion during the duration of the flight (Michael et. al, 2010). Cavoukian (2012) classifies these drones as mini-UAVs. With the growing usage of mini-UAVs for civilian and commercial purposes, steps have been taken to define and regulate the air space. In 2012, for example, the Obama administration re-authorized the Federal Aviation Administration (FAA) to be the primary determinant for regulations of these types of drones (Cavoukian, 2012). Hopkins (2017) lists several rules for noncommercial or recreational usage like the requirement to fly below an altitude of 400 feet or to not fly within five miles of an airport. Many places, like any national park or the airspace around Washington D.C., have been banned from usage altogether. In order to operate a drone, commercial drone users must obtain a remote pilot airman certificate and allow for the drone to be available for

FAA inspection upon request. These steps were put in place with the hope that risk of human danger or loss of aircraft would be significantly reduced. However, much of society has called for further regulation of drone usage as more incidents occur (Hopkins, 2017).

Unlike mini-UAVs, tactical UAVs are heavier and more robust drones that are used often for military applications (Cavoukian, 2012). The Predator drone, for example, is one such tactical UAV that can operate for over 40 hours and up to 3,000 kilometers away from the ground control state (Cavoukian, 2012). Equipped with image intensifiers and radar systems, this drone is capable of taking down targets with precision missiles and laser guided bombs (Hopkins, 2017). Strategic UAVs are the heaviest type of UAV with some reaching over 12,000 kilograms while reaching altitudes of 20 kilometers (Cavoukian, 2012). While some strategic UAVs are used for military purposes, many are used for geological data gathering and observation (Cavoukian, 2012). All in all, it is clear that there are many types of drones that serve many different purposes, and it appears that their development and usage are on the rise.

The Impact of Drone Usage in Society

With the evolution and advancement of drones over time, the relationship that this intricate technology has with the society around it needs to be further explored. Langdon Winner (1980), a renowned *Science, Technology, and Society* professor, examines different frameworks that focus on determining the relationship between technology and society. While many theorists believe that technology develops entirely on its own and ultimately shapes the society around it, others believe that technology has no part in its own growth and that the needs of society bring forth its development. Both arguments have their flaws but can be improved through their incorporation within the theory of *technological politics*. This theory argues that technology can

have an active role in society, so much that it begins to embody the political ideology of its user (Winner, 1980). In this instance, *politics* are not merely defined as governing nations but as “arrangements of power and authority in human associations as well as the activities that take place within those arrangements” (Winner, 1980, p.123). Winner (1980), notes that this theory is seen most effectively when technology and the political ideologies of its users seem to be strongly correlated. In these instances, users adopt the technology and develop it to meet their needs. In turn, new social conditions, in response to the technology, are created to maintain the environment of operation. While society impacts technology through its desire to meet its political agendas, technology impacts society through its inherent capabilities (Winner, 1980).

Drone usage in society is a great case that supports the framework of technological politics and how a technology can begin to embody the political ideologies of its user. In the United States military, drone strikes in foreign countries effectively subdue terrorists with little risk to troops (Franke, 2014). With names like Global Hawk, Predator, and Reaper, drones now symbolize the future of modern warfare tactics (Franke, 2014). Commercially, drones can be used by companies like Amazon to reduce delivery time and improve efficiency through data and analytics (Jarvis, 2014).



Photo 1. NATO (2019). NATO’s first RQ-4D Alliance Ground Surveillance drone, a Global Hawk derivative, arrives at Sigonella Air Station in Sicily, Italy, in November 2019 [Online photograph].

Thus, drones embody the movements towards automation (Jarvis, 2014). Ivošević et. al (2015) note that in the realm of

science, drones have begun to embody the possibility of advanced exploration. They detail how they used drones to traverse complex landscapes, identify endangered species, and take samples with little impact on the ecosystem. In doing so, they offer one use ecologists and researchers can have for drones and leave it up to the imagination of the reader to think of all the infinite possibilities that drones can be used for in the future (Ivosevic et. al, 2015). Clearly, there is an ever-expanding development of how drones can be used in today's society.

