Forum: General Assembly 1

Issue: The question of the robotisation of armed forces

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Introduction

The robotisation of armed forces is an increasingly relevant topic with a new race to achieve military superiority. As people and governments progressively value life more, engineers are pushed to find ways to decrease the risks of death while operating machinery, both outside and within conflict zones. This has led the robotics field to see many developments in the last few years.

With modern technologies, where life is not unnecessarily put at risk, new powers emerged, and with that, new responsibilities as well. However there are concerns that these responsibilities are not being addressed and that technology that was made to be more 'humane' will end up being used in far more savage ways.

Through this research report, I wish to explore key parties' involvement in positive and negative practices, and look at legislation, both locally and internationally.

Definition of Key Terms

Autonomous

Able to operate with little or no human control or intervention: *an autonomous vehicle.*

Artificial Intelligence (AI)

The theory and development of computer systems capable of performing tasks that historically required human intelligence, such as recognising speech, making decisions, and identifying patterns. AI is an umbrella term that encompasses a wide variety of technologies, including machine learning, deep learning, and Natural Language Processing (NLP).

Civilian

A person who is not on active duty with a military, naval, police, or firefighting organisation.

Cruise altitude

A level determined by vertical measurement from mean sea level maintained during the main stage of flight.

Drone

An uncrewed military aircraft or ship that can navigate autonomously, without human control or beyond the line of sight

Extrajudicial Killings

Extrajudicial killing is the deliberate killing of a person without the lawful authority granted by a judicial proceeding. It typically refers to government authorities, whether lawfully or unlawfully, targeting specific people for death.

Humane

Acting in a manner that causes the least harm to people or animals

Indiscriminate killings

An attack of a nature to strike military objectives and civilians or civilian objects without discrimination, i.e. an attack which is not directed at a specific military objective (or person); employs a method or means of warfare which cannot be directed at a specific military objective (or person); or employs a method or means of combat the effects of which cannot be limited as required by international humanitarian law.

Indiscriminate attacks are prohibited and include:

an attack by bombardment, by any means or method which treats as a single military objective a number of clearly separated and distinct military objectives located in a city, town, village or other area containing similar concentration of civilians or civilian objects;

an attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the tangible and direct military advantage anticipated.

Infantry

Soldiers or military units that fight on foot, in modern times typically with rifles, machine guns, grenades, mortars, etc., as weapons.

Multi-role

Has the ability to carry out many different tasks. For example, a multi-role combat aircraft is intended to perform different roles in combat. This could be air-to-air combat, reconnaissance, aerial bombing, etc.

Robot

Any machine or mechanical device that operates automatically, sometimes with humanlike skill.

Robotics

The scientific field of making and using robots.

Robotisation

The act or process of introducing robots to do work that was previously done by people.

Semi-autonomous

Denoting or performed by a device that is capable of operating without human control to some extent, but incomplete

Reconnaissance

A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area.

Unmanned aerial vehicle

Unmanned aerial vehicles (UAVs) are aircraft with no on-board crew or passengers. They can be automated 'drones' or remotely piloted vehicles (RPVs). UAVs can fly for long periods of time at a controlled level of speed and height and have a role in many aspects of aviation.

Endurance

The time an aircraft can continue flying, or a ground vehicle or ship can continue operating, under specified conditions, eg, without refueling.

Background Information

Firstly, we need to look at what robotization in a military context means.

Unmanned aerial vehicles (UAVs) were quick to be developed and put into use after the invention of airplanes themselves, in 1903. The first pilot-less aircraft were developed by the British and Americans during the First World War. Britain's 'Aerial Target', a small Remotely Piloted Vehicle (RPV), was first tested in March 1917 while the American aerial torpedo known as the 'Kettering Bug' first flew in October 1918. Although both seemed promising in flight tests, neither were used operationally during the war.

