ROBO COPS 8. 9. 19 *by* KRISTIN HOUSER

China Deploys Its First Robot Traffic Police

The bots are helping human officers maintain order on Chinese roads.

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Image by Xinhua/Zhao Hongyu

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We can now add one more initiative to the growing list of ways China is using tech to police its population.

On Wednesday, the Handan Public Security Bureau in Northern China deployed three types of traffic robots to assist human officers in the city. A report in state-run news agency *Xinhua* quotes Zhou Zuoying, deputy head of the Ministry of Public Security's Traffic Management Research Institute, as saying the bots' deployment marks China's first use of "robot traffic police."

Each of the three types of robots looks slightly different from the others and will serve a unique function, which the *Global Times* — another state-run outlet — detailed in its own report.

One type is a "road patrol robot" designed to look like a human traffic officer, with a yellow uniform and white hat. That bot is capable of identifying drivers and snapping photos of their illegal behavior.

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Another is an "advice traffic robot." That one will post up in vehicle management stations where it will answer residents' questions and guide them where they need to go. It'll also automatically report any security risks or suspects to police, the *Global Times* wrote.

The third type is an "accident warning robot" designed to let drivers in passing vehicles know when human police have a traffic accident to deal with.

The robots will be on duty 24/7, Handan Public Security Bureau official Li Huai told Chinese news site hebnews.cn, according to the *Global Times'* report, but it isn't clear whether that applies to just one of each type of robot or several.

What is clear, though, is that China is leaning into the use of technology for law enforcement.

The nation has already deployed facial recognition systems to catch jaywalkers and made RFID tags mandatory in new cars so drivers can't skip out on paying highway tolls. It has also equipped some police officers with facial recognition glasses to help them spot people wanted in connection with crimes.

This isn't the first time China has deployed police robots, either — in 2016, its AnBot security robot began making the rounds at the Shenzhen airport, and in 2017, its E-Patrol Robot Sheriff began patrolling streets.

It was seemingly only a matter of time before China found a way to use robots to help its traffic officers maintain order — and now, it appears that time has arrived.

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August 2, 2021 12:01AM EDT

Killer Robots: Urgent Need to Fast-Track Talks

Shared Vision Forms Sound Basis for Creating a New Ban Treaty

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- Governments should move urgently to begin negotiations on a new treaty to prohibit and restrict autonomous weapons systems, known

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as “killer robots.”

- A small number of powerful countries that are developing autonomous weapons have been holding up action on a treaty at international talks.
- The many countries that oppose delegating life-and-death decisions to machines should adopt new international law to ensure human control and accountability in the use of force.

(Washington, DC, August 2, 2021) – Governments should make up for lost time by moving urgently to begin negotiations on a new treaty to retain meaningful human control over the use of force, Human Rights Watch said in a report released today. Representatives from approximately 50 countries will convene on August 3, 2021 at the United Nations in Geneva for their first official diplomatic meeting on lethal autonomous weapons systems, or “killer robots,” in nearly a year.

The 17-page report, “Areas of Alignment: Common Visions for a Killer Robots Treaty,” co-published by Human Rights Watch and the Harvard Law School International Human Rights Clinic, describes the strong objections to delegating life-and-death decisions to machines expressed by governments at the last official Convention on Conventional Weapons (CCW) meeting on killer robots. That meeting, held in September 2020, featured proposals from many countries to negotiate a new international treaty to prohibit and restrict autonomous weapons.

“International law needs to be expanded to create new rules that ensure human control and accountability in the use of force,” said Bonnie Docherty, senior arms researcher at Human Rights Watch and associate director of armed conflict and civilian protection at the Harvard Human Rights Clinic. “The fundamental moral, legal, and security concerns raised by autonomous weapons systems warrant a strong and urgent response in the form of a new international treaty.”

Nearly 100 countries have publicly expressed their views on killer robots since 2013. Most have repeatedly called for a new international treaty to retain meaningful human control over the use of force, including 31 that have explicitly called for a ban on lethal autonomous weapons systems. Yet a small number of militarily advanced countries – most notably Israel, Russia, and the United States – regard any move to create new international law as premature. They are investing heavily in the military applications of artificial intelligence and developing air, land, and sea-based autonomous weapons systems.

Governments have expressed support for banning autonomous systems that are legally or morally unacceptable, the groups said. There is strong interest in prohibiting weapons systems that by their nature select and engage targets without meaningful human control, including complex systems that use machine-learning algorithms to produce unpredictable or inexplicable effects. There are further calls to ban antipersonnel weapons systems that rely on profiles derived from biometric and other data collected by sensors to identify, select, and attack individuals or categories of people.

“Killing or injuring people based on data collected by sensors and processed by machines would violate human dignity,” Docherty said. “Relying on algorithms to target people will dehumanize warfare and erode our humanity.”

Many countries have proposed complementing these prohibitions with regulations to ensure that all other autonomous weapons systems are only used with meaningful human control, the groups said. “Meaningful human control” is widely understood to require that technology is

2 October 7, 2022 | News Release
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3 November 12, 2018 | News Release
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4 October 5, 2022 | News Release
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5 November 1, 2018 | Report
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understandable and predictable and that its operations are constrained in space and time.

An October 2020 report by Human Rights Watch and the International Human Rights Clinic recommended elements for a new treaty on killer robots that largely align with the proposals made by countries that participated in the September 2020 meeting.

Decisions at the Convention on Conventional Weapons are by consensus, which allows a few countries – or even a single country – to block an agreement sought by a majority. A new treaty, however, does not have to be negotiated under Convention on Conventional Weapons auspices, and there are signs that political leaders are anxious to move on and achieve a faster, more lasting result.

In July, New Zealand's minister for disarmament and arms control, Phil Twyford, warned that the current diplomatic talks "are not delivering" and suggested those concerned by the prospect of autonomous weapons systems come together and "design something truly fit-for-purpose." He added, "For many of us, the idea that a computer could autonomously identify and attack a target will be unconscionable."

A broad range and growing number of countries, institutions, private companies, and individuals have reiterated their desire for a ban on lethal autonomous weapons systems. In May, the International Committee of the Red Cross (ICRC) called for countries to negotiate an international treaty to prohibit autonomous weapons systems that are unpredictable or target people and establish regulations to ensure human control over other systems. Since 2018, United Nations Secretary-General António Guterres has urged states to prohibit weapons systems that could, by themselves, target and attack human beings, calling them "morally repugnant and politically unacceptable."

The 31 countries demanding a ban on killer robots are Algeria, Argentina, Austria, Bolivia, Brazil, Chile, China (on use only), Colombia, Costa Rica, Cuba, Djibouti, Ecuador, Egypt, El Salvador, Ghana, Guatemala, the Holy See, Iraq, Jordan, Kazakhstan, Mexico, Morocco, Namibia, Nicaragua, Pakistan, Panama, Peru, the State of Palestine, Uganda, Venezuela, and Zimbabwe.

Human Rights Watch is a co-founder of the Campaign to Stop Killer Robots, the coalition of more than 180 nongovernmental organizations in 67 countries that advocates for a treaty to maintain meaningful human control over the use of force and prohibit weapons systems that operate without such control.

"It's feasible and essential to draw the line now on problematic emerging technologies by negotiating a new international treaty to retain meaningful human control over the use of force," Docherty said. "There should be no more delays."

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Artificial Intelligence, Emerging Technology, and Lethal Autonomous Weapons Systems:

SECURITY, MORAL, AND ETHICAL PERSPECTIVES IN ASIA

Edited by:
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NONVIOLENCE INTERNATIONAL ASIA

SEPTEMBER 2020

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Executive Summary

Artificial Intelligence (AI) development has been steadily expanding in the last decade, especially in the areas of economic development, rapid industrialization, increased productivity, and now, weaponry. Lethal Autonomous Weapons Systems (LAWS) are gaining attention due to prominent advances in weapons development. LAWS are loosely defined as "weapons that can select and engage targets without human intervention."[1] Global concern over the use of LAWS on human beings is growing, especially in countries that suffer from various security issues. Internal insecurity and armed confrontations over territorial disputes have all increased circumspection about the weaponization of AI and its integration to LAWS, contributing to its moniker, "killer robots". However, the threat does not merely lie in lethality, as an autonomous weapon system does not need to be "lethal" to inflict damage, and the weaponization of AI and the range of autonomous weapon systems that can inflict harm still pose a significant threat to human security. Beyond physical harm, the threat of force is enough to control the populace by discouraging certain actions. For now, the element of lethality remains unclear as most of these weapons systems are used to intercept and eliminate incoming projectiles.

In Asia, China, South Korea and India are known to be developing capabilities to weaponize AI. The rest of Asia is still a weapon importing region, though military spending has steadily increased in the past decade. The region's wide variety of cultures and political systems raise questions on how the weaponization of AI will affect its stability. China and South Korea have seen the most rapid economic growth in the past decades, including significant innovations in the research and development of military technology. Southeast Asia has also seen impressive economic growth which could enable governments to acquire complex military weapons, though perhaps not as advanced as LAWS. South Asia's economic growth as a whole has been less successful and is thus relatively underdeveloped compared to the other two sub-regions, though India is the clear economic power in the region. Each sub-region has experienced armed conflicts as well as unique political and socioeconomic challenges.

Much of Asia has not yet finalized its views and national positions on LAWS. A few countries have expressed concern over its manner of use and the applicability of International Humanitarian Law (IHL). So far, only three countries are in favor of a ban on use and only Pakistan is in favor of a ban on development. Based on consultations with government representatives, few understand and are aware of the technological requirements of LAWS development and the potential dangers of its use, especially as LAWS and its components are exceedingly more complex than non-autonomous weapons. A substantive dialogue with Asian countries would require sufficient coverage of these elements so that governments can respond adequately, participate actively in international discussions and develop their own policies.

This paper also shows that Asia will likely be divided between producers-suppliers and recipients-buyers of LAWS, also defined by the country's economic status. Lower middle income countries and middle income countries may be attempting to develop

1 Ekelhof, M. & Struyk, M. (2014). Deadly decisions: 8 objections to killer robots. Utrecht: PAX, p. 4. Retrieved from https://www.paxforpeace.nl/media/files/deadlydecisionsweb.pdf.

precursors to LAWS but will ultimately be behind countries such as China, South Korea, Singapore and Japan who may likely continue to devote resources to defense spending. Though majority of countries in Asia are less likely to manufacture LAWS due to lack of expertise and capability, these countries can still be suppliers of parts, components, or software, making regulatory policies a necessary standard for the entire region.

There are currently no international agreements or regulation frameworks that address LAWS specifically. Discussions regarding LAWS started in informal meetings leading up to the CCW in 2014 and have been continuing through Group of Governmental Experts (GGE) meetings ever since. Some agreements could serve as a foundation for future agreements by virtue of their scope. Treaties such as the 2017 Treaty on the Prohibition of Nuclear Weapons (TPNW), the 2013 Arms Trade Treaty (ATT), the 2008 Convention on Cluster Munitions (CCM), and the 1996 Mine Ban Treaty (MBT) may cover related weapons or parts of LAWS. The Convention on Certain Conventional Weapons (CCW) and its Protocol IV, adopted in 1995, on Blinding Laser Weapon is perhaps the most relevant provision as it preemptively banned a weapon that is still being developed.

The Martens Clause found in the Geneva Convention is also relevant in the moral and ethical discussion of a weapon that is still perceived to be under development, as it states that "civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience."[2] The international dialogue on LAWS would benefit from a discussion of the moral and ethical implications of its potential development and use, especially regarding democracy, transparency, human rights and accountability.

Additionally, this paper recommends certain steps to spread awareness and encourage countries to confront issues that may emerge from LAWS development and use. States may be engaged at the international, regional and national levels to determine at which degree are they discussing LAWS issues and what is their awareness of the international debates.

At the international level, more efforts should be made to have clarity on the definition of LAWS. It is especially critical for definitions to be decided in order to increase understanding on the development and use of LAWS and its implications on conflict, warfare and human rights. It would be useful for countries if more inter-sectoral discussions between the scientific and engineering community, government representatives and civil society are encouraged. This would provide clarity between AI and robotics workers, state, defense, arms industries, and civil society and urge them to find a unified position. Steps should be taken to map out the "complex life cycle" of a LAWS, similar to defining the life cycle of conventional weapons, which includes various aspects of conceptualization, development, up to its disposal. As standards are important in contributing to a wider understanding of LAWS, a legally-binding international instrument must take into consideration the humanitarian impact of LAWS. Such an instrument should also have considerable space for the views of states who have no intention to develop, possess or use LAWS.

2 Protocol additional to the Geneva conventions of 12 August 1949, and relating to the protection of victims of international armed conflicts (Protocol I), 8 June 1977. Retrieved from https://ihl-databases.icrc.org/ihl.nsf/WebART/470-750004

At the regional level, regulatory policies are important. The complexity of LAWS components, each with its own international development and distribution process, points even more to the necessity a regional policy response. Regular dialogue will help states develop their own positions, something civil society organizations can provide assistance in. States in the region should be encouraged to take on LAWS as an emerging security and humanitarian issue and step up its leadership towards a common regional position. The nature of emerging technologies and the security threats it will pose in the future cannot be addressed by any single state effort, and this should be highlighted in discussions and engagements with states.