However, there are drawbacks to drone usage, and they are serious causes of concern. Whetham (2013) notes that in the military, there is a moral disconnection when drones are used for targeting militants. The physical distance between the hunter and the hunted creates an emotional distance from enemies, dehumanizing them to mere targets. In addition, while drones significantly decrease the chance of endangering US troops, this emotional disconnection may lead to post-traumatic stress disorder within the operator after consistent strikes on targets are carried out through a high-resolution screen. In addition, opposing armed defenses, facing these faceless assassins and knowing they are outmatched, might be further inclined to retaliate through other means such as fighting local governments or targeting civilians. It is clear that if not addressed, drones will become less of a resemblance of modern warfare tactics and more an unnecessary form of brutality (Whetham, 2013). Commercially, with all the potential risks to public safety, there is concern on how these vehicles will fill the airspace around us as well as how the rights to privacy will be preserved (Wilson, 2014). Clearly, there are both positives and negatives that comes with the rise of drone usage. These examples show the necessity of discussing the moral repercussions of drones and confirm that their adoption is heavily reliant upon accurately representing how they are used to carry out objectives.

Research Question and Methods

With the growing popularity of drones in society creating more unique ways in deploying them, the relationship between the two must be analyzed further. Using this description of the way drones can embody the political ideologies of its users, the research question I will address is: How do the political ideologies that drones personify influence adoption as seen through their usage in public surveillance, military, commercialization, and sciences? Through answering this question, misperceptions of drones can be addressed more directly so that their usage in the future can be secured.

This question will be addressed through four case studies:

- its usage as a means of surveillance
- its integration into the military
- its establishment within commercial automation
- its development within scientific exploration

For each specific case, I will conduct a content analysis on key factors that influence drone acceptance in society. This analysis will be done through an extensive literature review of journal articles, relevant reports, and documented accounts of drone usage. On top of discussing whose political ideologies are promoted, this analysis will also show who benefits from this technology and who can be hurt by it. Several articles including those published by the *Institute of Electrical and Electronics Engineers (IEEE)*, *The Atlantic*, and the *Journal of Ecology and Environment* highlight not only the different ways drones are used, but also their societal implications, including how power and political influence will be extended using drones in different context.

Results

The way drones take on the political ideologies of their users directly influences their overall acceptance within society. As a means of surveillance, drones have the power to protect citizens from harm but in doing so, may violate rights to privacy (Cavoukian, 2012). Within the military, drones can accomplish short-term goals like targeted missile strikes but put in jeopardy long-term goals such as the war on terrorism and its global acceptance as a military weapon (Kennedy, 2013). As a feature in commercial automation, drones improve quality of life through speed and innovation, but in doing so, they can displace workers in the industry or negatively impact consumers (Hopkins, 2017). Within scientific exploration, drones aid tremendously in data collection, but with potential threats of hurting ecosystems, their usage has been questioned or even restricted (Coops et. al, 2019). Thus, while drones have shown to be beneficial in each of these four areas, steps need to be taken to address their drawbacks if overall acceptance is to take place. The following paragraphs expand upon these results and discuss not only the relationship between drones and society, but also how public adoption of drones can be achieved.

Drones have many uses when it comes to reporting and surveillance. From hurricanes to car chases, journalists and reporters can utilize drones to gain high-resolution aerial views without significant cost or with an operator onboard (Jarvis, 2014). Takahashi (2012) notes that, in addition, drones can help officers when it comes to policing. Given its ability to view from above, officers could acquire evidence and retrieve information without ever having to step on someone's premises. That being said, interpretations of the Fourth Amendment have been put into place to limit drone surveillance and prevent misuse. Drone usage, for example, as a method of policing must be accompanied by a warrant (Takahashi, 2012).

