Conversations Surrounding Lethal Autonomous Weapons

A Research Paper submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

Abigail Levine

Spring 2022

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

Abigail Levine

Advisor

S. Travis Elliott, Department of Engineering and Society

Abstract

As technology advances, one of the topics that is brought up most is autonomy. Autonomy is found in many different fields, most notably self-driving vehicles. While self-driving vehicles are the most well-known implementation of autonomy, another large contributor is weapons. Lethal autonomous weapons systems (LAWS) have been a major topic of conversation and controversy regarding the use of autonomous technology. Some weapons systems now apply artificial intelligence (AI) to "replicate the human decision-making process …, outside the confines of a script" (Bills, 2015). One of the main concerns is, and always will be, the effect that this recent technology has on the lives of humans.

Distinct groups have their own opinions on how the development of LAWS should be managed, some opting for a preemptive ban on such weapons and others taking a more lenient approach. Through the Social Construction of Technology (SCOT) framework, the effect human involvement has on weapons development can be analyzed. This framework broadly states that human action affects technological development. The main factors of consideration in the framework are interpretive flexibility, relevant social groups, closure and stabilization, and wider context. By looking at social groups affected by the development of LAWS and the controversies surrounding them, we can analyze the way LAWS get created.

Introduction of Social Construction of Technology

The two main frameworks that are considered when trying to understand the relationship between humans and technology are social construction of technology and technological determinism (TD). As stated before, social construction of technology (SCOT) is the general

idea that humans influence technology. More specifically, SCOT regards technology as an effect of human involvement and "suggests that humans create and control technology to achieve practical ends" (Giotta, 2017). In contrast, TD regards technology as the cause of change in humans and their environment (Giotta, 2017).

SCOT has four main components: interpretive flexibility, relevant social groups, closure and stabilization, and wider context. Interpretive flexibility suggests that the outcomes of a technological development process will change depending on the environment it is developed in. Relevant social groups implies that all members of a certain group share certain ideals and based on these ideals will guide the design of technology. Closure and stabilization occur when all the relevant social groups previously defined have compromised on the design based on their different ideals and all parties finish satisfied, thus stopping any further changes to the design. Finally, wider context is the environment in which the technology is being developed, and the background of the project, including each social group and the relationship between social groups (Klein & Kleinman, 2002).

Unlike SCOT, TD suggests that society has been influenced by the technology they have created instead of the other way around. The idea is that a group of people will make new developments, and only after this happens will the society react and change to this creation. While an argument could be made that the effect of LAWS on societies was cause for change and thus supported by TD, SCOT is a more thorough description of the relationship between the development of LAWS and societal change. As LAWS came into the scope of development, previously established societies and social groups made decisions about how this technology should proceed, supporting the idea that humans influenced technology.

Links Between SCOT and LAWS

SCOT is a relevant framework because of the human involvement with LAWS. In many cases, weapons manufacturing is driven by war and the need for each country to be able to protect itself. Not only do humans propagate the production of weapons, but when weapons are created that have the potential to cause unnecessary harm, humans also place restrictions on this development.

Many conferences have been held to address the topic of weapons negotiations, the most relevant one being the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (Convention on Certain Conventional Weapons – CCW). The CCW, whose first meeting concluded in 1980, was held to decide the future of conventional weapons versus weapons of mass destruction. This convention had many productive outcomes, one of which is the signatories continuously meeting "at regular intervals to discuss further development of the law" (Carvin, 2017). In these conventions, the people and countries involved have a direct effect on how development of the considered weapons will proceed.

In 2014, LAWS became the weapon of consideration where different social groups debated about the budding topic. At this point, the conversation regarding autonomous weapons had just begun. The considerations during the CCW focused on how development of LAWS should be allowed to proceed, whether it be a preemptive ban "because such technology would bring about the third revolution in warfare," development restrictions with varying levels of rigidity, or no early regulation at all (Akimoto, 2019). The decisions made at this conference and conferences such as these, determine if and how LAWS are created, meaning human decision has a direct effect on such advancements.

Discussion Regarding LAWS and Ethical Concerns

Responsibility for damage

In warzones, the goal is to engage with enemy forces while also avoiding civilian populations. Responsibility for damage is a concern frequently brought up because, with LAWS being unmanned weapons, the technology is "pulling the trigger" instead of humans. In cases where technology does fail and damage does occur, be it laws being broken or noncombatants being hurt or killed, there must be accountability to ensure damage does not happen again.

For LAWS, blame can be put multiple places, one being the engineer(s) that created the weapon and another being the weapon itself. When looking at the ethics of these choices, choosing to place regulations on the technology at fault is more ethical than firing the personnel working on the project. Having this foresight, placing preemptive regulations on LAWS offers an ethical solution to a problem before it occurs.

