OUTLOOK ON LETHAL AUTONOMOUS WEAPON SYSTEMS AND THEIR PROBABLE FUTURE

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Abstract: New world issues arise with the advancement in technology and especially artificial intelligence. AI allows the existence of weapons that could decide using pre-programmed parameters to neutralize personnel without the need of communication or human input. An increasing amount of countries start to develop such weapons, so for better or worse, we are entering in a new era of modern warfare. As the new peril starts to creep in, the world enters into a disagreement in regard to what regulations should be applied. Despite there being a hefty amount of adversaries who endorse a complete ban on the technology, nothing can stop the great powers from competing in the development of lethal autonomous weapons. What should the governments do in order to escape an imminent danger?

Keywords: lethal, autonomous, system, killer, robot, artificial intelligence, AI

Introduction

Lethal autonomous weapon systems (AWS) are weapon systems that can identify, select and engage a target without meaningful human control [10]. This includes the enemy, its armament or military equipment. AWS are also known by the grim name, "robot killers".

There are various kinds of weapons with different degrees of autonomy that allow certain actions to be automated, thus performed without human intervention. Semi-autonomous weapons include so-called "fire and forget" weapons, such as certain types of guided missiles that deliver effects to human-identified targets using autonomous functions [10]. The oldest automatically triggered lethal weapon is the land mine, used since at least the 1600s, and naval mines, used since at least the 1700s [8]. Semi-autonomous armament comprises of heat-guided missiles, anti-missile systems, and others.

The difference between these systems and the fully autonomous system is that it can be implemented without an established communication network and will respond independently to the changing environment and decide how to achieve its pre-programmed goals [5].

For instance, the so-called kamikaze drones. These are drones that circle in the air and if necessary, self-destruct for a specific purpose.

Lethal autonomous weapon systems could shape up the outlook of modern warfare. The movies we watched when we were children could become a reality.

1. World policy-map regarding AWS

At present, fully autonomous weapons systems occupy a small part of the armaments in armies around the world. Semi-automatic or remote-controlled systems are mainly used, which require a person to pull the trigger. According to Bulgaria and other governments "one must make the final decision to take the life of another human being", because "such a moral decision cannot be delegated to an autonomous weapons system." But if we look at the world map, the countries that support the spread of technology mainly include the world's leading powers. USA, Russia, China, England, Israel, South Korea and others. It is these countries that are developing automatic weapon systems and stand against prohibi-

tion. The Russian Federation is actively developing artificial intelligence missiles, drones, unmanned vehicles, military robots and medical robots. The fire control system of the next-generation Russian T-14 tank, based on the Armata universal heavy-crawler platform, will be capable of autonomously detecting targets and bombarding them until they are completely suppressed or destroyed [13]. Russia is also simultaneously working on a family of tracked robots that will be able to participate in combat with human soldiers [13]. Israeli Minister Ayoob Kara stated in 2017 that Israel is developing military robots, including ones as small as flies [14].