At the national level, it is important to fully engage governments to tackle the future of LAWS. National policies can only be effective if policymakers and implementing agencies understand the nature and feature of LAWS. It would be useful for states to conduct further studies on the implications of LAWS in the national security, public order and safety situation vis-à-vis positive technological advancements. Any national process on LAWS regulation or ban must involve various stakeholders in preparation for a global diplomatic conference negotiating a new international law governing LAWS.

To this end, civil society organizations (CSO) can play a significant role. CSOs can serve as intermediaries between different sectors of society including government, private and technological sectors. They can engage and encourage states to participate actively in international meetings towards developing their own national positions. Civil society's efforts must thus be supported, especially those from developing countries who do not have the resources to constantly engage governments or participate in the global discussions on LAWS. In the same vein, experts, particularly tech workers, AI and robotics experts, should be encouraged to share their views at various levels of discussions. An Asian regional platform on humanitarian disarmament can be strengthened to help build a stronger unified position of CSOs working on this issue, especially those who are working with victims in conflict-ridden countries. Knowledge materials should be developed and produced to assist CSOs in raising the awareness of the public and their respective governments. CSOs can work together towards producing a unified position and message regarding the very real threat that LAWS can pose to their communities.

List of Abbreviations

AAR	Association for Aid and Relief Japan
AI	Artificial Intelligence
ASEAN	Association of Southeast Asian Nations
ATLA	Acquisition, Technology and Logistical Agency of Japan
ATT	Arms Trade Treaty
BIT	Beijing Institute of Technology
CAIR	Centre for Artificial Intelligence and Robotics
CCM	Convention on Cluster Munitions
CCW	Convention on Certain Conventional Weapons
CSO	Civil Society Organization
DAC	Defense Acquisition Council
DTI	Defense Technology Institute
DMZ	Demilitarized Zone
DRDO	Defense Research and Development Organization
EOS	Electro Optic Systems
ERW	Explosive Remnants of War
EU	European Union
GGE	Group of Governmental Experts
HRN	Human Rights Now
HRW	Human Rights Watch
ICRAC	International Commission on Robotic Weapons Control
IJOP	Integrated Joint Operations Platform
IT	Information Technology
JCBL	Japan Campaign to Ban Landmines
JVC	Japan International Volunteer Center
KAIST	Korea Advanced Institute of Science and Technology
LAWS	Lethal Autonomous Weapons Systems
LOAC	Laws of Armed Conflict
MARF	Multi Agent Robotics Framework
MBT	Mine Ban Treaty
NAM	Non-Aligned Movement
NISEA	Nonviolence International Southeast Asia
SDG	Sustainable Development Goal
SIPRI	Stockholm International Peace Research Institute
SOE	State-owned enterprises
TPNW	Treaty on the Prohibition of Nuclear Weapons
UAV	Unmanned aerial vehicle
UGV	Unmanned ground vehicle
UUV	Unmanned underwater vehicle
UXO	Unexploded ordnance

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CHAPTER I

The Problem with Lethal Autonomous Weapons Systems

The application of Artificial Intelligence (AI) in our daily lives has been steadily expanding in the last decade. Economic development, rapid industrialization and increased productivity all drive the quest for greater efficiency and accuracy in machines. Systems that employ facial recognition, image analysis, automated assistance and data entry and analysis all utilize AI to reduce processing times.[3] AI has contributed greatly to the growth of the global economy, with a potential to increase global economic output by as much as 16% in 2030.[4] AI applications in the field of agriculture facilitate higher yields. In medicine, AI powered robots conduct more precise and swift surgical procedures with minimal risk to patients. Most recently, AI has been tapped to help in the fight against the corona virus pandemic. In the areas of transportation and trade, AI in self-driving vehicles contributes to road safety by eliminating human errors in driving. It also decreases the time it takes to deliver products by automating parts of shipping and delivery systems. AI is integrated in various other industries including media, telemarketing, information technology and telecommunications, and that AI and automation mean delegation of more and more functions to non-humans.

Just as AI can be utilized to improve the quality of human lives, so can it be used to control them. Wide access to personal data and the digitization of information exchange has enabled states and tech companies to harvest and amass data from every corner of the connected world.[5] Data utilized in communications, surveillance, public services and internet-based applications are sold to advertisers and other private entities for various uses.[6] Some use of personal information may cross ethical lines and violate

3 Scharre, P. (2018). *Army of none: Autonomous weapons and the future of war.* New York: W.W. Norton.

4 Bughin, J. et al. (2018, September). Notes from the AI frontier: Modeling the impact of AI on the world economy. *McKinsey Global Institute*. Retrieved from https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Artificial%20Intelligence/Notes%20from%20the%20frontier%20Modeling%20the%20impact%20of%20AI%20on%20the%20world%20economy/MGI-Notes-from-the-AI-frontier-Modeling-the-impact-of-AI-on-the-world-economy-September-2018.ashx.

5 Fanning, D. (Producer), & Fanning, D. & Docherty, N. (Directors). (2019). *In the age of AI* [Documentary film]. United States: PBS.

6 Ibid.

privacy, as in Cambridge Analytica's leveraging of personal data obtained from social media sites to influence foreign elections and politics.[7]

Adding to the privacy issues is the increased personalization of mobile technology. Applications use personal information such as location, social networks and preferences to inform advertising, but where and in what instances these details are used are not entirely clear. Companies like Facebook, whose negligence with user privacy has enabled Cambridge Analytica to improperly harvest personal data from its users, have been accused of giving companies unfettered access to user profiles and their supposedly private details.[8] This is not strictly AI's doing. However, software can be developed to analyze personal information, leaving enormous benefits to those who have access to it.[9] One company that seems to enable this is Clearview AI. Clearview AI provides facial recognition software to its clients from its own curated database of pictures surreptitiously collected from various websites. All a user needs to do is upload an image of a person from their photo library or even one they just captured to the Clearview search engine. The software presents a list of matching images and names of the individual, which the user can then use to unearth more information about them.[10] Clearview has given access to their software to law enforcement, foreign governments and companies[11] and there are fears that governments can use it to crack down on protesters or political opposition. These examples demonstrate the possibilities that could be accomplished with the help of AI and how it can also be inimical to human rights.

It was only a matter of time before AI was used to enhance weapons systems. Since the Cold War, governments have been experimenting with weapons systems that have been programmed with increasingly sophisticated AI functions.[12] Lethal Autonomous Weapons Systems (LAWS), as they have come to be called, are gaining attention due to prominent advances in advanced weaponry. Speed and efficiency are commonly identified as the primary benefits of equipping weapons systems with AI technology.[13] Proponents argue that precision can be very useful in the battlefield.[14] LAWS can identify the correct targets and defend combatants and non-combatants at a rate that far exceeds human capabilities and are also not susceptible to human error.[15] AI has already been used in weapons systems such as active protection systems, or systems that prevent missiles and projectiles from destroying a target such as a tank, and sentry robots, which are equipped with weapons that automatically fire at targets that

7 Confessore, N. (2018, April 4). Cambridge Analytica and Facebook: The scandal and the fallout so far. *The New York Times*. Retrieved from https://www.nytimes.com/2018/04/04/us/politics/cambridge-analytica-scandal-fallout.html?auth=login-email&login=email.

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9 Verdelli, A. (2018). World report 2019: China. *Human Rights Watch*. Retrieved from https://www.hrw.org/world-report/2019/country-chapters/china-and-tibet.

10 Hill, K. (2020, January 18). The secretive company that might end privacy as we know it. *The New York Times*. Retrieved from https://www.nytimes.com/2020/01/18/technology/clearview-privacy-facial-recognition.html.

11 Heilweil, R. (2020, May 8). The world's scariest facial recognition company, explained. *Vox*. Retrieved from https://www.vox.com/recode/2020/2/11/21131991/clearview-ai-facial-recognition-database-law-enforcement

12 Scharre, P. (2018). *Army of none: Autonomous weapons and the future of war*. New York: W.W. Norton.

13 Altmann, J. & Sauer, F. (2017). Autonomous weapon systems and strategic stability. Survival, 59(5), 117-142.; Fanning, D. (Producer), & Fanning, D. & Docherty, N. (Directors). (2019). *In the age of AI* [Documentary film]. United States: PBS.; Scharre, P. (2018). *Army of none: Autonomous weapons and the future of war*. New York: W.W. Norton.

14 International Committee of the Red Cross [ICRC]. (2018, March 21-22). *Emerging military technologies applied to urban warfare. Programme on the Regulation of Emerging Military Technologies*. Asia Pacific Centre for Military Law, 1161-1174.

15 Scharre, P. (2018). *Army of none: Autonomous weapons and the future of war*. New York: W.W. Norton.

its sensors detect.[16] While most of these weapons systems are used to intercept and eliminate incoming projectiles, global concern over the use of LAWS on human beings is growing. Recent collaborations between research institutions and military contractors to develop technologies in this field have come to light, sparking public outrage.[17]

AI in commercial applications provides a glimpse into how it is being used in the Asian region. When Google DeepMind's AlphaGo defeated Go World Champion Lee Se-dol in 2016, tech companies saw the infinite possibilities of deep neural learning in machines.[18] But the most intelligent AI and the most efficient system may still be used for unethical and illegal activities, such as in violating privacy and in cyberattacks.[19] While states have not actively discussed their development of LAWS, most research and development on it are kept in the dark, away from public scrutiny.

Civil society organizations (CSOs) have started raising awareness on the issue but had received the same feedback from law enforcement and defense agencies. The common perception is that "robots are better than humans" in terms of enforcement because they will be more objective, precise, and incorruptible and thus will commit less mistakes.[20] This perception was also common among some academics and other CSOs engaged in the region. There is an air of trust in a more objective machine than the average law enforcer. LAWS are perceived to be more accurate in enforcing peace and order compared to people who can deviate from lawful behavior.[21] The understanding of how LAWS can be deployed in the real world is still unknown, but these perceptions by both state and society will shape how development of LAWS and its potential use will be decided.

Defining LAWS

There is no universally agreed definition on LAWS, though this paper will use a definition that corresponds to its autonomous feature. LAWS are loosely defined as "weapons that can select and engage targets without human intervention,"[22] although governments ultimately decide what they consider autonomous based on degree of independence or the complexity of the AI's intelligence. For example, the United States defines autonomous weapon systems as "(a) weapon system that, once activated, can select and engage targets without further intervention by a human operator. This includes human-supervised autonomous weapon systems that are designed to allow human operators to override operation of the weapon system, but can select and engage targets without further human input after activation."[23] Human involvement is limited to activating the device. Thus, any autonomous weapon system is one with the

16 Bode, I. & Huelss, H. (2018). Autonomous weapons systems and changing norms in international relations. *Review of International Studies*, 44(3), 393-413.

17 Wakefield, J. (2018, April 5). South Korean university boycotted over "killer robots." *BBC News*. Retrieved from https://www.bbc.com/news/technology-43653648.

18 Fanning, D. (Producer), & Fanning, D. & Docherty, N. (Directors). (2019). *In the age of AI* [Documentary film]. United States: PBS.

19 Ibid.

20 Nonviolence International Southeast Asia [NISEA]. (2018-2019). Personal communications with government officials and civil society organizations of Southeast Asian countries.

21 Ibid.

22 Ekelhof, M. & Struyk, M. (2014). Deadly decisions: 8 objections to killer robots. Utrecht: PAX, p. 4. Retrieved from https://www.paxforpeace.nl/media/files/deadlydecisionsweb.pdf.

23 Department of Defense. (2017, May 8). Directive 3000.09, autonomy in weapon systems, November 21, 2012, incorporating change 1, May 8, 2017, pp. 13-14. Retrieved from https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodd/300009p.pdf.

independence to select, aim and fire at a target. The United Kingdom (UK), meanwhile, does not have a definition that specifically describes LAWS. Instead it defines an autonomous system as "capable of understanding higher level intent and direction… [are] able to take appropriate action to bring about a desired state… [are] capable of deciding a course of action from a number of alternatives without depending on human oversight or control."[24] For the UK, the intelligence of the AI and its independence from human action matter. Anything short of human and contextual understanding is thus considered an automated machine, not an autonomous one.[25]

In other words, autonomous weapons systems can determine who is a threat, and whether or not coercive action should be taken against that threat. Both intelligence and independence are important in determining the level of autonomy, although it can be argued that independence is the defining factor. A machine may be programmed to fulfill complex tasks and consider a plethora of variables, but without independence to act, it cannot execute its programming.[26]

LAWS in Conflict Areas

The application of AI in weapons systems is alarming for several reasons. One, there will always be a degree of unpredictability in using LAWS, especially in cases where deep neural learning is part of the programming. Recent research on facial recognition AI has exposed several critical weaknesses. Facial recognition software works by matching the images it receives to its database and ignore what it deems to be irrelevant images. In this process of elimination, it can be taught to ignore many images, but it will not be possible to input all of them. If it encounters an image that it does not recognize, it may mis-identify or miss targets. In addition, AI that has been programmed with deep learning has also been seen to create abstract and nonsensical images and then identify them as human faces.[27] The human brain would be able to tell the difference, but a machine, limited by its programming, cannot. Second, in connection with the previous point, LAWS must be predictable to ensure that it follows only what it is directed to do. But in order to guarantee predictability, LAWS must be subjected to empirical tests, something that is impossible to do if it is intended to be used in a conflict setting. Wars are chaotic, disorderly and confusing compared to a target range or a controlled area. The use of LAWS in battle will always be accompanied by the risk that it cannot be fully controlled. Third, human beings are capable of perceiving moral dilemmas in warfare. Soldiers may choose not to target child soldiers or child informants, while it remains to be seen if machines could. If civilians are mixed in with a group of combatants, or are armed for self-defense and not belligerent, would machines be able to tell the difference between armed combatants and armed, nonbelligerent civilians? Finally, in the wrong hands, LAWS may be used in non-conflict situations they are not designed for. Such systems could empower authoritarian governments who could use it as a tool of repression. Non-state armed groups could also access LAWS and use it against government armed forces or may be used to commit terroristic activities.