Complying with laws of armed conflict

Another factor of consideration with the development of LAWS is the compliance with regulations that are already in place (Callender, 2017). Previous conventions, like the CCW, have already set a code of conduct regarding certain conventional weapons. Based on this precedent, LAWS should not be considered any differently.

The regulations were put in place to ensure that these weapons would not be causing unnecessary damage. Therefore, awarding LAWS any more leniency than other weapons implies that damage cause by LAWS is more necessary. The unnecessary damage being referred to is harm to noncombatants, so holding LAWS to a different standard would put civilian lives in danger, making this unethical.

Meeting the standards of "meaningful human control"

Meaningful human control can be defined as a weapons system that can "respond to ... the relevant moral reasons of the humans designing and deploying the system and the relevant facts in the environment in which the system operates," and its decisions are "traceable to a proper technical and moral understanding" (Verdriesen et al., 2020). Due to the technology getting rid of human involvement, the technology is anticipated to be at least as proficient as humans when doing its job.

The problem arises when the technology is not sophisticated enough to accomplish its goal and makes errors that end in death or destruction. By requiring LAWS to follow the guideline of being under meaningful human control, a regulation is being set to ensure that a weapon lacking the same moral reasoning as humans will not be used to complete a human task in an environment where human lives are at stake. This essentially means that if a weapons system cannot be classified as "under meaningful human control," it cannot be deployed, and the weapon will require human involvement instead of being autonomous.

Increasing the technology gap

As with all technology, when wealthy countries create technological advancements that poorer countries cannot afford or create themselves, the technology gap increases. Less wealthy countries have expressed many concerns regarding the introduction of LAWS (Mohanty, 2016). As weapons technology advances, all countries, including developing countries, feel pressure to protect themselves, which means buying or developing technology that provides such protection. This process has a much more significant impact on countries that do not have the means or the wealth to acquire this technology. Poorer countries must either allocate a larger percentage of

their wealth to the weapons industry, taking away money from other necessities, or they risk falling behind, leaving them insecure and vulnerable (Kim, 1984). While this predicament is not unique to the weapons industry, it is a factor to consider when proposing regulations regarding LAWS.

Degradation of the human psyche from war

One argument that supports the development of LAWS is the toll that war takes on the people directly involved with battle. Posttraumatic stress disorder (PTSD) is one of the may diagnoses given to soldiers after returning home from war. The significant psychological damage that soldiers sustain from warzones can cause ongoing problems for the rest of their lives. PTSD and many other forms of trauma that are experienced are a product of being in environments of extreme stress (Tyre, 2004). The use of autonomous weapons would allow for soldiers to be removed from the middle of these stressful environments, thus saving soldiers from the experience of war.

Analysis Using Social Construction of Technology

Interpretive flexibility

Interpretive flexibility suggests that the outcome of a situation could drastically change if placed in a different environment (Klein & Kleinman, 2002). When discussing the future for the development of LAWS, if the decision was being made by a group that valued only one of the concerns discussed above, the ruling would very likely fit the ideals of only that value. For example, if a group only valued the mental health of their soldiers, the outcome would probably align with the last point of consideration and there would be a push to create weapons systems

that allowed for soldiers to be removed from battles. However, if the group was a poor country who was only concerned with decreasing the technology gap in the weapons industry, they might opt for regulations to contain the production of LAWS.

As more factors of consideration, such as the ideals of another social group, get added to a decision-making process, there are more concerns that need to be accommodated. The product that gets created is then a conglomeration of the different ideals of each social group that was being considered (Klein & Kleinman, 2002). In the case of LAWS, the entire world is affected by the development of weapons, which makes negotiations incredibly difficult. Each country has a different type of government and different ideals that must be considered. This makes topic of warfare one of the hardest to debate and one of the reasons a consensus is hard to come by.

Often, when an agreement cannot be made, the conversation turns to defining the system that is being debated. Moving forward, the convention will conduct a "legal review of the weapons systems" that includes the United States working on a "document setting forth the 'best practices' for conducting a comprehensive weapons review" (Meier, 2016). The paper is comprised from questions that have been raised by different parties during the convention, showing that decisions regarding LAWS can be considered a collective opinion, instead of the opinion of just one group.

Relevant social groups

In terms of war and the weapons industry, the most notable social groups are the different governments involved. Each government has a different set of values that contributes to the manufacturing of weapons, and these values affect the laws of armed conflict that have been and will be created. On a smaller scale, there are specific groups that are affected by LAWS,

such as weapons manufacturers. Their goal in the industry is to make money, so by restricting the manufacturing of weapons, their profit would decrease.