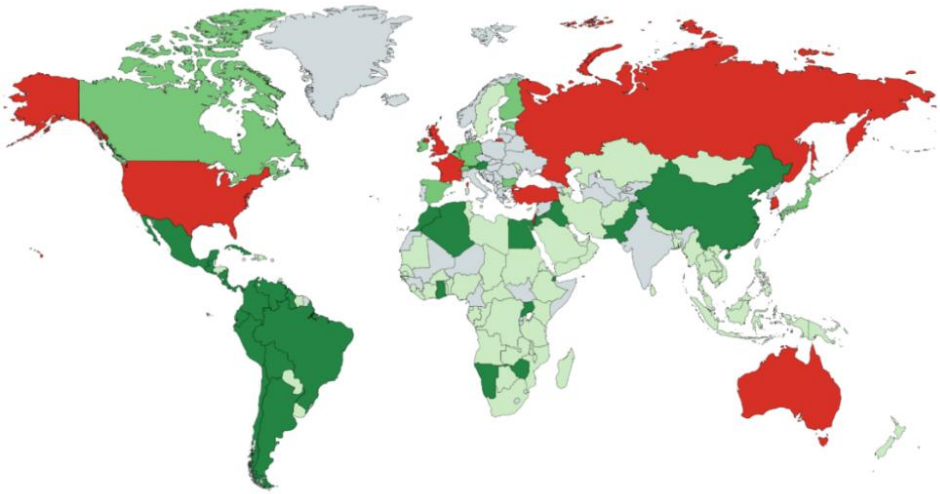

Figure 1: World AWS policy map. Red – Against regulation or ban on lethal AWS. Grey – Voted in favor of TPNW. Green – support, regulate or maintain human control over AWS. Dark Green – support legally binding ban treaty on lethal AWS [5].

Meanwhile, China's People's Liberation Army anticipates that AI could fundamentally change the character of warfare even as it fears the emergence of a generational gap between its capabilities and that of the U.S. military. It thus seeks to develop AI and other "strategic front-line" technologies in future military competition with the United States [7]. In October 2018, Zeng Yi, a senior executive at the Chinese defense firm Norinco, gave a speech in which he said that "In future battlegrounds, there will be no people fighting", and that the use of lethal autonomous weapons in warfare is "inevitable" [1].

South Korea has long been in favor of autonomous technology. In the midst of 1997, the country ordered the Israel Aerospace Industry Harpy-100 system, which represents the so-called loitering munitions or kamikaze drone. This autonomous weapon is pre-programmed to perform flights in a predefined area and can detect attack and destroy targets without human intervention. Currently, it's used to destroy radar emitters but the system may not have enough safeguards as to where the radar is located. Heather Roff, assistant professor at the University of Denver's - Josef Korbel, said in an interview for TechInsider [11]:

"The Israeli Harpy is going to fly around for several hours and it's going to try to locate that signature. It's not making a calculation about that signature, if it's next to a school. It's just finding a signal ... to detonate."

In 2006, it was reported that Korea University and Samsung Techwin Co. had developed a Robot Military Sentry (SGR-A1) equipped with a machine gun (and optional grenade launcher), which the South Korean military stationed along the De-Militarized Zone separating North and South Korea.

Although it was initially reported to need a human operator to fire upon targets, various sources confirmed that the stationary robot also had the ability to act autonomously. Using a low-light camera

and pattern recognition software to distinguish humans from animals and other objects, the robot is able to detect when a person enters its range (from over 2 miles away) [6].

2. AI in armament, another major world issue

16th of July, 1945 is a fateful date in human history. On this day, for the first time, we had a tested technology with which we could destroy ourselves, namely the atomic bomb. Since then, nuclear weapons have undergone many regulations and disarmament in the countries in possession, but we still have enough to destroy life on Earth as we know it. It is worth mentioning that nuclear weapons have the ability to keep the peace between the great powers. Because a nuclear conflict between both sides would result in an equal massive destruction. History remembers Hiroshima and Nagasaki, after such a catastrophe, can we be certain that with the development of artificial intelligence, similar threats will not arise? How could we know that a mistake in such a system would not lead to the outbreak of a world conflict? Could it be possible that a state uses a "mistake" in an autonomous system to justify war with another country? Who can we hold accountable for a decision made by a machine? Fully autonomous weapons would undermine the principles of humanity because of their inability to show compassion or respect human dignity [3].

These issues do not stop the world powers from competing in the development of lethal autonomous systems. If two parties are competing, one could not afford to lag behind the other. According to Israeli author, historian and philosopher Yuval Noah Harari, autonomous weapons are a disaster waiting to happen. In an interview with him, he said:

"We are entering an artificial intelligence arms race that is leading us very quickly to the world of autonomous weapon systems. I think this could be a catastrophe for humanity, especially if these weapons are not in the hands of responsible democratic governments, but in the hands of dictators or terrorist organizations, criminal groups and so on. The only real way to stop it is through strong global cooperation."

With some exceptions, the European Union is committed to regulating artificial intelligence weapons, but will this remain the case if the United States, Russia and China do not agree? Concealing AWS is much easier than nuclear weapons. You can simply claim to be semi-autonomous or lie about what exactly you are developing.

