

Research Report

Topic 2: Recognising technological warfare as a problem and implementing countermeasures.



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Introduction

Technological warfare has become a critical aspect of modern conflict due to huge advancements in technology. These technological developments have enabled countries to use a variety of new methods of warfare, such as **cyber-attacks**, armed drones and robots. ¹**Artificial intelligence** and **machine learning**² have also aided the nature of warfare to evolve, imposing **humanitarian** and legal problems. This includes the challenge of identifying if pre-existing rules to new technology are sufficient or is needed to be modified to ensure better regulation. The **International Committee of the Red Cross (ICRC)** plays a vital role in addressing these issues and focuses on the responsible use of technology in warfare, the understanding of conducting warfare giving the advancing technology and the protection of victims of armed conflict from a humanitarian perspective.

Delegates should consider their country's position on technological warfare, its impact on international security, and the challenges it poses to global governance. This report provides insights into recent developments, potential solutions, the positions of key countries and organisations involved, and the risks associated with this issue.

Key Terms 1

Technological Warfare³: Gaining control or having an edge in particular vital technologies that can be used in both peace and wartime.

(Note that this technology of war can refer to offensive and defensive arms, transportation technology that move soldiers and weaponry, and communication technology coordinating movement of armed forces⁴.)

Technology⁵: Application of scientific knowledge to the practical aims of human life or to the change of the human environment.

Cyberattacks⁶: Attempt to steal, expose, alter, disable or destroy information through unauthorised access to computer systems.

Artificial intelligence (AI)⁷: Technology that allows computers and machines to simulate

¹ <https://www.icrc.org/en/law-and-policy/new-technologies-and-warfare>

² <https://www.icrc.org/en/document/artificial-intelligence-and-machine-learning-armed-conflict-human-centred-approach>

³ <https://www.lawinsider.com/dictionary/technological-warfare>

⁴ <https://www.britannica.com/technology/military-technology>

⁵ <https://www.britannica.com/technology/technology>

⁶ <https://www.ibm.com/think/topics/cyber-attack>

⁷ <https://www.ibm.com/think/topics/artificial-intelligence>

human learning, comprehension, problem solving, autonomy, decision making and creativity.

Machine Learning⁸: Branch of AI focused on enabling computers and machines to imitate the way that humans learn to perform tasks autonomously and improve performance.

Humanitarian⁹: A person involved in improving people's lives and reducing suffering; supporting people in extreme need.

International Committee of Red Cross (ICRC)¹⁰: An organisation ensuring humanitarian protection and assistance for people affected by armed conflict and other violence.

Background Information

Military technology isn't only something that has been pursued in modern times but has existed and has been constantly developed among many militaries. From early times, military organisations had to find a fine line between their **military technology** and how they tactically employ it. To gain a broader perspective on these different types of technology, a simple timeline of technological evolution will be covered.

Ancient Era – 2000 BC – AD 500

In this time period, chariots were developed. This was an effective method of transport and a weapon in war, as one could also shoot arrows at enemies from it. This was a crucial approach for many kingdoms and dynasties. During this period other effective military technologies developed were slingers, archery and cavalry. Naval warfare was also discovered to be a crucial method of transportation for militaries, which introduced opportunities to attack enemies through cannons for example.

Middle Ages – around year 1100

During the Middle Ages, bows and arrows were most commonly used to combat. Particularly, crossbows and longbows were used in many battles such as the Hundred Years' War. This was a dominating method for battlefields. Other advancements include trebuchet (type of catapult) and artillery.

Gunpowder revolution – 1300 – 1650

⁸ <https://www.ibm.com/think/topics/machine-learning>

⁹ <https://dictionary.cambridge.org/dictionary/english/humanitarian>

¹⁰ <https://www.icrc.org/en/we-are-international-committee-red-cross-icrc>

This invention had a significant impact on warfare advancements. A chemical reaction takes place, harnessing the energy to reach the desired target. Gunpowder connects the Middle Ages to the modern eras, as it allowed not only for weapons to be based on physical strength, but also its tactical use. Note that gunpowder also evolved partly by Chinese alchemists in the 4th century. Other military technologies that were developed in this era include cannons, infantry firearms, naval mines and artillery rockets.

World War II – around 1945

There were many technological advancements from World War II that made a profound impact on life and warfare after this war. For example, radar technology was developed for combat. In addition, computers were being developed around this time. The Electronic Numerical Integrator and Computer (ENIAC) was capable of performing thousands of calculations per second, designed for military purposes.

The atomic bomb is also one of the greatest technological and scientific advancements during this period and sparks the arms race in getting a hold of nuclear weapons, which would give power and superiority.

Technological advancements also occurred in space, driven by The Space Race between the U.S and USSR. The tension and competency for technological and military dominance ultimately aided the culmination of Apollo 11 landing on the moon (1969)¹¹.

Modern Era – late 1900s onwards

Major technological advancements nowadays, especially in the field of artificial intelligence and developing machine learning systems. The number of autonomous weapon systems and unmanned systems, and new forms of cyber and information warfare are developing.