Even though the First World War was over, global powers saw the utility of these unmanned vehicles and continued developing and testing these technologies during the inter-war period. 1935 was a particularly successful year for the British in the development of UAVs, where many of these radio-controlled aircraft were made to be used as targets in training exercises for Royal Air Force (RAF) pilots. This was extremely helpful as this meant the RAF could have an edge in dogfights and air battles due to their ability to practice shooting enemy aircraft down without having to lose their own pilots in training. It is more or less during this period, that it is thought the term 'drone' began to be used, named after the 'DH.82B Queen Bee'. These kinds of technologies were likewise developed in the United States of America at a similar time.
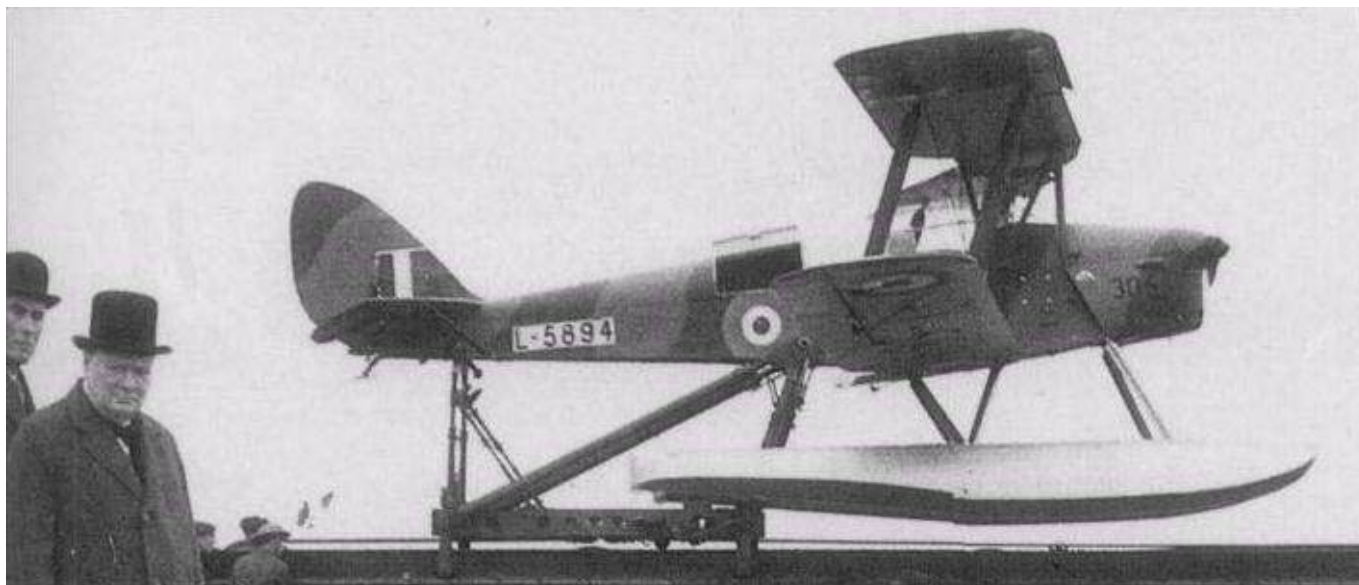
De Havilland 82.B 'Queen Bee'

In the Second World War, these drones could be used in real-life scenarios, outside relatively safe training conditions. By this time, the Germans had a remotely-controlled ground vehicle named "German Goliath tracked mine", a relatively small and disposable demolition vehicle, known as "Beetle tanks" by the Allies.


Goliath tracked mine

These robots were either electric or diesel-powered devices that could carry between 60 kilograms and 100 kilograms of high explosives. The multi-purpose 'Beetle tanks' were used to destroy tanks, demolish buildings or bridges, and disrupt infantry formations. People saw a revolutionary aspect of having these drones, as harm could be done on behalf of a country, without risking their own lives in the process. This led to a great push for development in the robot sector.

The first large-scale deployment of Reconnaissance UAVs was during the Vietnam War (01.11.1955 - 30.04.1975). Drones also saw a new time of development for themselves, such as missile launching, being used as decoys, and dropping leaflets for psychological warfare. It was after this war that several other countries, beyond just the United Kingdom, Germany and the United States of America, began exploring their use as well, with the aim of improving endurance, and cruise altitude.

In more recent history, drones, especially in the United States of America, NATO member states and countries such as Russia have seen a rise in use since the 9/11 terrorist attacks. They are now mostly used as Robot Vehicles (RVs) to carry out surveillance missions in areas where troops cannot go safely. Notable cases include the tracking down of Osama Bin Laden's hiding home, and a strike operation that killed Al-Qaeda leader Ayman al-Zawahiri through technologies such as Synthetic Aperture Radar (SAR) [IV] and Light Detection And Ranging (LiDAR) [V] imageries to find them. These drones are weapons that are credited with killing suspected militants, and their use in some countries has raised ethical concerns about this robotic weaponry when their use results in civilian casualties, due to their proximity to the 'target', or inaccurate data.