Still, further actions need to be put into place as drones have the capability of violating rights to privacy. Cavoukian (2012) discusses this by bringing forward the concept of the Panopticon prison. Equipped with a multitude of cameras, the prison allows security officers to monitor all aspects of prisoners'



Photo 2. Seelie (2017). The interior of one of the prison buildings [Online photograph].

lives. While there is no opportunity for escape, all human rights to privacy are relinquished (Cavoukian, 2012). An image of one of these prisons built based on the Panopticon prison is shown to the right here. Cavoukian (2012) notes that drones have the potential to embody this concept of the Panopticon prison. While increasing safety through surveillance, drones left unchecked can violate the basic rights to privacy. Steps may even need to be taken to proactively change the design of drones, whether it be through encrypting the view of private objects or distorting the faces of citizens (Cavoukian, 2012). Through this, the political ideologies of government officials who want to protect their citizens and prevent crime will be bolstered. However, while citizens have the most to gain through increased security, they have the most to lose due to the potential of loss of privacy (Cavoukian, 2012). Therefore, in order to gain drone acceptance within society, these government bodies must answer the tough questions with regards to how to protect a citizen's right to privacy and make transparent the purpose and intentions behind drone usage.

When it comes to the military, drones are the forefront of a new age of warfare tactics. Lin (2011) notes how drones can not only be used to do dull or extensive work such as reconnaissance or border patrolling, but also have the capability of taking on dangerous jobs such as clearing explosive devices or



Photo 3. U.S. Air Force (2015). MQ-9 Reaper [Online photograph].

taking down targets. This can all be done without risking the lives of troops. Arguments can even be made that drones do the job better, as they possess the ability to lock-on to targets without the pressures of anxiety, fatigue, or stress. However, behind every drone is a drone operator, and the world that drones operate in is filled with humans that are directly impacted by what they do (Lin, 2011). Franke (2014) discusses several negative factors that influence the adoption of drones. With terrifying attack drones like the MQ-9 Reaper, many see drones as faceless machines capable of killing without mercy. In countries like Pakistan, many citizens witness these strikes in the very cities they live in, and without clarification from either the United States or Pakistani government, misrepresentations of the purpose and power of drones abound within the societies of both countries (Franke, 2014). Thus, while accomplishing short-term goals such as tactical strikes, these actions challenge long-term goals such as the war on terrorism and global acceptance (Kennedy, 2013).

Several political considerations on the impact of drones on operators and in international relations need to be addressed in order to gain acceptance (Kennedy, 2013). Operators may eventually feel detached from strikes when killing from a distance (Lin, 2011). Seeing targets as

simply objects rather than human lives, operators may eventually develop post-traumatic stress disorder (Lin, 2011). In addition, strikes may violate international law due to significant collateral damage (Whetham, 2013). Since 2004, 32% of all those killed by drone attacks were unarmed civilians (Whetham, 2013).

Thus, the political ideologies of developed countries with technologically-advanced militaries are benefited the most by the introduction of this technology as they are the most able to exploit it. Not only are they able to bolster defenses to better protect citizens, they are also able to keep troops out of harm's way (Lin, 2011). However, drones can endanger not only the safety of other nations, but also the very people using them (Whetham, 2013). In order to accomplish both short and long-term goals of military drones, these specific military entities have the global responsibility to address the efficacy of drones and further regulate them if needed.

With regards to commercial automation, drones have become more desirable in their ability to deliver goods. This is primarily seen in Amazon Prime Air, a concept where drones would be utilized to deliver products in 30 minutes or less (Wilson, 2014). If proven to be successful, this could be translated to other delivery companies like GrubHub or DoorDash. Thus, as this technology develops, it will vastly improve quality of life in an era that increasingly demands for speed and convenience. However, there are many drawbacks that will in turn impact how drones are received. There are several questions of whether packages might get damaged in transit or if increased air traffic poses a threat to civilians (Hopkins, 2017). In addition, there is concern that this technology displaces delivery drivers and other transportation workers in favor of tech-savvy drone operators (Hopkins, 2017). Thus, it appears that large commercial and transportation firms would have their political ideologies bolstered the most as they can cut costs

while appeasing their customers. However, there are drawbacks, and growing concern may in turn limit how drones are regulated and developed.