The military is using AI in the forms of **decision support systems, predictive systems, unmanned aerial vehicles, multi-domain operations and target discovery**¹². These applications are raising huge concerns as to when and how not to use AI systems in military actions and how to manage it responsibly, as possibilities with AI are extensive.

Key Terms 2

The following terminology is explained in the context of the topic.

¹¹ https://en.wikipedia.org/wiki/Military_history#Ancient_era

¹² <https://blogs.icrc.org/law-and-policy/2024/12/12/the-im-possibility-of-responsible-military-ai-governance/>

Decision-Support Systems¹³: AI systems that help militaries make real time decisions, determination, judgements and courses of action during armed conflict.

Predictive Systems¹⁴: A statistical analysis and machine learning is used to predict behaviours and upcoming events like analysing surveillance data to predict potential threats and targets before acting.

Unmanned Aerial Vehicles (UAVs): Vehicles (e.g. aircraft) that operate autonomously. They are not controlled by a human operator such as a pilot, crew or any passengers. Instead, they are able to operate with a mapping of their surroundings and various radar sensors. Video cameras are also installed to monitor nearby vehicles, detect traffic lights, road signs ¹⁵etc. They can be used for surveillance, targeting, and combat operations.

Multi-domain Integration: When AI systems are able to operate across multiple domains (land, sea, air, space) smoothly. It refers to militaries connecting various systems, from various domains to act efficiently and readily across different environments. This can be a problem, as AI's reliance on vast amounts of data and interconnected systems can raise conflicts.

Target Discovery: Using AI systems which are trained on extensive data (surveillance footage, sensors, reports etc.) to identify threats and suspicious behaviours.

It is important to note that AI systems are very complex, and they require frequent updates to continually adjust to the nature of conflict. This takes time and needs to strictly be prioritised in warfare. If these are compromised, the safety and reliance of these systems will decrease significantly, and concerns the reliance on using it for military targeting, as raises concerns on humanitarian safety and security. Plus, strict ethical procedures must be placed to ensure that any system is thoroughly tested and evaluated before it can be used. If it doesn't meet these standards, it should not be used at all.

These AI systems require large language models (LLMs) to be built, and another concern is that they are exposed to implicit system biases and automation biases which is also a problem that needs to be addressed¹⁶.

¹³ <https://www.investopedia.com/terms/d/decision-support-system.asp>

¹⁴ <https://www.ibm.com/think/topics/predictive-ai>

¹⁵ <https://www.synopsys.com/glossary/what-is-autonomous-car.html>

¹⁶ https://blogs.icrc.org/law-and-policy/2024/03/14/falling-under-the-radar-the-problem-of-algorithmic-bias-and-military-applications-of-ai/?utm_source=chatgpt.com

Major Countries and Organisations Involved

USA

The United States has recognised that the field of AI and its capabilities, and military applications using AI has become a huge topic of interest. The Political Declaration on Responsible Military Use of Artificial Intelligence and autonomy as of November 2023 has been endorsed by 32 states¹⁷. The US acknowledges that the public and their rivals have access to generative AI, and thus wants to keep a technological edge¹⁸.

China

China has made large investments and progress in using AI for warfare. According to the International Affairs Review, China's military application include developing unmanned intelligent combat systems, improving battlefield situational awareness, judgement, conducting multi-domain offense and defence, and facilitating advanced training, simulation, and wargaming practices¹⁹. China wants to dominate in AI and continue developing these AI weapon systems and beat their rivals to it²⁰.

Russia

Russia is keen on using new weapon systems, and other military technology such as robotics, and unmanned vehicles, specifically aerial drones into their military operations. Russia is looking into capabilities to counter and disrupt their enemies' military satellite operations in the space sector. They are eager to develop their technology in warfare to gain an upper hand against the Western command and control systems and communication facilities. Moreover, they want to gain information superiority among their great power competitors such as the US and its NATO allies²¹.

European Union (EU)

The EU's strategy mainly revolves around prohibiting lethal autonomous weapon systems and restricting the use of artificial intelligence to be under human control²². The EU AI Act states that it *“does not apply to AI systems used for military, defence, or national security purposes, or to AI systems used by foreign public authorities or international organisations for law*

¹⁷ https://lieber.westpoint.edu/political-declaration-responsible-military-use-artificial-intelligence-autonomy/?utm_source=chatgpt.com

¹⁸ <https://sdi.ai/blog/the-most-useful-military-applications-of-ai/>

¹⁹ <https://www.iar-gwu.org/print-archive/blog-post-title-four-xgtap>

²⁰ <https://www.brookings.edu/articles/ai-weapons-in-chinas-military-innovation/>

²¹ <https://www.chathamhouse.org/2021/09/advanced-military-technology-russia/06-military-applications-artificial-intelligence>

²² <https://www.europarl.europa.eu/news/en/press-room/20210114IPR95627/guidelines-for-military-and-non-military-use-of-artificial-intelligence>

enforcement and judicial cooperation, provided they protect individuals' rights."²³

International Committee of the Red Cross (ICRC)

ICRC has concerns on the use of AI in armed conflicts, as autonomous weapons are dangerous. They have a pure human-centred approach to this military technology where legal obligations and ethical responsibilities are valued. They believe the use of AI in weapon systems must be approached with a lot of caution and care of surroundings²⁴.