SAR imagery of Palm Jumeira, Dubai, United Arab Emirates
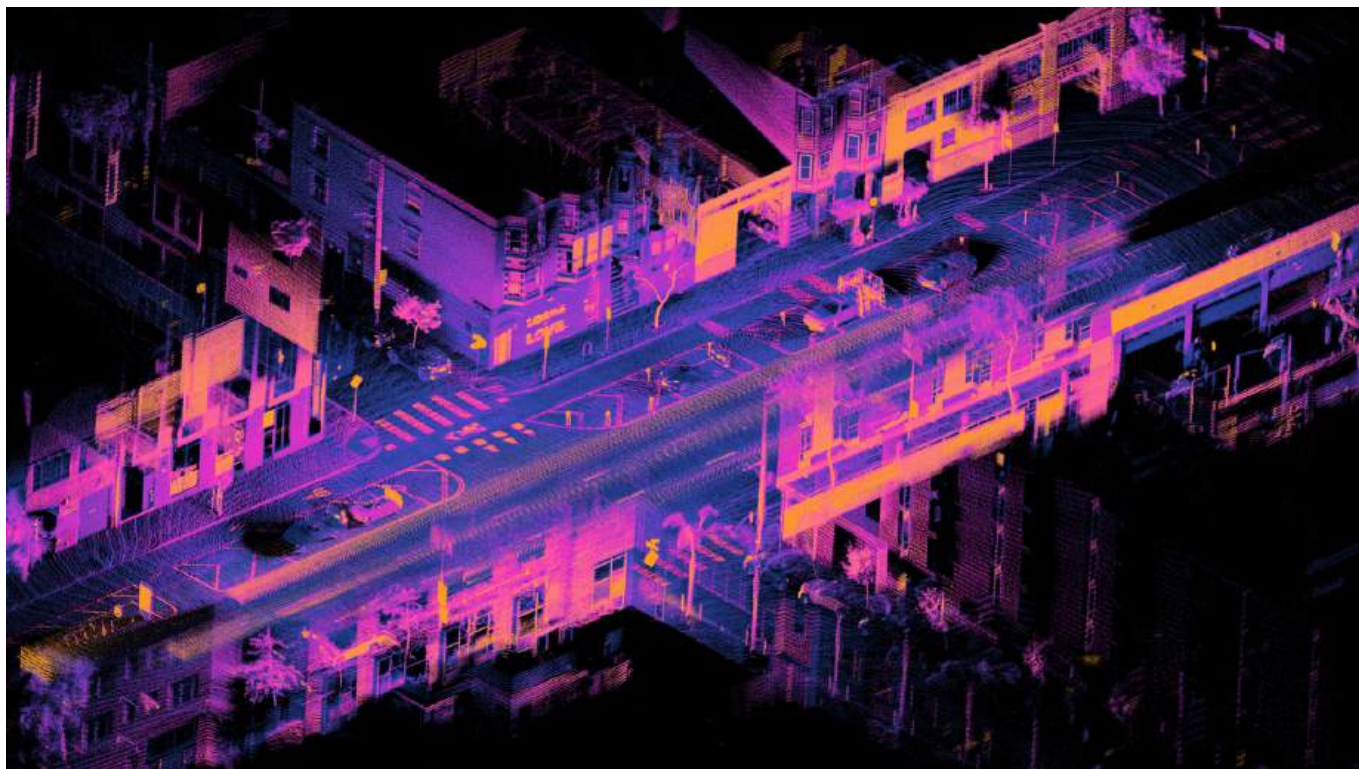
LiDAR imagery

Returning to the mission of improving these technologies, endurance is a priority amongst operating nations as they want to maximise operating hours. One of the latest American-made drones, the MQ4C Triton, can fly up to 30 hours, surveilling areas of over 40,000 square kilometers. Although 30 hours of flying capabilities is an astonishing feat, it requires large quantities of fuel which is expensive, emits carbon emissions, and through the hot turbine, a larger Infrared cross-section. This is why the United States of America has invested twenty million US Dollars into a new solar-powered drone that can fly up to 24 hours, with lower emissions and a smaller radar cross-section.

There is also the emerging use of Artificial Intelligence (AI), and as it evolves, there is a growing need for effective governance mechanisms to manage its use, but mainly to mitigate potential hazards. The use of AI in the military means it has a far greater potential to affect society than before, as it is capable of making decisions regarding lives at stake. This has evidently raised ethical concerns, as for example there is no way to guarantee that AI systems are impartial in their decision making and do not perpetuate existing biases. On the other hand, some may argue AI *should* be biased. This stems from the famous *'Trolley Problem'* analogy (https://en.wikipedia.org/wiki/Trolley_problem, *Wikipedia article on the Trolley problem psychological debate. This is very interesting when discussing Artificial Intelligence's decision making ethics.*); if an enemy state were to be in larger numbers in a conflict zone, would a drone choose to strike a battalion of its own to "save more lives"?