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24 UK Ministry of Defence. (2017). Joint doctrine publication 0-30.2: Unmanned aircraft systems, p. 72. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/673940/doctrine_uk_uas_jdp_0_30_2.pdf.

25 Scharre, P. (2018). *Army of none: Autonomous weapons and the future of war*. New York: W.W. Norton.

26 Ibid.

27 Ibid.

While it remains to be seen if LAWS can accurately make a distinction between combatants and civilians in a conflict setting, the race to build these weapons is on, and most countries in Asia will most likely suffer the fallout.

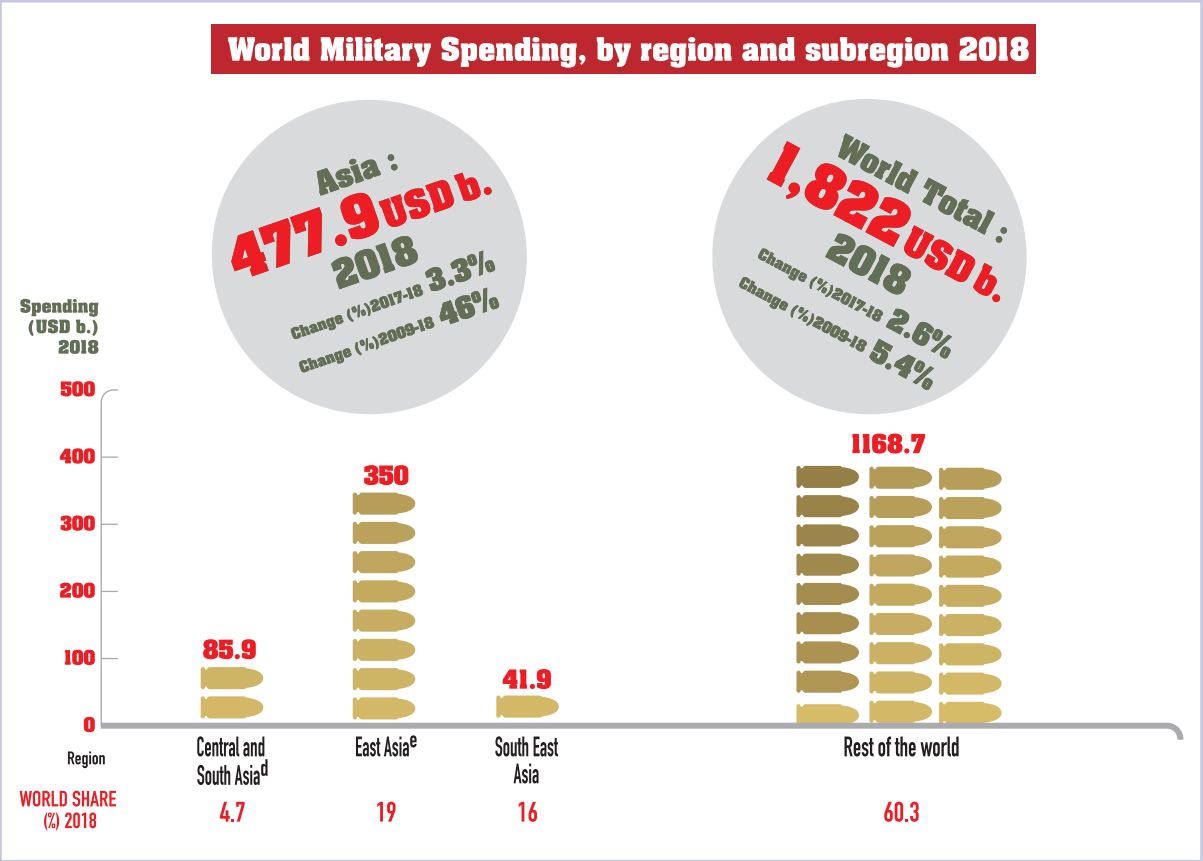
Overview of Arms Trends in Asia

Despite the existence of LAWS precursors such as unmanned utility vehicles and machines, a fully automated weapon system is still largely conceptual. One way to get insights into the future attitudes of states on LAWS is through growth in military spending. The purpose of this data is not to predict each states' propensity to develop and use LAWS, as it is too early to make this determination. An increase in military spending sheds some light on how states have prioritized military development over the years. Later chapters then look into the possible motivations for this increase.

Data from the Stockholm International Peace Research Institute (SIPRI) shows that Asia has increased its military spending in the last decade (see Figure 1a).[28] The percent change in Asia and Oceania from 2009-2018 is 46%, compared to 9.2% in Africa, -14% in the Americas, and 3.1 in Europe. East and South Asia saw the greatest increase in military spending in the last decade. Among the top 40 countries with the highest military expenditure in 2018, China and India are among the top 5, Japan and Korea in the top 10, and Pakistan, Singapore, Taiwan, Indonesia, Thailand and Vietnam in the top 40 (see Figure 1b). Among the largest percentage increases in Asia between 2009-2018, Indonesia had a 99% spending increase, followed by China with 83%, Pakistan with 73%, India with 29% and South Korea with 28%.

28 Stockholm International Peace Research Institute [SIPRI]. (2019, April 29). World military expenditure grows to $1.8 trillion in 2018. Retrieved from https://www.sipri.org/media/press-release/2019/world-military-expenditure-grows-18-trillion-2018#:~:text=Military%20expenditure%20in%20Asia%20and,per%20cent%20to%20%2466.5%20billion.

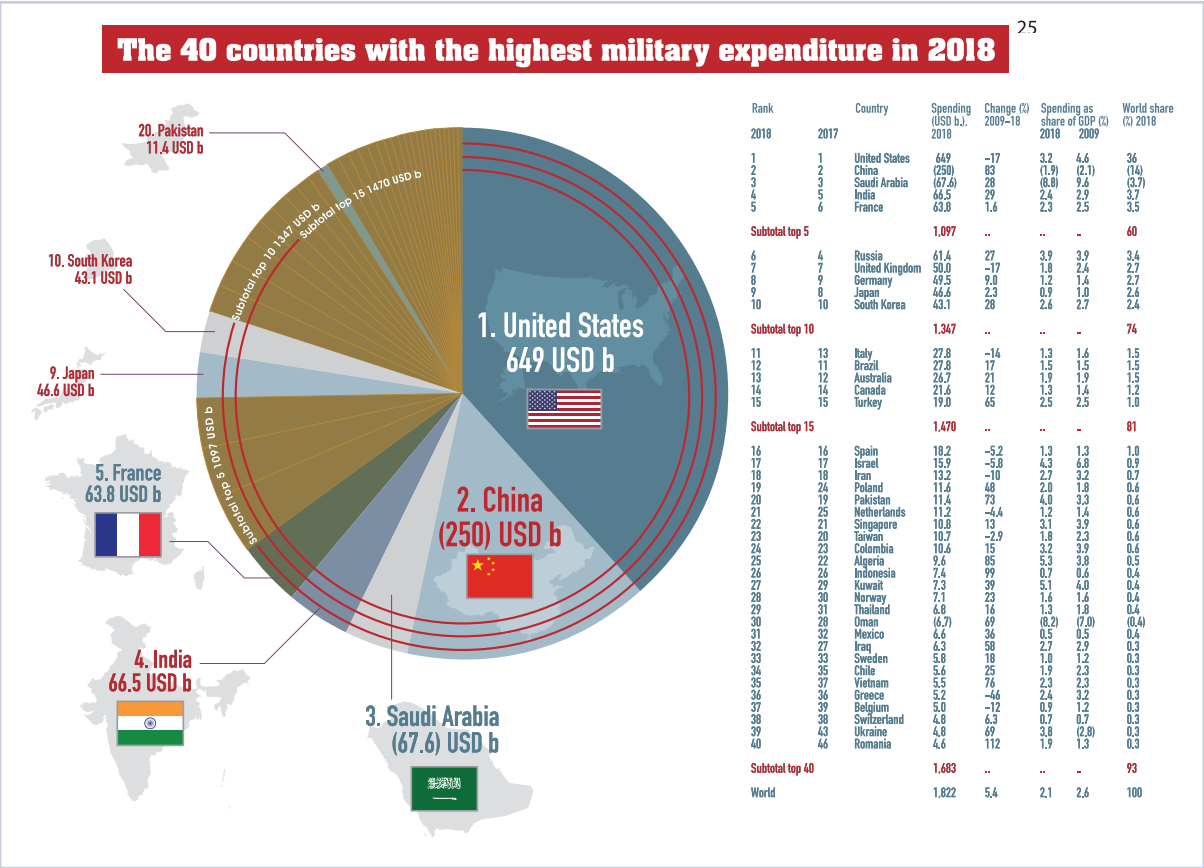
Figure 1a:[29]



Notes:
World Total Figure excludes the following:
Eritrea and Somalia
Cuba
There is no SIPRI estimate available for the Middle East from 2015 to 2018. A rough estimate for the Middle East (excluding Qatar and Syria) is included in the world total.
[d] - Figures exclude Turkmenistan and Uzbekistan
[e] - Figures exclude North Korea

29 Tian, N. et al. (2019, April). *Trends in world military expenditure, 2018*. Stockholm: Stockholm International Peace Research Institute, p.6. Retrieved from https://sipri.org/sites/default/files/2019-04/fs_1904_milex_2018_0.pdf. Data taken from SIPRI Military Expenditure Database, April 2019.

Figure 1b:[30]