In the realm of scientific exploration, drones have created opportunities for researchers to explore vast, uninhabited regions of the world. On top of its ability to collect and store samples, drones can take high-resolution images of wildlife animals and immediately analyze health, population size, and overall well-being (Ivosevic et. al, 2015). Coops et. al (2019) explains that

with improved control and collision avoidance systems, drones can take more sophisticated flights to gather data. Not only do these developments improve the way scientists conduct research, it also reduces overall costs and increases productivity. However, with all of these possibilities,



Photo 4. Doctorow (2019). No drones sign, Joshua Tree National Park, California, USA [Online photograph].

drone misuse threatens its ability to be used in the future for scientific research. Drones used improperly have shown to quadruple the heart rate of wildlife animals or even scatter herds leaving young separated from their parents. Drones have even been banned from all United States National Parks in order to protect the natural ecosystems (Coops et. al, 2019). Clearly, as drones have advanced, the political ideologies of scientists and researchers have been boosted as they are able to collect data in ways never done before. However, society has questioned their usage in natural environments and called for a need to further regulation. If these scientific

entities do not take the proactive measures necessary to address rising concern of drone usage, the banning of this technology will expand further than merely within national parks.

Discussion

Looking at drones through the lens of technological politics, these cases show how drones and society influence each other. By taking on the political agendas of their users to help accomplish tasks, drones exert power on different members of society. In turn, society responds to the presence of drones, considers the positive and negative aspects, and both regulates and modifies the technology. While these four instances highlight this intricate relationship, it is not limited to just these cases. In 2014, for example, a drone flew a map of several territories in the Greater Albania area over a soccer match between rival nations Albania and Serbia (Payne, 2014). With tensions high already over border controls of the region, riots took place and the game was cancelled (Payne, 2014). Therefore, the versatility of drones allows them, for better or for worse, to be used in many different ways, ultimately triggering societal response.

Clearly, drones are being used in several different ways, and one of the main limitations for this paper is having to choose only a few noticeable cases. Other limitations though stem from the relative infancy of the relationship between drones and society. Amazon Prime Air, for example, is only a concept that has been theorized. The essence, then, of my research question emphasizes both on how *will* drones' impact on society influence its adoption and on how *did* they do so. More time needs to be given to the question because the impact and view of drones will change as society regulates and responds to them. Therefore, an important caveat to make is that current results discussed within this paper may change as drones and society respond and adapt to the influence on each other.

Given these limitations, in the future I would want to survey the general public to get an accurate gauge on how society views drones in the four different cases. It would be interesting to see whether society accepts drones used in particular contexts as opposed to others. In addition, it would be useful to interview leading proponents for drones in the different cases to understand their reasoning for using them in their particular fields. I would also like to explore other contexts in which drones are being used in and understand how drones and the society around them impact each other.

One final opportunity I would like to take later on would be to conduct an ethical analysis on drones in society. One approach would be through using the lens of *utilitarianism* which focuses on the action which results in the most good for the most people (Driver, 2014). While this would be an interesting approach, I believe there is a better approach that looks at the design practices of these drones. Marc Steen (2015), discusses design practices like participatory design which focuses on how the users of the technology place an important role in its design and modification. This type of design works in conjunction with *virtue ethics* in how it looks at the defining characteristics of a user and how the designed technology manifests them (Steen, 2015). In the future, I would want to look at these different cases, examine each user group's defining virtues under the framework of *virtue ethics*, and determine the ethical validity of using drones within each field. It may very well be the case that the answer of how ethical drones are may vary depending on which case and which user groups one looks at.

Nonetheless, this research has proven to be considerably valuable as I advance my engineering career. My plans are to pursue a career in defense consulting, and I am excited knowing that I will enter my future career knowing about a technology of great value for the military and how it impacts societies both in the United States and abroad. I feel like I could be a

valuable resource in discussing specific ethical dilemmas to aid in its overall acceptance as a defense technology.

Conclusion

Therefore, with society finding new and exciting uses for this technology, drones have begun to personify the many different political agendas of its users. In doing so, a relationship between technology and society is being formed. As seen in each case, particular user groups will have their political ideologies bolstered significantly by utilizing the technology further. However, if left unchecked, these entities may exploit or mishandle it. Therefore, it is of utmost importance to ensure that this relationship becomes more defined, either through theoretical analysis, regulation, or modification. Next steps for others are to understand the misperceptions of drones in society and determine where drones are being handled poorly. Through this, public acceptance can be secured and misuse can be mitigated. All in all, drones are a highly valuable, versatile, and innovative technology, and in order to secure its usage in the future, the growing relationship it has with society needs to be understood and appreciated.