Another underlying issue with Machine Learning is that it is trained, or 'taught', by a large, existing data set. Once again, there can be no guarantee that this data set in itself is not highly flawed

and riddled with human bias. For example, Predictive Policing has been used in the United States and in the United Kingdom, where artificial intelligence was used to collect existing police records, identify neighbourhoods where more crime occurred, and distribute the police force accordingly. This resulted in the vast majority of police being stationed in more ethnically diverse neighbourhoods, meaning that more crimes are likely to be spotted in these neighbourhoods, leading to more arrests, resulting in the AI program stationing a higher percentage of the police force in those areas, creating a negative cycle of prejudice.

A final example of critical decision-making made by Autonomous vehicles is Tesla's autopilot in cars. There have been numerous instances in which a Tesla, or any other autonomous car for that matter, has been on autopilot and taken part in a car accident, and the car has had to make decisions on whether to brake, swerve, or crash into a less harmful object (https://youtu.be/QNgtceetrUo?si=EffGHkYWGyccbhPH, *A video of a Tesla crashing into another car in order to prevent running a pedestrian over*). This is a perfect example of where RVs have faced a moral decision such as the one in the Trolley problem. Further details on the Trolley Problem can be found here: https://www.merriam-webster.com/wordplay/trolley-problem-moral-philosophy-ethics. Placing this trust in the military and armed forces is a monumental decision to make that must not be taken lightly by any governing body, as military vehicles have a lot more power and can cause far more damage than any ordinary road vehicle.

Drones are weapons systems that can be used to carry out targeted killing, but can likewise be used for indiscriminate killings. This is up to the drone operator's discretion, someone who can decide whether or not to deliberately instruct a drone to destroy public buildings such as educational or health institutions that are known to have women, children, and elderly people inside. This is already a dangerous task that requires an immense responsibility on behalf of the operator, and even so, when strikes have been carried out with the most 'moral' intentions, innocent bystanders have also been killed. This is where morality fuels discussion on the use of drones in moral respects; some people may argue that the use of drones is completely immoral and that anti-terrorist missions that take place in areas heavily populated by civilians should be banned. In just the span of 13 years, from 2002 to 2015, US drone strikes in Yemen, Pakistan, and Somalia, have accounted for over 2800 deaths, presenting a major issue to solve.
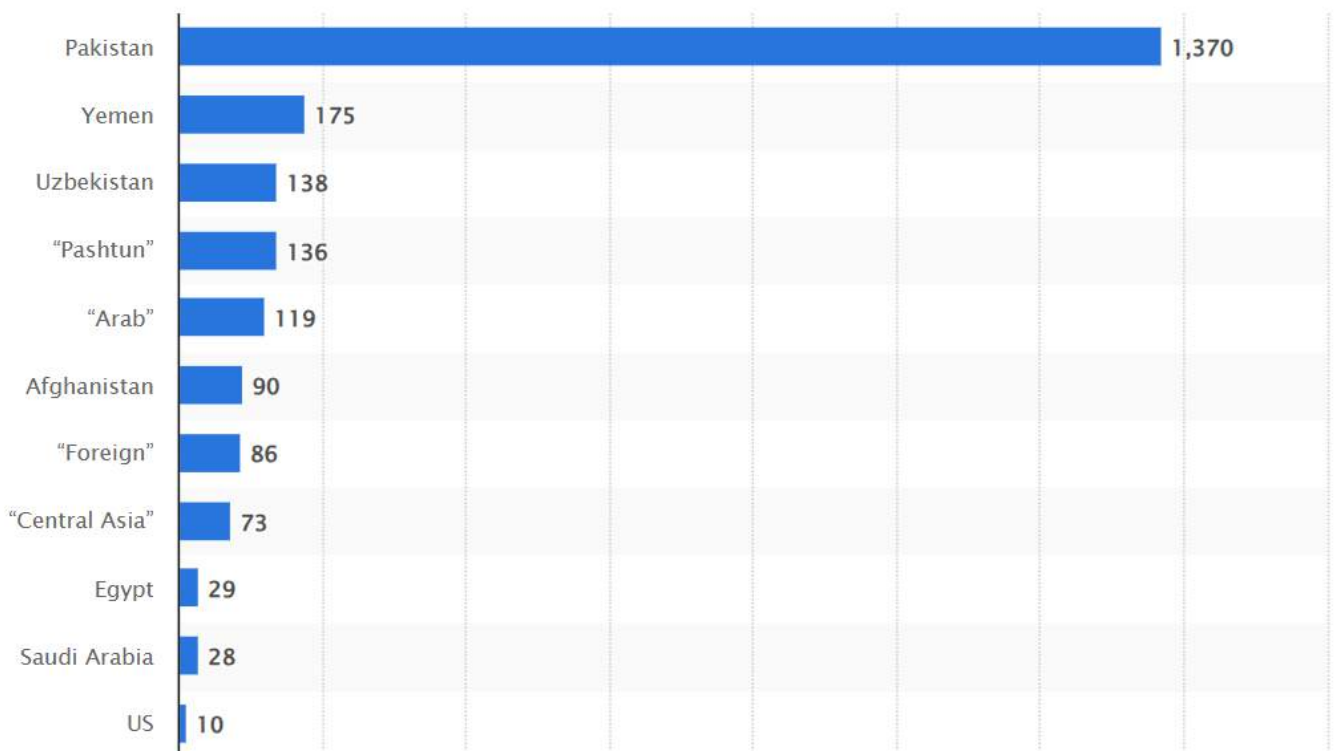
Number of casualties from U.S. drone strikes carried out from 2002 to 2015 in Pakistan, Yemen and Somalia, by country or region of origin, Statista, May 7 2015