The Women's International League for Peace and Freedom (WILPF) is a social group that believes LAWS are a threat to national security and publicly demands to ban them (ADR Daily, 2019). The Campaign to Stop Killer Robots pushes for policies that favor meaningful human control when referring to LAWS (Lawry, 2015). Other groups such as the Heritage Foundation argues that, instead of a ban, LAWS should be required to comply with the laws of armed conflict (Callender, 2017).

Each of the groups involved have suggestions with varying levels of regulations, some taking a stricter approach and others a more lenient one. Regulation regarding LAWS is a unique issue in terms of social groups due to its main purpose: being used in warzones. The world is affected by war meaning the development of weapons to be used in war is a large-scale issue.

Closure and stabilization

While technically not having reached closure and stabilization yet, as described in the interpretive flexibility section, there have been smaller decisions made in the process. In 2019, the final report states that "international humanitarian law applies fully to autonomous weapons and that 'human responsibility for decisions on the use of weapons systems must be retained'" (LeGrone, 2019).

The closure and stabilization of weapons is more complicated than for other types of technologies. At the CCW in 1980, the decisions made consisted of banning a weapon that did not yet exist and regulating, rather than outlawing, other weapons (Carvin, 2017). The same outcome is not unlikely for LAWS.

Wider context

Global debates over war and the weapons industry have been prevalent for many years. The political climates in the differing countries at the time of these debates contributed to the decisions made about the technology being created then. Much of the time, smaller or poorer countries had less of an impact on the decisions that were made. The larger, wealthier countries had more influence in the matters.

Conclusion

Lethal autonomous weapons systems, like any other highly impactful weapon being created, has led to much debate and disagreement. There are many different factors that need to be considered when determining regulations for weapons of war such as the impact on humans and societies and their compliance with definitions and laws that have been widely agreed upon. Based on a country's values and power, they have an opinion on the regulations that should be put in place regarding LAWS. Human involvement and opinions drive these debates and, although the decision is ongoing, will eventually decide the fate of LAWS, as it did many other weapons systems.

References

ADR Daily. (2019, January 8). *WILPF to petition Parliament against Killer Robots*. ADRDAILY.com. https://adrdaily.com/wilpf-to-petition-parliament-against-killer-robots/.

Akimoto, D. (2019). International regulation of "lethal autonomous weapons systems" (LAWS): Paradigms of policy debate in Japan. *Asian Journal of Peacebuilding, 7*(2), 311–332.

Bills, G. (2015). LAWS unto Themselves: Controlling the Development and Use of Lethal Autonomous Weapons Systems. *EBSCOHost*.

Callender, T. (2017, November). *Why the effort to ban "Killer robots" in warfare is misguided*. The Heritage Foundation. https://www.heritage.org/defense/commentary/why-the-effort-ban-killer-robots-warfare-misguided.

Carvin, S. (2017). The 1980 Convention on Certain Conventional Weapons and the Politics of Legal Restraints on Weapons during the Cold War. *Journal of Cold War Studies, 19(1),* 38-69. https://doi.org/10.1162/JCWS_a_00717.

Giotta, G. (2017, May). Teaching technological determinism and social construction of technology using everyday objects. *Communication Teacher, 32(3),* 136-140. https://doi.org/10.1080/17404622.2017.1372589.

Kim, G. (1984, November). The Arms Race and Its Consequences for Developing Countries. *Asian Survey, 24(11),* 1099-1107. https://www.jstor.org/stable/2644144

Klein, H. K., & Kleinman, D. L. (2002). The Social Construction of Technology: Structural Considerations. *Science, Technology, & Human Values, 27(1),* 28-52. https://www.jstor.org/stable/690274.

Lawry, M. (2015). *Killer robots are closer than you think! Thomas Nash: Campaign to stop killer robots*. The Terrestrial.

LeGrone, O. (2019, December). Decision on Autonomous Weapons Talks Eludes CCW. *Arms Control Today, 49(10),* 33.

Meier, M. W. (2016). Lethal Autonomous Weapons Systems (LAWS): Conducting a Comprehensive Weapons Review. *Temple International & Comparative Law Journal, 30(1),* 119-132.

Mohanty, B. (2016, May). *Command and Ctrl: India's place in the lethal autonomous ...* ORF Issue Brief. https://www.orfonline.org/wp-content/uploads/2016/05/ORF_Issue_Brief_143_Mohanty.pdf.

Tyre, P. (2004, December). Battling the Effects of War. *Associates Programs Source, 144(23).*

Verdiesen, I., Santoni de Sio, F., Dignum, V. (2020, August 1). *Accountability and Control Over Autonomous Weapon Systems: A Framework for Comprehensive Human Oversight.* Springer.