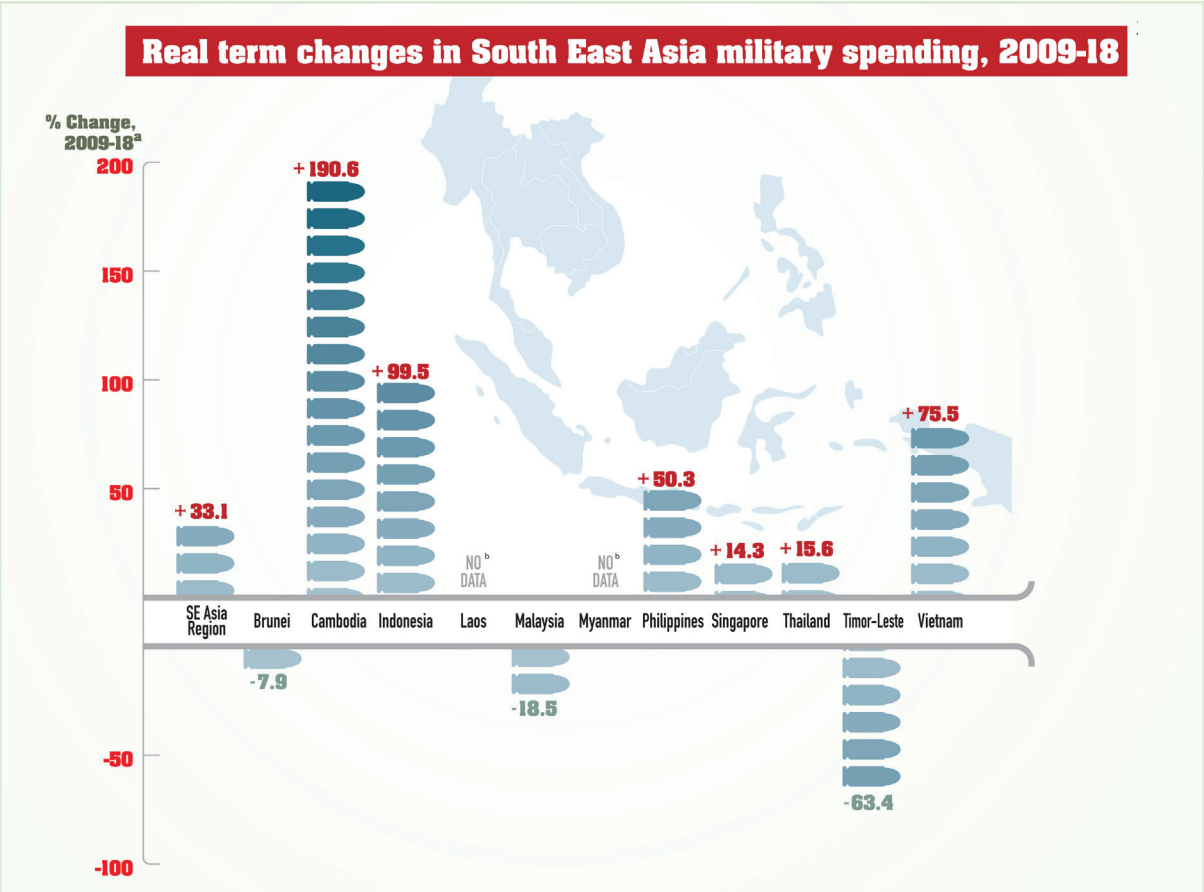
Rank 2018	Rank 2017	Country	Spending (USD b.), 2018	Change (%) 2009–18	Spending as share of GDP (%) 2018	Spending as share of GDP (%) 2009	World share (%) 2018
1	1	United States	649	–17	3.2	4.6	36
2	2	China	(250)	83	(1.9)	(2.1)	(14)
3	3	Saudi Arabia	(67.6)	28	(8.8)	9.6	(3.7)
4	5	India	66.5	29	2.4	2.9	3.7
5	6	France	63.8	1.6	2.3	2.5	3.5
Subtotal top 5			1,097	..	..	..	60
6	4	Russia	61.4	27	3.9	3.9	3.4
7	7	United Kingdom	50.0	–17	1.8	2.4	2.7
8	9	Germany	49.5	9.8	1.2	1.4	2.7
9	8	Japan	46.6	2.3	0.9	1.0	2.6
10	10	South Korea	43.1	28	2.6	2.7	2.4
Subtotal top 10			1,347	..	..	..	74
11	13	Italy	27.8	–14	1.3	1.6	1.5
12	11	Brazil	27.8	17	1.5	1.5	1.5
13	12	Australia	26.7	21	1.9	1.9	1.5
14	14	Canada	21.6	12	1.3	1.4	1.2
15	15	Turkey	19.0	65	2.5	2.5	1.0
Subtotal top 15			1,470	..	..	..	81
16	16	Spain	18.2	–5.2	1.3	1.3	1.0
17	17	Israel	15.9	–5.8	4.3	6.8	0.9
18	18	Iran	13.2	–10	2.7	3.2	0.7
19	24	Poland	11.6	48	2.0	1.8	0.6
20	19	Pakistan	11.4	73	4.0	3.3	0.6
21	25	Netherlands	11.2	–4.4	1.2	1.4	0.6
22	21	Singapore	10.8	13	3.1	3.9	0.6
23	20	Taiwan	10.7	–2.9	1.8	2.3	0.6
24	23	Colombia	10.6	15	3.2	3.9	0.6
25	22	Algeria	9.6	85	5.3	3.8	0.5
26	26	Indonesia	7.4	99	0.7	0.6	0.4
27	29	Kuwait	7.3	39	5.1	4.0	0.4
28	30	Norway	7.1	23	1.6	1.6	0.4
29	31	Thailand	6.8	16	1.3	1.8	0.4
30	28	Oman	(6.7)	69	(8.2)	(7.0)	(0.4)
31	32	Mexico	6.6	36	0.5	0.5	0.4
32	27	Iraq	6.3	58	2.7	2.9	0.3
33	33	Sweden	5.8	18	1.0	1.2	0.3
34	35	Chile	5.6	25	1.9	2.3	0.3
35	37	Vietnam	5.5	76	2.3	2.3	0.3
36	36	Greece	5.2	–46	2.4	3.2	0.3
37	39	Belgium	5.0	–12	0.9	1.2	0.3
38	38	Switzerland	4.8	6.3	0.7	0.7	0.3
39	43	Ukraine	4.8	69	3.8	(2.8)	0.3
40	46	Romania	4.6	112	1.9	1.3	0.3
Subtotal top 40			1,683	..	..	..	93
World			1,822	5.4	2.1	2.6	100

Notes:
( ) - SIPRI estimate
.. - Data is not available.
Rankings for 2017 are based on updated military expenditure figures in the current edition of the SIPRI Military Expenditure Database. They may therefore differ from the rankings for 2017 given in SIPRI Yearbook 2018 and in other SIPRI publications in 2018.
The figures for military expenditure as a share of GDP are based on estimates of 2018 GDP from the International Monetary Fund World Economic Outlook and International Financial Statistics databases.

A closer look at Southeast Asia also shows a rising trend in military spending. From 2009-2018, Southeast Asia in general has been increasing its military spending (see Figure 2a and 2b). Cambodia and Indonesia have seen the greatest increase, followed by Vietnam. Cambodia has not reduced its spending once in the past 10 years, while Indonesia, Laos, Myanmar, the Philippines, Singapore and Thailand have only reduced it less than 5 times over this time period. Many countries in Southeast Asia are attempting to modernize their military and naval capabilities.

30 Tian, N. et al. (2019, April). *Trends in world military expenditure, 2018*. Stockholm: Stockholm International Peace Research Institute, p.2. Retrieved from https://sipri.org/sites/default/files/2019-04/fs_1904_milex_2018_0.pdf. Data taken from SIPRI Military Expenditure Database, April 2019; International Monetary Fund, World Economic Outlook Database, October 2018; and International Monetary Fund, International Financial Statistics Database, September 2018. The highlighted parts are countries in East, South and Southeast Asia.

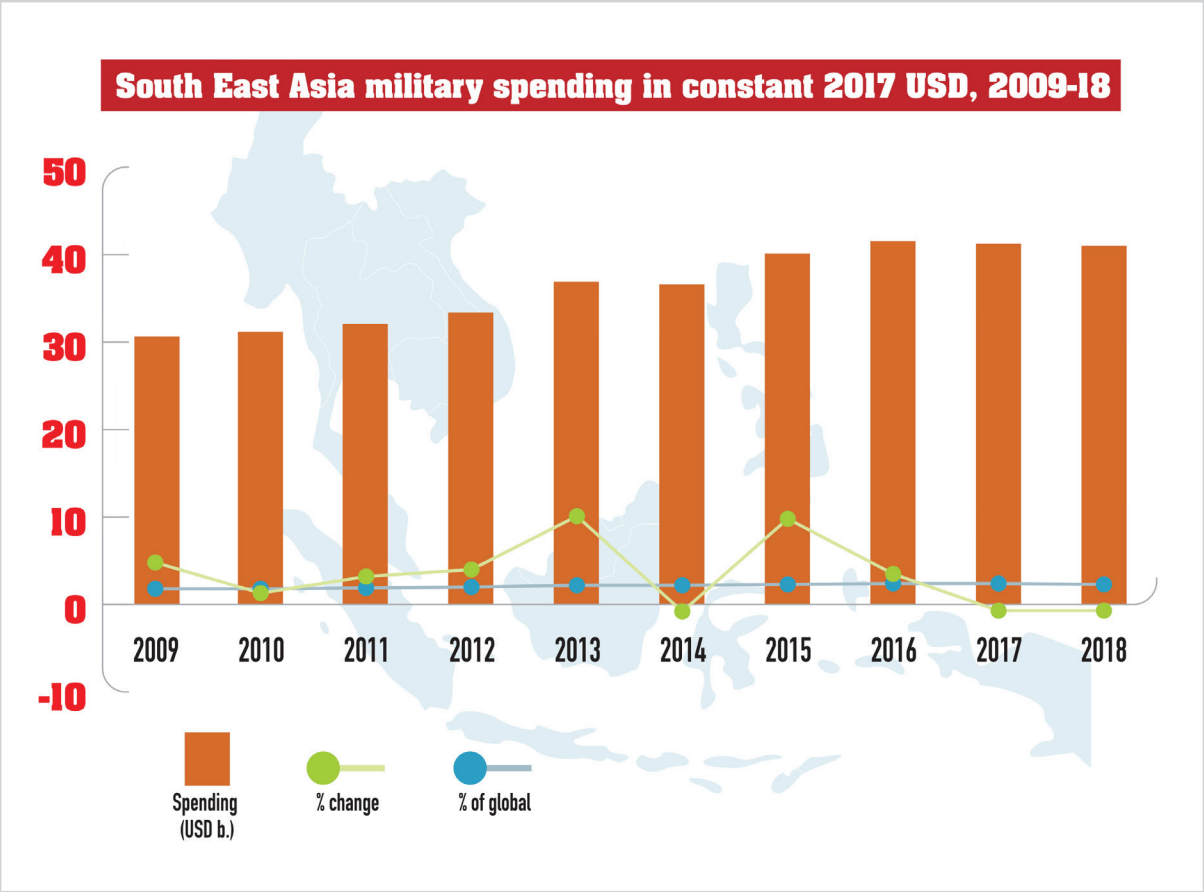
Figure 2a:[31]



Notes:
.. - Data is not available.
[a] Percentage change is for military spending in constant 2017 US dollars.
[b] Myanmar (for which there is no data available for 2009-11)
and Laos (for which there is no data available for 2014-18) are excluded.
For Laos only the five years, 2009-13 inclusive, are counted.
For Myanmar only the six years, 2013-18 inclusive, are counted.

31 Wezeman, S. (2019, December). *Arms flows to Southeast Asia.* Stockholm: Stockholm International Peace Research Institute, p.11. Retrieved from https://www.sipri.org/sites/default/files/2019-12/1912_arms_flows_to_south_east_asia_wezeman.pdf. Data taken from SIPRI Military Expenditure Database, April 2019.

Figure 2b:[32]



Notes:
For Myanmar no data is available for 2009-11 and for Laos no data is available for 2014-18. For both states, estimates have been made for missing years based on trends in known years.

The top ten importers of major weapons in Asia are distributed across the East, South and Southeast sub-regions (see Figure 3). With the exception of China, who is also a major exporter for the period 2013-2017, India, Pakistan and Indonesia have all experienced internal conflict for prolonged periods. India and Pakistan have an acrimonious relationship and China is locked in territorial disputes with surrounding neighbors. Indonesia, much like other Association of Southeast Asian Nations (ASEAN) members, is working towards modernizing its navy.

32 Ibid.

Figure 3:[33]

Overall, Asia is still a weapons' importing region and military modernization appears to be a primary driver in the increase in military spending. China, India and Singapore are top exporters, although China surpasses the other two by hundreds of millions in US dollars.[34] Military modernization in these sub-regions is motivated by both security concerns and a desire to professionalize the military and law enforcement forces.[35]

Majority of the countries may not be developing LAWS yet but this upward trend in military spending forebodes a looming security dilemma. Fueled with conflicts and territorial disputes, military spending will continue to influence politics in the region. In later chapters, this study will show that while there are no concrete plans to develop LAWS, some countries do intend to invest in precursors to LAWS such as unmanned vehicles. This section provided some insight into how countries may respond to LAWS development and proliferation.

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33 Smith, D. (2018). Summary. *SIPRI yearbook 2018: Armaments, disarmament and international security*. Stockholm: Stockholm International Peace Research Institute, p.8. Retrieved from https://www.sipri.org/sites/default/files/2018-06/yb_18_summary_en_0.pdf.

34 Wezeman, S. (2019, December). *Arms flows to Southeast Asia*. Stockholm: Stockholm International Peace Research Institute. Retrieved from https://www.sipri.org/sites/default/files/2019-12/1912_arms_flows_to_south_east_asia_wezeman.pdf. Data taken from SIPRI Military Expenditure Database, April 2019.; Hoe, P.S. (2013, March 21). Singapore is world's 20th biggest arms exporter. The Straits Times. Retrieved from https://www.straitstimes.com/singapore/singapore-is-worlds-20th-biggest-arms-exporter.; Marlow, I. (2018, February 1). India struggles to match China as elite weapons exporter. Retrieved from https://economictimes.indiatimes.com/news/defence/india-struggles-to-match-china-as-elite-world-weapons-exporter/articleshow/62733075.cms.

35 Heiduk, F. (2014). Introduction: *Security sector reform in Southeast Asia.* In F. Heiduk (Ed.), Security sector reform in Southeast Asia: From policy to practice (pp. 1-22). Hampshire: Palgrave Macmillan.

Impact of the Development of LAWS in Asia

Asia's wide variety of cultures and political systems raise questions on how LAWS will impact the region. East Asia has seen the most rapid economic growth in the past decades, including significant innovations in the research and development of military technology (see Figure 4 for a partial list of semi-autonomous and autonomous weapons that are active or are in development). Southeast Asia has also seen impressive economic growth which could enable governments to acquire complex military weapons systems, though perhaps not as advanced as LAWS. South Asia's economic growth as a whole has been less successful and is thus relatively underdeveloped compared to the other two sub-regions, aside from India, which is the clear economic power in the region. Political unrest and violence are common in South Asia as countries grapple with forced migration, insurgency, terrorism, and ethnic persecution.