Major Countries and Organisations Involved

Austria

Austria has continuously advocated for a legally binding international treaty that would ban all use of fully autonomous weapons. In 2018, Austria called for a comprehensive ban on 'killer robots', referring to autonomous lethal weapons, arguing that these autonomous weapons cannot comply with IHL distinction and proportionality principles. They therefore suggested that an overarching ban is the logical solution to ethical and legal challenges that would otherwise arise. They also submitted a resolution that passed on Human rights implications of new and emerging technologies in the military domain, in 2022.

China

China has been a major player in the recent development of autonomous systems for military use, with less transparency regarding the specific legal frameworks governing their deployment. Due to Chinese laws on AI and military technology being still in the early stages of development, the manufacture and innovation of AI and robotics can move at a far faster and more efficient speed than in other countries with stricter regulations. This means many Western countries are concerned about China's mission and goals with the employment of these emerging technologies.

Convention on Certain Conventional Weapons (CCW)

The CCW is a key international framework for regulating the use of weapons that may cause unnecessary suffering or have indiscriminate effects. The treaty was designed to restrict or prohibit the use of certain types of weapons in armed conflicts, particularly those that could cause excessive injury or have unintended humanitarian consequences. The CCW has been a crucial forum for discussing the regulation of autonomous weapons and lethal autonomous weapons systems (LAWS).

Costa Rica

Costa Rica has also supported a full ban on autonomous weapons, reiterating that such systems would violate the prohibition on extrajudicial killings and make accountability for violations of IHL more difficult. Costa Rica has called for the development of an international legal framework to ensure these weapons are regulated. Costa Rica famously abolished their army in October 1949 by decree. This came after World War II, when Costa Rica was one of the first to take such large steps towards demilitarisation and peace.

European Union member states

The European Union has started exploring the moral consequences of robotics and artificial intelligence in defense, including autonomous weapons. The EU's Common Security and Defense Policy (CSDP) addresses the development and use of military technologies, though it has not yet implemented specific regulations for autonomous systems.

International Committee for Robot Arms Control (ICRAC)

The ICRAC is a key organization involved in the global conversation about the development, deployment, and regulation of autonomous weapons systems (AWS), also referred to as "killer robots." ICRAC is a non-governmental organization made up of experts from fields including robotics, ethics, law, and international security. It is dedicated to preventing the misuse of robotics and autonomous systems in warfare, advocating for the regulation or complete ban of fully autonomous lethal weapons.

Russian Federation

Russia has been increasingly investing in robotic systems for its military, including autonomous ground and aerial vehicles. Russian legal frameworks for robotics in defense remain unclear, and Russia has expressed clear interest in the development of autonomous weapons systems. With a large number of sanctions already placed on the Russian Federation, further sanctions do not seem to deter their research and development missions on LAWS.