References

- Cavoukian, A. (2012). *Privacy and Drones: Unmanned Aerial Vehicles*. Ontario, Canada: Information and Privacy Commissioner.
- Coops, N.C., Goodbody, T. R. H., & Cao L. (2019). Four steps to extend drone use in research. *Nature*, 572(7770), 433-435.
- Doctorow, C. (2019). *No drones sign, Joshua Tree National Park, California, USA*. photograph. Retrieved from <https://flickr.com/photos/doctorow/47994799302/in/photostream/>
- Driver, J. (2014). The History of Utilitarianism. Retrieved March 28, 2020, from <https://plato.stanford.edu/entries/utilitarianism-history/>
- Franke, U. (2014). Drones, Drone Strikes, and US Policy: The Politics of Unmanned Aerial Vehicles. *Parameters*, 44(1), 121-130.
- Hopkins, A. (2017). The Ethical Debate on Drones. *Augustana Digital Commons*, 1-17. Retrieved from <http://digitalcommons.augustana.edu/ethicscontest/9>
- Ivosevic, B., Han, Y., Cho, Y. and Kwon, O. (2015). The use of conservation drones in ecology and wildlife research. *Journal of Ecology and Environment*, 38(1), 113-118.
- Jarvis, J. (2014). The Ethical Debate of Drone Journalism: Flying into the Future of Reporting. *Research Papers*, 1-37. Retrieved from http://opensiuc.lib.siu.edu/g_s_rp/475
- Kennedy, G. (2013). Drones: Legitimacy and Anti-Americanism. *Parameters*, 43(1), 25-28.
- Lin, P. (2011). Drone-Ethics Briefing: What a Leading Robot Expert Told the CIA. *The Atlantic*. Retrieved from <https://www.theatlantic.com/technology/archive/2011/12/drone-ethics-briefing-what-a-leading-robot-expert-told-the-cia/250060/>
- Michael, N., Mellinger, D., Lindsey, Q. and Kumar, V. (2010). The GRASP Multiple Micro-UAV Test Bed. *IEEE Robotics & Automation Magazine*, 17(3), 56-65.

- NATO. (2019). *NATO's first RQ-4D Alliance Ground Surveillance drone, a Global Hawk derivative, arrives at Sigonella Air Station in Sicily, Italy, in November 2019.* photograph. Retrieved from <https://www.defensenews.com/smr/nato-2020-defined/2019/12/22/new-nato-surveillance-drones-bet-on-italian-safety-ruling/>
- Payne, M. (2014, October 14). UPDATED: Drone toting pro-Albanian flag causes riots that end Albania vs. Serbia Euro 2016 qualifier early. *Washington Post*. Retrieved from <https://www.washingtonpost.com/news/early-lead/wp/2014/10/14/drone-toting-albanian-national-flag-causes-riots-that-end-albania-vs-serbia-euro-2016-qualifying-match-early/?arc404=true>
- Seelie, T. (2017). *The interior of one of the prison buildings.* photograph. Retrieved from <https://www.atlasobscura.com/articles/panopticon-prison-cuba>
- Steen, M. (2015). Upon Opening the Black Box and Finding It Full: Exploring the Ethics in Design Practice. *Science, Technology, & Human Values*, 40(3), 389–420.
- Takahashi, T. (2012). Drones and Privacy. *The Columbia Science & Technology Law Review*, XIV, pp.74-112.
- U.S. Air Force. (2015). *MQ-9 Reaper.* photograph. Retrieved from <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/104470/mq-9-reaper/>
- Whetham, D. (2013). Killer Drones. *The RUSI Journal*, 158(3), 22-32.
- Wilson, R. (2014). Ethical Issues with Use of Drone Aircraft. In *2014 IEEE International Symposium on Ethics in Science, Technology and Engineering*. Chicago, Illinois: IEEE.
- Winner, L. (1980). Do Artifacts Have Politics?. *Daedalus*, 109(1), 121-136.