Figure 4:[36]

36 Bode, I. & Huelss, H. (2018). Autonomous weapons systems and changing norms in international relations. *Review of International Studies*, 44(3), 393-413, p. 402.

Several countries in Asia have ongoing armed conflicts that are aggravated by the proliferation of illicit weapons. These countries will most likely be recipients or transit points for LAWS or remain sites of conflict instead of serving as suppliers of LAWS. On top of this, Asia as a whole has a history of authoritarian leaders accused of violating human rights. LAWS could have disastrous effects in the region if used in conflict situations or to repress populations.

There are currently no international agreements or regulation frameworks that address LAWS specifically. Discussions regarding LAWS started in informal meetings leading up to the CCW since 2014. After three informal meetings, states decided to formalize the discussions in a Group of Governmental Experts (GGE) in mid-November 2017. The GGEs have been convened each year since. In these meetings, 19 governments have so far called for preventive prohibitions on LAWS. Outside of the GGE dialogues, 22 countries have publicly supported a complete ban, though it remains to be seen how a formal treaty process will pan out.[37]

Some agreements could serve as a foundation for future agreements by virtue of their scope. Treaties such as the 2017 Treaty on the Prohibition of Nuclear Weapons (TPNW), the 2012 Arms Trade Treaty (ATT), the 2008 Convention on Cluster Munitions (CCM), and the 1996 Mine Ban Treaty (MBT) may cover related weapons or parts of LAWS. Convention on Certain Conventional Weapons (CCW) is perhaps the most relevant provision as it provided a precedent to banning a weapon that is still in development.[38] Because of the complexity of LAWS, however, a new international instrument that covers the entire lifecycle of autonomous weapons systems becomes a necessity. From the production and deployment of the hardware to the programming and integration of the software on the weapon, a future convention on LAWS must be able to adapt to the rapid technological advances in every stage of LAWS development.

37 Bode, I. & Huelss, H. (2018). Autonomous weapons systems and changing norms in international relations. Review of International Studies, 44(3), 393-413.; Scharre, P. (2018). *Army of none: Autonomous weapons and the future of war.* New York: W.W. Norton.

38 Precedent for Preemption: The Ban on Blinding Lasers as a Model for a Killer Robots Prohibition. Retrieved from https://www.hrw.org/news/2015/11/08/precedent-preemption-ban-blinding-lasers-model-killer-robots-prohibition#_ftn2

CHAPTER II

Overview of Disarmament and Regulation Frameworks in Asia

To better understand the need for a dedicated and comprehensive international agreement on LAWS, this chapter will look at the reach of arms and munitions regulation agreements in each sub-region. One will see that the reach of these agreements is scattered and may not adequately cover future developments of robotics in weapons systems.

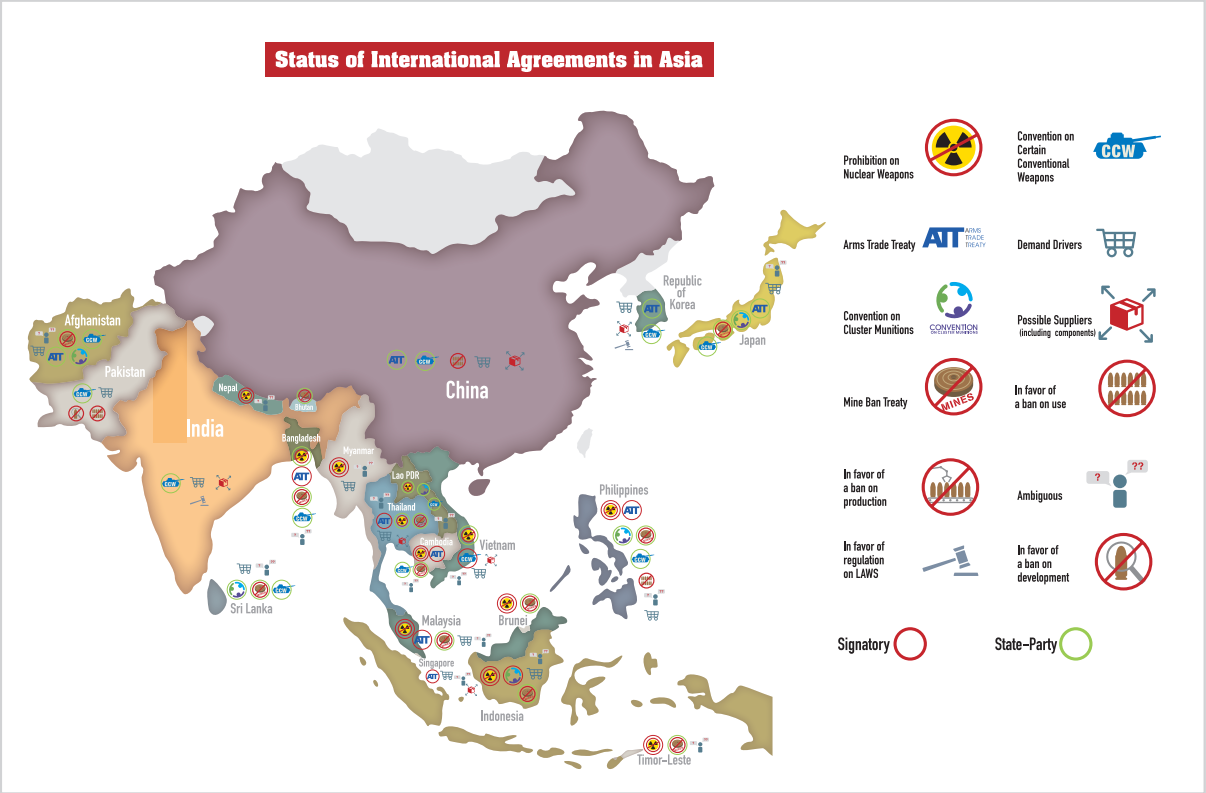
In East Asia, Japan is the most consistent proponent of major international arms control instruments, bar one due to its use of nuclear power (see Figure 5). Interestingly, China, Japan and South Korea have all ratified/acceded to the Arms Trade Treaty and the CCW.

In Southeast Asia, participation in these agreements is more varied (see Figure 5). The Convention on Cluster Munitions is less accepted than other agreements, although the sub-region is known for passing and implementing relevant laws before signing and ratifying international agreements. Several non-signatories suffer from internal armed conflicts, especially Myanmar, which has not signed any regulatory instruments except the Prohibition on Nuclear Weapons.

South Asia follows a similar trend. Though Afghanistan has adopted the most agreements (see Figure 5), most countries have not signed them. This is unlikely to change as long as the two nuclear powers in the region, India and Pakistan, remain hostile to each other.

The international Campaign to Stop Killer Robots (CSKR) is looking at International Humanitarian Law (IHL) principles and the CCW framework to support the advocacy to ban LAWS. The CCW, in particular, is seen as an important precedent by civil society organizations (CSO) working towards banning “killer robots” before they are developed

Figure 5:



or used because of the process and negotiations that led to Protocol IV, entitled "Protocol on Blinding Laser Weapons", which was adopted on 13 October 1995.[39] The CSKR argues that the "1995 protocol banning blinding lasers is an example of a weapon being preemptively banned before it was acquired or used."[40] Advocates for a ban also point out the relevance of the Martens clause in assessing the issue of LAWS as a new weapons systems:[41] "In cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience."[42] This clause "creates a legal obligation for states to consider moral implications when assessing new technology."[43] With varying commitments to international agreements on arms control, the presence of domestic and international disputes, and a history of authoritarian leaders, it seems that LAWS will have an inevitable impact in Asia. This paper will discuss the development of AI for military and enforcement use and signs towards LAWS development against a backdrop of politics and state control. How will LAWS affect security, political stability and democratic institutions in Asia? Which ethical principles and international laws are LAWS poised to destabilize? The paper will examine these issues in the particular contexts of East Asia (China, Japan and South Korea), Southeast Asia (Brunei, Cambodia,

39 United Nations [UN]. Retrieved from https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-2-a&chapter=26.

40 Campaign to Stop Killer Robots. Retrieved from https://www.stopkillerrobots.org/2017/11/ccwun-2/.

41 Docherty, B. (2018, August 21). *Heed the call: A moral and legal imperative to ban killer robots.* Human Rights Watch. Retrieved from https://www.hrw.org/report/2018/08/21/heed-call/moral-and-legal-imperative-ban-killer-robots.

42 Protocol additional to the Geneva conventions of 12 August 1949, and relating to the protection of victims of international armed conflicts (Protocol I), 8 June 1977. Retrieved from https://ihl-databases.icrc.org/ihl.nsf/WebART/470-750004.

43 Docherty, B. (2018, August 21). *Heed the call: A moral and legal imperative to ban killer robots.* Human Rights Watch. Retrieved from https://www.hrw.org/report/2018/08/21/heed-call/moral-and-legal-imperative-ban-killer-robots.

Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor Leste and Vietnam) and and South Asia (Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka). Chapter III will feature country profiles from these three subregions and present the different political realities and challenges that could potentially affect AI and LAWS development. It will also look at national laws and policies which may determine how countries will design and implement national systems around LAWS, as well as the national positions of governments, if any, regarding LAWS. Regional and international discussions on LAWS will be included to provide a complete picture of how LAWS are perceived and will be treated in these regions. Chapter IV looks at the implication of LAWS on democracy and accountability, human rights, international humanitarian law and social justice. Chapter V concludes the paper with a summary of its findings, while Chapter VI recommends policy directions for future action.

CHAPTER III

Country and Sub-Regional Profiles:

POSITIONS AND POLICIES ON LAWS

This chapter covers a number of issues concerning the perception, treatment and potential impact of AI development for military use and LAWS in Asia. Three topics will be examined per sub-region, namely (1) the political realities of countries that may motivate weapons development, (2) the national policies and positions espoused by each country, and the (3) regional views and international dialogue on LAWS.

Each sub-region has experienced armed conflicts as well as unique political and socioeconomic challenges. The first issue aims to assess how emerging technological innovations on AI and LAWS are progressing amidst the politics and society of Asia. States that have engaged in the transfer, promotion and marketing of AI uses in military settings, precursors to LAWS and LAWS will be discussed, including the involvement of private companies and universities, independent of or in collaboration with states. How the development of AI and LAWS can impact countries currently in conflict with non-state armed groups will also be discussed.

The second issue examines the relevant laws, national policies and national positions on the issue of LAWS. Some countries have concrete policies and plans on LAWS and its precursors, most notably East Asia. Others, namely Southeast and South Asia, have a tentative attitude. Countries have expressed some concern about the ethical issues surrounding the use of LAWS, though none has openly condemned it.

The third issue shows sub-regional trends and efforts to address LAWS as a regional group. It sheds light on the normative views and actions on LAWS and its precursors as adopted and led by states, regional organizations and CSOs, or all these three elements working in tandem.

EAST ASIA

For all its rich heritage, economic miracles and technological innovations, East Asia is still occasionally encumbered by territorial and political disputes. East Asia's views on LAWS and AI development for military use are unique as countries in the region are not only facing geopolitical security challenges, but all are gifted with the capability of developing and producing LAWS. As potential developers or suppliers of LAWS, the motivations guiding each country towards its development and regulation must be looked into.

LAWS Development and National Position on LAWS

China

As one of the economic and military giants in the world, China has several interests to protect internationally and domestically so that its economic development and expansion remain unhindered. AI development in China is an important aspect of innovation-led economic progress. Military development, meanwhile, is acutely influenced by its rivalry with the US.[44] The Chinese government has made a declaration to catch up to the US in AI technology development by 2025, and lead the world by 2030.[45] Experts point out a looming AI race between China and the US to surpass the other over AI technology. Within the Chinese government, many have expressed fears of an AI arms race between the top military powers of the world, which analysts claim is China's view on the future of warfare.[46] Territorial disputes with its neighbors and its conflict with Taiwan further drive China's motivations to modernize its military.

Although the Chinese government has not officially published a LAWS development plan, one can refer to the People's Liberation Army's (PLA) documents on "intelligentized weapons" for clues to its intentions.[47] The PLA coins the term "AI Weapon" and defines it as "a weapon that utilizes AI to pursue, distinguish, and destroy enemy targets automatically; often composed of information collection and management systems, knowledge base systems, decision assistance systems, mission implementation systems, etc."[48] China has been developing a number of unmanned vehicles and incorporated robotics in its modernization plans. Precision guided and advanced missiles and drones are also reportedly being prepped to accommodate more intelligent programming in

44 Kania, E.B. (2020, April). "AI weapons" in China's military innovation. *The Brookings Institution*. Retrieved from https://www.brookings.edu/research/ai-weapons-in-chinas-military-innovation/.

45 Fanning, D. (Producer), & Fanning, D. & Docherty, N. (Directors). (2019). *In the age of AI* [Documentary film]. United States: PBS.

46 PAX. (2019, April). *State of AI: Artificial intelligence, the military and increasingly autonomous weapons*. Utrecht: PAX. Retrieved from https://www.paxforpeace.nl/media/files/state-of-artificial-intelligence--pax-report.pdf.