Türkiye

Türkiye has become a major party in the development and deployment of autonomous weapons, AI, and drones for military use. Over the past decade, Türkiye has rapidly advanced its military technology, particularly in the fields of drones, robotics, and AI, through high investment and allocating a large portion of its GDP, positioning itself as a key contributor to autonomous systems in modern warfare. Türkiye has produced drones such as the Bayraktar TB2, and swarming drones which involve the use of multiple drones operating together, possibly controlled by AI systems, in order to overwhelm enemy defenses. An 'overwhelming' force however, would likely violate the Principle of Proportionality.

United States of America

The U.S. Department of Defense has released numerous guidelines on autonomous weapon systems. The Department of Defense's Directive 3000.09, released in 2012, provides the basic guidelines for the use of autonomous and semi-autonomous systems, emphasizing that they must comply with the laws of war, including IHL principles. The U.S. has developed and deployed unmanned aerial vehicles (UAVs) and other robotic systems, leading the drone development and manufacturing market, with ongoing debates on whether autonomous weapons should be deployed on the battlefield.

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Timeline of Events

Date	Description of event
March, 1917	Britain tests its 'Aerial Target'
October, 1918	American 'Kettering Bug' flies for the first time
1935	The United Kingdom started developing new drones such as the Fairey Queen IIIF Mk.IIIB and using them in aerial combat training
October 10th, 1980	CCW adopted
December 1st, 1983	CCW in force
April 2018	Austria calls for a ban on LAWS
December, 2022	70 states support a cross-regional statement on autonomous weapons systems in General Assembly One
December 28th, 2023	164 countries support Austria's resolution on LAWS in General Assembly One

Previous Attempts to Solve the Issue

As of now, there isn't any unified set of global laws and legislation directed towards the robotisation of armed forces. However, International Humanitarian Law (IHL) does still affect how robots, drones and Artificial Intelligence is used in warfare.

IHL governs the conduct and behaviour of combatants, particularly to minimise negative effects on civilians. Although IHL has yet to target Robotisation, there are a few key points listed below that affect its use in the military.

Principle of Distinction - Combatants must make a clear distinction between other combatants and civilians, and military facilities and civilian objects. The distinction is a major challenge for robots and AI, as they lack a moral and emotional compass that allows these technologies to evaluate the situation adequately and avoid harming civilians.

Principle of Necessity - Only military facilities may be targeted, and be done so with military force only when strictly needed. This means that autonomous vehicles and systems must be limited to targeting military objectives to avoid unlawful damage.

Principle of Proportionality - Any military force used must anticipate military advantage and not be excessive. This means that technology should also be constrained to mitigate unnecessary harm.

Accountability also plays a substantial role in warfare and IHL, and while IHL explicitly describes the accountability of anybody responsible for harm in conflict zones, machines and technology are not specified and included in the parameters of consideration. This creates a large discussion about whose responsibility it is when an autonomous system acts in a way that has caused a disproportionate amount of harm and has led to negative consequences.

Although there is national policy in place, there is little international legislation regulating the use of Lethal Autonomous Weapons Systems (LAWS), other than the European Union. Many countries such as Austria, Costa Rica, Mexico, Brazil, Chile, France, and Germany along with NGOs for instance the Human Rights Watch, Amnesty International, and International Committee for Robot Arms Control (ICRAC) have advocated for regulations and legislations that would either ban completely or strictly control their use.

In 2022, Austria alongside Panama presented a resolution to the Human Rights Council that passed. The resolution is listed below:

- Human rights implications of new and emerging technologies in the military domain, 30 September 2022, **(A/HRC/51/L.25)**

This resolution however, is not binding and slightly vague on its aims with regulation, as it only has 3 main clauses, which is why legislation is such a pressing matter.

On the 28th December 2023, Austria initiated another resolution that was supported by 164 countries on LAWS:

- Lethal Autonomous Weapons Systems, 28 December 2023, **(A/RES/78/241)**

Possible Solutions

Depending on what viewpoints each country delegation holds, there might be different ideas of an ideal solution for the problems of legality and ethics that arise when using LAWS. Countries such as Austria and Costa Rica have proposed a fully comprehensive ban on all LAWS, meanwhile countries such as the United Kingdom, Mexico, Germany and France endorse a multilateral discussion on regulation and treaties, whilst preserving the ability to use the weapons 'responsibly'. This could be done through organisations such as the CCW and ICRAC.

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Appendix or Appendices

https://www.tradoc.army.mil/wp-content/uploads/2020/10/AD1029823-DOD-Dictionary-of-Military-and-Associated-Terms-2017.pdf

III. US Dictionary of Military terms which will be very useful when discussing technical aspects of robots and drones