If such a system is used on a small scale, let's say autonomous turret, it would not be so dangerous, and if certain regulations were imposed it would not be a problem. The same technology could be applied in an armament serving for close-quarters battle, rescuing hostages and other small-scale operations. The problems arise when we try to glimpse at the potential of the technology. The autonomous system instead of bullets could fire missiles or chemical, biological, radioactive and nuclear agents known as CBRN. Instead of a broad ban, the technology should require rigorous restrictions where the risk is high [6].

Autonomous vehicles are a great way to deliver chemical, radiological, and biological weapons. An autonomous vehicle cannot get sick with anthrax, nor choke on chlorine. Drones can more directly target enemies while adjusting trajectories based on local wind and humidity conditions. Plus, small drones can take to the air, fly indoors, and work together to carry out attacks. Operatives from the Islamic State in Iraq and Syria were reportedly quite interested in using drones to carry out radiological and potentially chemical attacks. North Korea also has an arsenal of chemical, biological, and nuclear weapons and a thousand-drone fleet [2]. If such technology falls into the hands of an Islamic State or North Korea, we cannot rely solely on that, that they won't use it. According to Yuval Noah Harari, it is very clear that you cannot regulate these kinds of technologies on the level of a single country or even a few countries.

If you have a treaty against killer robots and autonomous weapon systems only between European countries, then very soon they will break their own ban because nobody will be willing to stay behind if the Chinese and Russians are doing it – we would be crazy not to be doing it ourselves [12].

Maintaining a secret autonomous weapons program is less challenging than a nuclear program. Laws and regulations would not do the job alone, mutual trust is needed. But can you count on trust, let us say, between China and the United States? You cannot.

The Department of Defense has established a directive that requires the role of a human operator:

"DODD 3000.09 requires that all systems, including LAWS, be designed to "allow commanders and operators to exercise appropriate levels of human judgment over the use of force.".

Yet world powers are developing such weapons and there already have been inflicted conflicts. On 1 September 2017, Russian President Vladimir Putin declared, at a public lecture at a school in Yaroslavl:

"Artificial intelligence is the future, not only for Russia but for all humankind. It comes with colossal opportunities, but also threats that are difficult to predict today. Whoever becomes the leader in this sphere, will become the ruler of the world."

He added that it would be "highly undesirable for anyone to gain a monopoly. So, if we become leaders in this field, we will share these technologies with the entire world." But does this mean that we are not at the beginning of a new era of arms races [13]? Lethal AWS are unavoidable, and the consequences they would bring are far from clear.

3. For what should we strive for in the future?

It is safe to say that almost any technology or improvement of an existing one that serves to save people's lives or make them easier has started from the military. These include the telescope, nuclear medicine, nuclear power plants, duct tape, the microwave, the Internet and many more. Advances in artificial intelligence, in addition to their downsides, can have enormous benefits, but it is up to us and our global cooperation to not allow autonomous weapons systems to escalate to something that creates the preconditions for a global conflict.

If we are optimistic, we would take the following position. The development of autonomous weapons with artificial intelligence will continue, but regulations will be imposed that do not allow these weapons to be misused. At the same time, thanks to the arms race between countries artificial intelligence will advance and be used not only for hostile purposes but for more meaningful and benign ones.

Ideally, autonomous weapon systems would be governed by a comprehensive legal regime, comprised of international, transnational, and domestic laws [4]. Realistically speaking, this may never realize, because how can we guarantee infallibility in the system? If this technology is in the wrong hands, how could it be used? Can we completely rule out the possibility of friendly fire or the murder of an innocent person? There is no way to guarantee something with absolute certainty. Therefore, we could bring the preconditions for difficultly resolving international conflicts. As in any other technological aspect, an exciting future awaits us, but in this area, it is up to us whether the end would be potentially dangerous. I strongly doubt that even with imposed regulations there would be no chance of an accident.

We are in a position of difficult fragile peace, which we must strive to preserve with all our strength and means. Human history has been a never-ending wage of wars, culminating in the First and Second World Wars. History must give us subject for thought and make us humbler. The end of World War II must act as a lesson and keep us from similar conflicts. Because getting there would not bring any good.

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