47 Kania, E.B. (2020, April). "AI weapons" in China's military innovation. *The Brookings Institution*. Retrieved from https://www.brookings.edu/research/ai-weapons-in-chinas-military-innovation/.

48 全军军事术语管理委员会 [All-Military Military Terminology Management Committee]. (2011). 中国人民解放军军语 [People's Liberation Army Military Terminology], (Beijing: 军事科学出版社 [Military Science Press]). Cited in Kania, E.B. (2020, April). "AI weapons" in China's military innovation. *The Brookings Institution.* Retrieved from https://www.brookings.edu/research/ai-weapons-in-chinas-military-innovation/.

the future, though these plans are said to predate more recent discussions on LAWS.[49] Even conventional military weapons such as tanks and some types of aircraft are being outfitted to function by remote control.[50] At sea, China has also supposedly tested unmanned underwater vehicles (UUV) such as the HN-1 glider that was reportedly used in military exercises in the South China Sea.[51] Such UUV's can also be fitted with weapons, which could target enemy units in territorially disputed waters.[52] According to a paper published by the Brookings Institution, because of China's goal of being a world leader in AI, one can assume that it is doing more research and development on "intelligentized" weapons than what is publicly available.[53]

Aside from being active in weapons development, China is also a major global exporter of weapons, most recently, of unmanned systems. Among them are the Wing Loong platform, which was developed by the Aviation Industry Corporation of China (AVIC), and the CH-4 platform, which was in turn developed by the China Aerospace Science and Technology Corporation (CASC).[54] One drone model, the GJ-2, is said to be capable of identifying its target and making determinations on the target's level of threat.[55] Because of the relative affordability of China's drones, China is now the leading exporter of medium-altitude long endurance unmanned aerial vehicles (UAV).[56] It has built factories for the CH-4 platform in countries like Pakistan, Myanmar and Saudi Arabia.[57]

China supports the development of technologies related to LAWS, but it remains unclear on the application of these weapons systems. In international fora, China has stated that it supports a ban on the use— but not development—of LAWS, as it considers them indiscriminate and at risk of acting beyond human control. China has expressed that LAWS are an inherent violation of the Laws of Armed Conflict (LOAC), while also acknowledging that there are "dual-use"[58] benefits in the technologies behind LAWS.[59]

These innovations are only a glimpse of China's future plans. The PLA's Academy of Military and Science, along with the recently established Tianjin Binhai Artificial Intelligence Military-Civil Fusion Center, has been leading research and development on autonomous weaponry, especially on unmanned vehicles and undersea drones.[60] Future research prospects led by academics, engineers and technocrats point to even more experimentation with deep learning and neural networks to enable machines and

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49 Kania, E.B. (2020, April). "AI weapons" in China's military innovation. *The Brookings Institution*. Retrieved from https://www.brookings.edu/research/ai-weapons-in-chinas-military-innovation/.

50 Ibid.

51 Ibid.

52 Apps, P. (2019, January 19). コラム：ＡＩ軍拡競争、勝利するのは中国？ ロシアか.*Reuters Japan*. Retrieved from https://jp.reuters.com/article/apps-ai-column-idJPKCN1PC06P.

53 Ibid.

54 Kania, E.B. (2020, April). "AI weapons" in China's military innovation. *The Brookings Institution*. Retrieved from https://www.brookings.edu/research/ai-weapons-in-chinas-military-innovation/.

55 Ibid.

56 Ibid.

57 Ibid.

58 As defined by European Commission at https://ec.europa.eu/trade/import-and-export-rules/export-from-eu/dual-use-controls/, dual-use items refer to "goods, software and technology that can be used for both civilian and military applications".

59 Liu, Z. & Moodie, M. (2019, August 16). *International discussions concerning lethal autonomous weapons systems*: *Briefing paper*. Washington, DC: Congressional Research Service. Retrieved from https://fas.org/sgp/crs/weapons/IF11294.pdf.

60 Ibid.

weapons systems to autonomously identify and engage enemy targets.[61] For example, self-driving car technology can be applied to PLA intelligent unmanned military systems (robots, UAV, unmanned vessels and submarines, etc.). Applying computer-based image recognition and machine learning technologies will dramatically improve the capabilities of weapons that require target recognition. The government successfully improved its AI governance and development by merging efforts of both government and the private sector, especially on the military use of civilian AI technology through what it has termed "civil-military-fusion". This allows the military to harness any new developments by the private sector for the PLA's use.[62] This policy has been in place since President Xi Jinping took over presidency, and in 2017 he had created the "Central Commission for Integrated Military and Civilian Development, a new body for overseeing and coordinating civil-military fusion efforts."[63] In addition, it's collaboration with the academic community speaks of the unity of Chinese institutions and their purpose-driven goals. For instance, in research on AI and hypersonic glide vehicles, approximately 3,000 articles or more have been written by universities and military research institutes, including, among others, the PLA Rocket Force, the College of Mechatronic Engineering and Automation of the National University of Defense Technology, Harbin University, Tsinghua University, Beihang University, the China Academy of Launch Vehicle Technology, the PLA Rocket Force Engineering University, Northwestern Polytechnical University and the Beijing Institute of Tracking and Telecommunications Technology.[64] Gaining the most advantage from these partnerships, China has developed an effective system employing the use of government and academic institutions to continuously develop LAWS with impressive scope.

Japan

Though Japan does not experience continuous armed violence, it does face confrontations with China over territorial disputes. Prime Minister Shinzo Abe secured concessions to increase military defense spending in 2017.[65] Japan remains wary of China's military plans as they threaten Japan's security situation.

As a technologically advanced country, Japan has the existing infrastructure and capacity to lead in the development of LAWS, though Japan has repeatedly stated publicly, especially in previous CCW meetings, that it has no plan to develop LAWS.[66] This stance was reaffirmed at the recent CCW meeting in 2019, with Japan stating that it places utmost importance on the principle of rule of IHL in the international

61 Ibid.

62 Hille, K. & Waters, R. (2018, November 8). Washington unnerved by China's "military-civil fusion. *Financial Times*. Retrieved from https://www.ft.com/content/8dcb534c-dbaf-11e8-9f04-38d397e6661c

63 Laskai, L. (2018, January 29). Civil-military fusion: The missing link between China's technological and military Rise. *CFR Blog*. Washington, DC: Council on Foreign Relations. Retrieved from https://www.cfr.org/blog/civil-military-fusion-missing-link-between-chinas-technological-and-military-rise.

64 Saalman, L. (2019, October). Integration of neural networks into hypersonic glide vehicles. In Saalman, L. Ed., *The impact of artificial intelligence on strategic stability and nuclear risk volume II: East Asian perspectives* (pp. 24-28). Sweden: Stockholm International Peace Research Institute.

65 Kelly, T. & Kubo, N. (2017, December 22). Japan approves record defense spending that favors U.S.-made equipment. *Reuters*. Retrieved from https://www.reuters.com/article/us-japan-defence/japan-approves-record-defense-spending-that-favors-u-s-made-equipment-idUSKBN1EG081

66 Human Rights Watch. (2019, September 6). *Japan: Retain human control over the use of force*. New York: Human Rights Watch. Retrieved from https://www.hrw.org/news/2019/09/06/japan-retain-human-control-over-use-force#:~:text=Since%202014%2C%20Japan%20has%20participated,over%20the%20use%20of%20force.

community.[67] Japan maintains that while autonomous weapons systems may potentially reduce human error and free human personnel, in the end LAWS still pose significant security threats. To make it work appropriately, Japan stresses that significant human involvement is essential, defining it as human control by securing proper operation and be operated by persons with sufficient information on such weapons systems.[68]

Japan's Ministry of Foreign Affairs (MOFA) shared that it plans to contribute to more understanding on LAWS, emphasizing the importance of defining it to deepen discussions on what entails lethality and human involvement.[69] With regard to lethality, Japan only considers "autonomous weapon systems with lethality" or weapons systems that are explicitly designed to kill humans directly.[70] In addition, MOFA noted that the relationship with international law and ethics, compliance with international law, especially international humanitarian law, when tackling LAWS is essential. In examining the risk that violations of international humanitarian law will occur, the responsibility of the state and individuals to use LAWS in the same way as ordinary weapons should be questioned. MOFA also stated that trust building measures will contribute positively to ensuring transparency. To further improve transparency, MOFA suggests that a weapons review implementation system may be added to the CCW annual report.[71] MOFA recently announced that it will be hosting an international conference within 2020 "to create an international rule on weapons using artificial intelligence (AI)."[72]

South Korea

South Korea's science and engineering community is actively developing intelligent machines, an effect of the wave of the "fourth industrial revolution" which draws innovation ideas from the merging of "physical, biological and cyber technologies".[73] Although merely at its initial stages, there have been precursors to LAWS that have been successfully fielded. The armed sentry robot deployed at the DMZ, the SGR-1, is a stationary armed sentry robot and a precursor of LAWS which was developed by Samsung Techwin and Korea University.[74] It has two modes: human-supervised, where it alerts a human operator to seek authorization to engage a target, and fully autonomous, where no human authorization is required. In either scenario, the SGR-1 can issue verbal warnings and recognize physical cues of surrender, such as the raising of one's arms and dropping one's weapon. While the ethics of using such a system has been questioned, developers have argued that it vastly improves response times to border incursions.[75] Supporters argue that, as a first line of defense, the sentry's

67 Ministry of Foreign Affairs Japan. (2019). Possible outcome of 2019 GGE and future actions of international community on LAWS: Working paper to the group of governmental experts meeting of 2019. Retrieved from https://www.mofa.go.jp/mofaj/files/000459707.pdf.

68 Ibid.

69 Ibid.

70 Ibid.

71 Ibid.

72 Ibid.

73 Hwang, J.H. (2019, October). Applications of machine learning in North and South Korea. In Saalman, L. Ed., *The impact of artificial intelligence on strategic stability and nuclear risk volume II: East Asian perspectives* (pp. 29-32). Sweden: Stockholm International Peace Research Institute.

74 上野 博嗣 海幹校戦略研究. (2009, July). ロボット兵器の自律性に関する一考察 –LAWS（自律型致死兵器システム）を中心として, p.149.

75 Ray, T. (2018, December 14). Beyond the "lethal" in lethal autonomous weapons: Applications of LAWS in theatres of conflict for middle powers. Occasional Paper. New Delhi: Observer Research Foundation, pp. 6-7. Retrieved from https://www.orfonline.org/wp-content/uploads/2018/12/ORF_Occasional_Paper_180_LAWS.pdf.

presence provides disincentives to potential intrusions by increasing the costs faced by the attacker.[76] In addition to the SGR-1, South Korea has been preparing for greater undertakings in expanding AI capabilities. In 2019, the South Korean Army established the Artificial Intelligence Research and Development Center in order to develop plans for the modernization of the military, including the application of AI.[77] This is in line with the Ministry of National Defense's goal of improving combat strength by developing UAVs, including unmanned combat vehicles.[78] The Korea Advanced Institute of Science and Technology (KAIST) worked with the Hanwha Group to conduct research and development on AI-enabled weapons.[79] KAIST later had to issue a statement assuring the public that it would not develop "killer robots" after public backlash.

Other endeavors are focused on amassing large amounts of data in order to test machine learning programs. Two of these, the Exobrain, which is funded by the government, and ADAMs, which is developed by a private company, are dedicated to basic cognition, emotional and reasoning capabilities.[80] Some collaboration between the government and private institutions is present. However, they are not as elaborate and concerted as China's network of research and military institutions.

South Korea officially opposes the total ban on LAWS.[81] At the CCW meeting, South Korea, along with Israel and Russia, have officially stated that it is against a ban. Based on its capability to develop the SGR-1 sentry robot, the quantity of SGR-1 deployed is not publicly known.[82] South Korea's security considerations in the region are numerous, and this is said to be their motivation for pursuing military modernization. Its conflict with North Korea, who is said to have already deployed UAVs into South Korean airspace, remains a constant concern, especially as the North Korean government has challenged the limits of its armistice with the South.

For China and South Korea, opposition to such a ban lies in their perception of scientific and technological development. The private sector holds the initiative for technological development, which they perceive as ethically neutral and separate from military application.[83] This complicates efforts to internationally regulate LAWS (for fear that a ban is imminent) or to make their development more transparent (due to potential military uses).

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76 Ibid.

77 Su, F. (2019, October). Military developments in artificial intelligence and their impact on the Korean peninsula. Applications of machine learning in North and South Korea. In Saalman, L. Ed., *The impact of artificial intelligence on strategic stability and nuclear risk volume II: East Asian perspectives* (pp. 29-32). Sweden: Stockholm International Peace Research Institute.

78 Ibid.

79 Ibid.

80 Hwang, J.H. (2019, October). Applications of machine learning in North and South Korea. In Saalman, L. Ed., *The impact of artificial intelligence on strategic stability and nuclear risk volume II: East Asian perspectives* (pp. 29-32). Sweden: Stockholm International Peace Research Institute.

81 PAX. (2019, April). State of AI: Artificial intelligence, the military and increasingly autonomous weapons. Utrecht: PAX. Retrieved from https://www.paxforpeace.nl/media/files/state-of-artificial-intelligence--pax-report.pdf.