Relevant UN Resolutions

- UN General Assembly draft resolution: “Seizing the opportunities of safe, secure and trustworthy artificial intelligence systems for sustainable development” (A/78/L.49)²⁵
 - **Clause 2:** *Resolving* to promote safe, secure and trustworthy artificial intelligence systems
 - **Clause 6:** *Encouraging* Member States to apply governance and regulatory frameworks to promote safe appliance of artificial intelligence, following subclauses for in detail call to actions.
- UN General Assembly resolution: “Lethal autonomous weapon systems” (A/C.1/78/L.56)²⁶
 - **Clause 1:** *Stressing* the need for international community to handle the concerns autonomous weapons systems raise, particularly when lethally used.
- UN General Assembly resolution: “Artificial intelligence in the military domain and its implications for international peace and security” (A/C.1/79/L.43)²⁷
 - **Clause 1:** *Affirming* the international law, humanitarian law, rights laws and its importance of consideration when addressing to what extent artificial intelligence can be used
 - **Clause 6:** *Resolving* to connect the countries regarding responsible use of artificial intelligence in the military domain and emphasising sharing knowledge and cooperation between these countries to foster responsible use throughout

(Note that Clause’s brief summary has been provided, not the actual clause itself)

²³ <https://artificialintelligenceact.eu/article/2/>

²⁴ <http://international-review.icrc.org/articles/ai-and-machine-learning-in-armed-conflict-a-human-centred-approach-913>

²⁵ <https://documents.un.org/doc/undoc/ltd/n24/065/92/pdf/n2406592.pdf>

²⁶ <https://documents.un.org/doc/undoc/ltd/n23/302/66/pdf/n2330266.pdf>

²⁷ <https://documents.un.org/doc/undoc/ltd/n24/299/16/pdf/n2429916.pdf>

Previous Attempt to Solve this Issue

United Nations

“*Lethal autonomous weapon systems*” resolution: They want to affirm that the international law, the UN charter, the international humanitarian law and the international human rights law applies to autonomous weapons. They highlight concerns on global security and stability. To ensure safety, they urge to work with these weapons under the Convention on Certain Conventional Weapons (CCW). They would like to ensure that ICRC and the Human Rights Council address this issue and contribute any insights to be considered.

ICRC

*“The International Committee of the Red Cross (ICRC) has, since 2015, urged States to establish internationally agreed limits on autonomous weapon systems to ensure civilian protection, compliance with international humanitarian law, and ethical acceptability.”*²⁸ They recommended legal rules such as unpredictable autonomous weapon systems to be ruled out, using them to target humans should be ruled out, the design and use of autonomous weapon systems that would not be prohibited should be regulated, further limits should be placed on the scale of use, duration, types of target and requires for human supervision and timely interactions. (2021)

Possible Solutions

1. As of now, there have been several resolutions to discuss this topic, yet the call to action is considered to be quite vague. So, clearer international regulations can be made on the specific use cases of various autonomous weapon systems.
2. Human Control over these weapon systems will be necessary to ensure civil safety. Discussing whom to trust on making critical decisions on a machine’s autonomous capabilities and reliability.
3. Banning/Limiting specific autonomous weapon systems for humanitarian safety. Temporary bans could be imposed, until the implications of technology are further understood
4. Assuring that the development of military technology is within international ethical guidelines, the international human rights law, and international humanitarian law to ensure minimisation in harm to civilians.

²⁸ <https://www.icrc.org/en/document/icrc-position-autonomous-weapon-systems>

Bibliography

- (1) Army University Press. (2023). *Artificial Intelligence in Modern Warfare: Strategic Innovation and Emerging Risks*. [online] Available at: <https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/SO-24/SO-24-Artificial-Intelligence-Strategic-Innovation-and-Emerging-Risks/>.
- (2) Humble, K. (2024). *AI & The Future of Conflict* / *GJIA*. [online] Georgetown Journal of International Affairs. Available at: <https://gjia.georgetown.edu/2024/07/12/war-artificial-intelligence-and-the-future-of-conflict/>.
- (3) ICRC (2021). ICRC position on autonomous weapon systems. *www.icrc.org*. [online] Available at: <https://www.icrc.org/en/document/icrc-position-autonomous-weapon-systems>.
- (4) International Committee of the Red Cross. (2015). *New technologies of warfare*. [online] Available at: <https://www.icrc.org/en/law-and-policy/new-technologies-and-warfare>.
- (5) The United States Unveils Political Declaration on Responsible Military Use of Artificial Intelligence and Autonomy. (2023). *American Journal of International Law*, [online] 117(4), pp.728–734. doi:<https://doi.org/10.1017/ajil.2023.50>.