82 Prigg, M. (2014, September 15). Who goes there? Samsung unveils robot sentry that can kill from two miles away. *Daily Mail*. Retrieved from https://www.dailymail.co.uk/sciencetech/article-2756847/Who-goes-Samsung-reveals-robot-sentry-set-eye-North-Korea.html.

83 Sato, H. (2018, June). 外務省、AI兵器規制で国際会議(LAWS). *International issue*, 672,p.44. Retrieved from http://www2.jiia.or.jp/kokusaimondai_archive/2010/2018-06_005.pdf?noprint.

Regional Responses to International Norms on LAWS

The Chinese government is supporting AI research at domestic research institutions and has increasingly harnessed the potential of the private sector.[84] More than 70 Chinese universities and colleges have introduced AI-related majors, and 283 universities are licensed to offer data science programs.[85] In 2018, 40 academic and research institutes established AI-specific programs in a race to keep up with the US.[86] China is also encouraging high school graduates to begin training as the world's youngest AI weapons scientists. In 2018, 31 teenagers were selected to undergo a four-year "experimental program for intelligent weapons systems" at the Beijing Institute of Technology (BIT), a research institution that is reportedly a national front-runner in the testing and development of new weapons technologies.[87]

Reviewing media reports, both favorable and negative opinions of LAWS have been expressed. However, majority of the polled population are against LAWS, especially in China and in South Korea. In one survey of 26 countries conducted in December 2018 by the market research company Ipsos and commissioned by the CSKR, 60% of respondents in China were opposed to the development and use of LAWS, while 74% responded negatively in South Korea. Only 48% of respondents oppose LAWS in Japan.[88] International peace groups are monitoring the development of LAWS and publish information to increase awareness on the topic.

While South Korean research institutions have supported the development of LAWS, the public has demonstrated its displeasure for AI applications for military use. KAIST was boycotted over "killer robots" in 2018, as mentioned, due to reports that KAIST was researching military applications of AI in collaboration with the defense industry. Professor Toby Walsh of the University of New South Wales in Australia led the boycott, which drew support from researchers in about 30 countries around the world.[89] Addressing the boycott, KAIST President Sung-Chul Shin said, "as an academic institution, we value human rights and ethical standards to a very high degree. KAIST will not conduct any research activities counter to human dignity, including autonomous weapons lacking meaningful human control."[90]

In Japan, efforts have been made toward initiating a dialogue about LAWS. CSOs have been active in the country to raise awareness and gather viewpoints from the scientific,

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84 PAX. (2019 April). State of AI: Artificial intelligence, the military and increasingly autonomous weapons. Utrecht: PAX. Retrieved from https://www.paxforpeace.nl/media/files/state-of-artificial-intelligence--pax-report.pdf.

85 Synced. (2018, June 30). China's AI schools are accepting applications: Here's a list. *Medium.* Retrieved from https://syncedreview.com/2018/06/30/chinas-ai-schools-are-accepting-applications-heres-a-list-1/.

86 Xinhua News. (2019, May 24). 中国AI学術環境、AI産業発展の重要な下支えに 18分野で応用. *AFP-BB News*. Retrieved from https://www.afpbb.com/articles/-/3226196.

87 Chen, S. (2018, November 8). Chinese scientists test underwater drone designed for South China Sea. *South China Morning Post*. Retrieved from https://www.scmp.com/news/china/science/article/3036964/chinese-scientists-test-underwater-drone-designed-south-china.

88 Campaign to Stop Killer Robots. (2019, January 22). Global poll shows 61% oppose killer robots. Retrieved from https://www.stopkillerrobots.org/2019/01/global-poll-61-oppose-killer-robots/.

89 Walsh, T. (2018, March). Open letter to Professor Sung-Chul Shin, president of KAIST from some leading AI researchers in 30 different countries. Sydney: University of New South Wales. Retrieved from https://www.cse.unsw.edu.au/~tw/ciair/kaist.html.

90 Ross, J. (2018, April 4). Korean university warned of boycott over "killer robot" fears. *The Times of Higher Education.* Retrieved from https://www.timeshighereducation.com/news/korean-university-warned-boycott-over-killer-robot-fears#survey-answer.

academic and civil society communities. The Association for Aid and Relief Japan (AAR Japan) hosted fora in line with the "Campaign to Stop Killer Robots" which was attended by NISEA in February 2019. AAR Japan has also started to embark on activities such as distribution of campaign materials and giving lectures to raise awareness on the issue to junior schools.[91]

As a means of promoting awareness surrounding LAWS in the parliament, a study session was held in April 2018 at the House of Representatives First House to consider Japan's role in a world without killer robots. A meeting was held in November 2019, hosted by members of parliament from several parties such as Liberal Democratic Party, Komei Party, and the Constitutional Democratic Party. AI experts and civil society were also invited to exchange opinions with the members of parliament.[92]

In 2019, Rikkyo University held an open symposium entitled "Toward a World without Killer Robots" in collaboration with AAR JAPAN and the Campaign to Stop Killer Robots. The conference included 15 representatives from 10 countries and 11 civil society representatives from the Asia-Pacific region, two experts from the International Commission on Robotic Weapons Control (ICRAC), and two members of the Campaign To Stop Killer Robots. AAR and others participated as representatives of Japan in a steering committee of the CSKR. On the last day, the "Tokyo Statement" was adopted, reaffirming the importance of developing AI and the robotics industry for peaceful purposes. The statement also recognized the need to urgently develop new conventions calling for the prohibition of LAWS in the Asia-Pacific region, and that further engagement is necessary at the national, regional and international levels.[93]

Japan has clearly stated that it will not develop LAWS or contribute to a worldwide AI arms race. Due to its own security considerations, Japan will likely continue to play a central role in Asian diplomacy. However, given Japan's aging society and dwindling population, acquiring weapons and machines with AI capabilities could be an attractive option for the country's defense institutions.[94] This argument is applicable for many countries advocating for a ban on LAWS.

South Korea may be persuaded to develop and deploy LAWS due to the security challenges posed by North Korea. A key motivation for integrating LAWS into military capabilities is that they could theoretically close the military gaps caused by a dwindling population and enhance its capabilities in a strategically challenging neighborhood.[95] South Korea's birth rate has hit an all-time low in recent years. Proponents of LAWS would argue that border security can be improved ten-fold in the absence of a sufficiently large military or border police force. At the same time, its border with North Korea is

91 Association for Aid and Relief Japan [AAR Japan]. (2016, April 1). キラーロボットについて学べるブックレットをご利用ください. Retrieved from https://www.aarjapan.gr.jp/about/news/2016/0401_2014.html.

92 Ohashi, T. (2019, December 28). 【産経新聞外交□ 安保取材の現場から】ＡＩの軍事利用をタブー視するなかれ. *The Sankei News*. Retrieved from https://www.sankei.com/politics/news/181228/plt1812280001-n1.html.

93 AAR Japan. (2019, March 29).「キラーロボットのない世界に向けて」国際会議とシンポジウムを開催しました. Retrieved from https://www.aarjapan.gr.jp/activity/report/sp/2019/0329_2726.html.

94 Ryall, J. (2019, September 10). Japan under pressure to join campaign against killer robots. *Deutsche Welle*. Retrieved from https://www.dw.com/en/japan-under-pressure-to-join-campaign-against-killer-robots/a-50370333.

95 Chamie, J. (2017, September 4). Robots: A solution to declining and aging populations? *IPS News*. Retrieved from http://www.ipsnews.net/2017/09/robots-solution-declining-aging-populations/.

one of the most heavily militarized zones in the world and is littered with an estimated 1.1 million landmines planted by both sides, making it dangerous for soldiers to patrol.[96]

SOUTHEAST ASIA

Southeast Asia is a heterogeneous region, composed of different political systems, historical experiences and governance capabilities.[97] Countries in the region are plagued by political, economic and security challenges resulting from a history of conflict. Many countries are locked in territorial disputes that have been particularly tense in recent years. China is expanding its occupation of strategic islands in the South China Sea and other claimants have been increasing their military capabilities. Long running internal conflicts have caused devastating loss of life and extensive damage to local communities in Indonesia, Myanmar, the Philippines and Thailand.[98] At the same time, institutional and governance challenges involving populist leaders have affected political stability and constrained socioeconomic development. Regional military spending trends are increasing, triggering fears of an arms race.[99]

Currently, there is no ASEAN-level or ministerial-level discussion on LAWS.[100] There have been statements made by the Non-Aligned Movement (NAM) on LAWS at UN CCW meetings, though these remain limited to expressions of concern regarding its ethical and moral use.[101] LAWS, including its precursors will likely impact each Southeast Asian state differently.

LAWS Development and National Position on LAWS

Brunei

Although Brunei has no internal armed conflicts and is a relatively small country, it possesses significant resources. Brunei's government, the only absolute monarchy remaining in the region, has always prioritized foreign relations over domestic issues. Brunei is an active member of the ASEAN and has taken some roles in peacebuilding in the region, and has shown its commitment in their neighbors peace processes, especially in the Bangsamoro, southern Philippines.[102] Brunei's economic stature has ensured a steady support for its military spending that has been steady over the years from 2009-2018, keeping the amount at an average of USD 383.41 million.[103] Brunei's

96 BBC News. (2018, October 1). Koreas begin clearing landmines from heavily fortified border. *BBC News*. Retrieved from https://www.bbc.com/news/world-asia-45704909.

97 Acharya, A. (2009). *Whose ideas matter? Agency and power in Asian regionalism*. Ithaca: Cornell University Press.

98 Heiduk, F. (2014). Introduction: Security sector reform in Southeast Asia. In F. Heiduk (Ed.), *Security sector reform in Southeast Asia: From policy to practice* (pp. 1-22). Hampshire: Palgrave Macmillan.

99 Wezeman, S. (2019, December). *Arms flows to Southeast Asia*. Stockholm: Stockholm International Peace Research Institute. Retrieved from https://www.sipri.org/sites/default/files/2019-12/1912_arms_flows_to_south_east_asia_wezeman.pdf.

100 NISEA. (2016-2019). Personal communications with government officials of Southeast Asian countries.

101 UN. (2001, December 21). Group of governmental experts of the high contracting parties to 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 as amended. Retrieved from https://www.unog.ch/80256EDD006B8954/(httpAssets)/40BDE99D98467348C12571DE0060141E/$file/CCW+text.pdf/.

102 Ochiai, N. (2016, July). The Mindanao conflict: Efforts for building peace through development. *Asia Pacific Review*, 23(2), 37-59. Retrieved from https://www.researchgate.net/publication/311096305_The_Mindanao_Conflict_Efforts_for_Building_Peace_through_Development.

103 Wezeman, S. (2019, December). *Arms flows to Southeast Asia*. Stockholm: Stockholm International Peace Research Institute. Retrieved from https://www.sipri.org/sites/default/files/2019-12/1912_arms_flows_to_south_east_asia_wezeman.pdf.

arms procurement currently does not include LAWS-related materiel and related technology and the country has not made any public statements in international fora regarding LAWS.

Cambodia

Cambodia faces sporadic border tensions with Thailand that has resulted in armed clashes and, at times, mutual accusations of cluster munitions-use.[104] Incursions and skirmishes at the border happen occasionally, though each of the two countries has chosen at times not to respond too aggressively against the other in the spirit of ASEAN non-interference.[105] Nonetheless, intermittent border tensions may serve as motivation to acquire and upgrade current weaponry which may include lethal autonomous weapons systems in the future if such problems are not resolved. Cambodia is still recovering from the impact of the Cambodian-Vietnamese war of 1978-1989.[106] Cambodia is also still suffering from the millions of landmines and explosive remnants of war (ERW) left during the war, posing a danger to civilians.[107]

At the same time, Cambodia is experiencing a rapid increase in investments from Chinese industries, especially in the areas of infrastructure building and telecommunications.[108] It remains to be seen if these investments will extend to AI technology and advanced weapons development. Though at the moment, the infrastructure in Cambodia is not yet capable of supporting such industries, this is a trend that should be closely observed in the future.

Amidst these developments and challenges, Cambodia has actively supported regional and international initiatives devoted to disarmament and responsible arms use and transfers. Cambodia led the process during the Mine Ban Treaty, and along with Mali and Costa Rica, it was one of the first three countries who called on the UN to negotiate the ATT.[109]

Indonesia

Indonesia is the largest country in the region in terms of land area and population and is considered an influential political player in Southeast Asia. Indonesia has allocated significant resources to weapons modernization and arms manufacture. The Indonesian arms industry is comprised of state-owned manufacturers that produce weapons for

104 International Crisis Group. (2011, December 6). Waging peace: ASEAN and the Thai-Cambodian conflict. *Asia Report* (215). Retrieved from https://d2071andvip0wj.cloudfront.net/215-waging-peace-asean-and-the-thai-cambodian-border-conflict.pdf.

105 Tofani, R. (2011, February 4). Thailand-Cambodia tensions reveal ASEAN's limitations. *World Politics Review*. Retrieved from https://www.worldpoliticsreview.com/articles/7871/thailand-cambodia-tensions-reveal-aseans-limitations.

106 Subhan, A. (2018, April 9). Lesser known border tensions between Cambodia and Vietnam. *The ASEAN Post*. Retrieved from https://theaseanpost.com/article/lesser-known-border-tensions-between-cambodia-and-vietnam-0.

107 Dunlop, N. (2017, September 12). Beating the odds and clearing landmines in Cambodia. *Aljazeera.* Retrieved from https://www.aljazeera.com/indepth/inpictures/2017/08/beating-odds-clearing-landmines-cambodia-170830073311964.html; Open Development Cambodia. (2015, August 4). Landmines UXO and demining. Retrieved from https://opendevelopmentcambodia.net/topics/landmines-uxo-and-demining/.

108 Black, E. (2018, April 29). How China is shaping Cambodia's skyline. *Southeast Asia Globe*. Retrieved from https://southeastasiaglobe.com/how-china-is-shaping-cambodias-skyline/.

109 Cenko, B. 2013. *Five ways the Arms Trade Treaty advances arms control.* Washington, DC: Institute for Policy Studies 4 June. Retrieved from https://ips-dc.org/five_ways_the_arms_trade_treaty_advances_arms_control/.

local and international demand.[110] Exports amount to less than USD 500,000 at the moment, but plans are underway to increase this in the next few years. [111] Indonesia has made a number of acquisitions to enhance its terrestrial and maritime military capabilities in the recent years.[112]

Security concerns are not isolated to external issues, however. Indonesia has struggled with a number of secessionist movements in the past, the most prominent of which led to Aceh's autonomy and Timor Leste's independence. A peaceful resolution to the West Papua conflict remains elusive.[113] Based on Indonesia's current capacity to acquire weapons, it is too early to tell if it will be capable of acquiring LAWS in the next few years. A number of internal security concerns remain including maritime control of its thousands of islands and various threats of terrorism.

Indonesia is not a participating party to the CCW, but has been giving their position through the joint statements by members of NAM, which will be discussed in later parts.

Lao People's Democratic Republic

Like Cambodia and other countries in the Indochinese Peninsula, Lao PDR struggles with a legacy of civil war and the proxy violence of the Cold War. As a consequence, Lao PDR is considered the most bombed country in the world. Millions of cluster munitions were used during the war, and unexploded ordnances (UXOs) and ERWs continue to threaten the safety of civilians.[114] As a policy response, Lao PDR developed its own Sustainable Development Goal (SDG), namely SDG 18: Lives Safe from UXO.[115] Due to its safety and development concerns, Lao PDR has not acquired new weapon systems and may not think of doing so for some time.

Malaysia

Malaysia is one of strongest economies in the region and also possesses the resources to improve its military capacity. Its security concerns are mostly external, specifically territorial disputes with the Philippines over Sabah and with China over territorial waters. Malaysia's defense budget has remained steady over the years, though there was a slight increase in 2018.[116] There has been no mention of LAWS in Malaysia's defense plans or any official statements that allude to their position on the issue.

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110 Indonesia. (2010). *National report on the implementation of the United Nations programme of action to prevent, combat and eradicate the illicit trade in small arms and light weapons in all its aspects*. New York: Permanent Mission of Indonesia to the United Nations. Retrieved from https://unoda-poa.s3.amazonaws.com/poa-reports-le/2010%4091%40PoA-Indonesia-2010.pdf.

111 Ghaliya, G. (2019, December 22). Indonesia grows muscles as arms manufacturer. *The Jakarta Post*. Retrieved from https://www.thejakartapost.com/news/2019/12/22/indonesia-grows-muscles-as-arms-manufacturer.html.

112 Wezeman, S. (2019, December). *Arms flows to Southeast Asia*. Stockholm: Stockholm International Peace Research Institute. Retrieved from https://www.sipri.org/sites/default/files/2019-12/1912_arms_flows_to_south_east_asia_wezeman.pdf.

113 Singh, B. (2019, September 12). Why is West Papua in constant turmoil? The Indonesian territory has struggled for independence in more than 50 years. *The Diplomat*. Retrieved from https://thediplomat.com/2019/09/why-is-west-papua-in-constant-turmoil/.

114 Boland, R. (2017, May 13). Death from below in the world's most bombed country. *The Irish Times*. Retrieved from https://www.irishtimes.com/news/world/asia-pacific/death-from-below-in-the-world-s-most-bombed-country-1.3078351.

115 SDG 18: Lives safe from UXO. Retrieved from https://www.la.undp.org/content/lao_pdr/en/home/sustainable-development-goals.html.

116 Wezeman, S. (2019, December). *Arms flows to Southeast Asia.* Stockholm: Stockholm International Peace Research Institute. Retrieved from https://www.sipri.org/sites/default/files/2019-12/1912_arms_flows_to_south_east_asia_wezeman.pdf.

Myanmar

There are presently more than two dozen armed groups in Myanmar, many of which regularly see active combat against the government.[117] On top of this, Myanmar has been criticized heavily for its treatment and abuse of the Rohingya people. After decades of military rule, Myanmar has not been transparent about its military spending nor its military activities. This makes it difficult to determine if Myanmar would be likely to acquire or develop LAWS in the future. For now, the government is concerned with non-state armed groups, the Rohingya refugee crisis, democratization and socioeconomic challenges.[118]

Philippines

The Philippines is afflicted by both internal conflicts and external security threats. Domestically, the government has ongoing armed conflicts against several armed groups, the most notorious of which are the New People's Army, the Abu Sayyaf Group, and other ISIS-inspired groups.[119] The government faced more complex security challenges with the recent siege of Marawi City in Southern Philippines by the ISIS-inspired Maute Group and its allies. Along with territorial disputes between other Southeast Asian countries and China, the government has pursued its long-stalled plans to modernize its military arsenal in recent years. The Philippine government unveiled a strategy to improve military capabilities until 2028.[120] As of the moment, the modernization plans do not include the development or acquisition of LAWS.

Further AI development may not be a distant prospect for the Philippines. The country's largest industry is electronics and there is a fairly lucrative business process outsourcing industry for programming and information technology that is enjoying relatively relaxed rules, tax exemptions and other benefits to attract more investors. The government has encouraged the funding of IT schools in the past few decades. In addition, the government has constantly been challenged by cybercrimes committed by citizens and foreign migrants. If the Philippines is an unlikely source or end-user of LAWS, it can still be vulnerable to the software development of AI used in LAWS.

Singapore

Though Singapore may be relatively small compared to its neighbors, it is one of the wealthiest countries in the region. It is considered a pioneer in advanced technologies and innovations and is one of the most vibrant trading hubs in Asia. Despite its

117 International Crisis Group. (2016, October 19). Myanmar's peace process: Getting to a political dialogue. Crisis Group Asia Briefing (149). Retrieved from https://d2071andvip0wj.cloudfront.net/b149-myanmar-s-peace-process-getting-to-a-political-dialogue.pdf.

118 Wezeman, S. (2019, December). *Arms flows to Southeast Asia*. Stockholm: Stockholm International Peace Research Institute. Retrieved from https://www.sipri.org/sites/default/files/2019-12/1912_arms_flows_to_south_east_asia_wezeman.pdf.

119 Franco, J. (2017). The battle for Marawi: Appropriating ISIS propaganda and importing the Wilayah model. *Security Reform Initiative*. Retrieved from http://www.securityreforminitiative.org/2017/06/22/battle-marawi-appropriating-isis-propaganda-importing-wilayah-model/. ; Hernandez, C. (2014). Security sector reform in Southeast Asia: From policy to practice. In F. Heiduk (Ed.), *Security sector reform in Southeast Asia: From policy to practice* (pp. 23-53). Hampshire: Palgrave Macmillan.

120 Parameswaran, P. (2019, August 28). What does the new Philippines defense budget say about future military modernization under Duterte? *The Diplomat*. Retrieved from https://thediplomat.com/2019/08/what-does-the-new-philippines-defense-budget-say-about-future-military-modernization-under-duterte/.

geographic size, Singapore is one of the largest exporters of weapons in the world and is host to a substantial arms industry.[121] Singapore has delved in automated robots before and has developed an armed protector robot to fight alongside its troops.[122] Its further foray into LAWS is not unlikely, especially in maintaining peace and order and addressing maritime security challenges.

Thailand

Thailand has seen much political turmoil over recent years. These have been driven by violent changes in leadership. It has suffered the most coups in modern history and constant changes to its constitution, both serving as barriers to government reforms.[123] The death of Thailand's longest reigning monarch, Bhumibol Adulyadej, and the ascension to power of his son, King Maha Vajiralongkorn, shifted some of the political dynamics from one of reform to the new King's efforts to consolidate power.[124]

Aside from the changes in leadership, Thailand faces several security challenges. It is yet to resolve the conflict in South Thailand.[125] Border issues with Cambodia may escalate into skirmishes now and then, though both countries have tended to avoid addressing the issue bilaterally. Landmines are spread throughout the Thai-Myanmar border, a consequence of the many armed conflicts within Myanmar.[126] Amidst all this, Thailand has demonstrated a desire to improve weapons regulation and prevent proliferation by ratifying the Nuclear Ban Treaty and the Mine Ban Treaty.[127]

Thailand's foray into autonomous weapons began with a combat unmanned ground vehicle (UGV). Defence Technology Institute (DTI) jointly developed the project with Australian company Electro Optic Systems (EOS) and Estonian firm Milfrem Robotics. The UGV can also be fitted with multi-calibre weapons.[128] There are plans to further develop UGVs in the future, which makes Thailand a potential player in the region, especially with the rising Thai economy seemingly unaffected by political issues.

Timor Leste

Timor Leste is the youngest country in the region, one borne from war. Though it currently does not have the capacity to acquire new weapons systems, it does have

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121 Hoe, P.S. (2013, March 21). Singapore is world's 20th biggest arms exporter. *The Straits Times*. Retrieved from https://www.straitstimes.com/singapore/singapore-is-worlds-20th-biggest-arms-exporter.

122 Lim, A. (2017, March 3). Parliament: Robots armed with machine guns to fight alongside soldiers. *The Straits Times*. Retrieved from https://www.straitstimes.com/singapore/parliament-robots-armed-with-machine-guns-to-fight-alongside-soldiers.; Lim, K. (2019, July 17). 300 cleaning robots to roll out in Singapore by March 2020. *The Straits Times*. Retrieved from https://www.straitstimes.com/singapore/300-cleaning-robots-to-roll-out-by-march-2020.; Scharre, P. (2018). Army of none: Autonomous weapons and the future of war. New York: W.W. Norton.

123 Mérieau, E. (2019, March 20). How Thailand became the world's last military dictatorship. *The Atlantic*. Retrieved from https://www.theatlantic.com/international/archive/2019/03/thailand-military-junta-election-king/585274/.

124 Kurlantzick, J. (2019, October 16). Why the Thai King's power grab could backfire. *World Politics Review*. Retrieved from https://www.worldpoliticsreview.com/articles/28268/the-thai-king-is-consolidating-power-and-it-could-backfire.

125 International Crisis Group. (2015, July 8). Southern Thailand: Dialogue in doubt. *Asia Report* (270). Retrieved from https://d2071andvip0wj.cloudfront.net/270-southern-thailand-dialogue-in-doubt.pdf.

126 Pinitwong, A. (2018, May 19). Landmine kills Thai boy inside Myanmar. *Bangkok Post*. Retrieved from https://www.bangkokpost.com/thailand/general/1468857/landmine-kills-thai-boy-on-myanmar-border.

127 NISEA. (2016-2019). Personal communications with government officials of Southeast Asian countries.

128 Grevatt, J. (2019, J.G.) D&S 2019: Thailand collaborates with EOS and Milrem on UGV project. *Jane's*. Retrieved from https://www.janes.com/article/92636/d-s-2019-thailand-collaborates-with-eos-and-milrem-on-ugv-project.

security needs and demands to maintain peace and order.[129] Weapons are highly regulated in Timor Leste. Weapons are imported and only used for national defence; manufacturing is prohibited. Civilians are forbidden from acquiring weapons. Data on Timor Leste's imports are sparse, only registering meager imports in 2010 and 2011 from China and South Korea.[130] Weapons acquisition and military expansion are not high on the priorities of the government, who prefer to focus on development issues instead.[131]

Vietnam

Vietnam has made strides towards improving its military capabilities in recent times due to its impressive economic development and China's maneuvering in the South China Sea.[132] It has become one of the fastest emerging economies in the region, enabling it to acquire new weapons systems for national defense. It has been establishing stronger bilateral ties with developed countries for military assistance or cooperation, tech transfers and industrial development.[133] It has partnered with Japan to improve its Coast Guard capabilities.[134] It has strengthened its defense partnership with Israel with a signing of a memorandum of agreement in 2015, acquisition of weapons systems and technology and bilateral dialogue on defense policy.[135] Vietnam has also strengthened ties with Russia, who infused foreign investment mostly in Vietnam's energy sector. Speculation revolves around Vietnam attempting to gain more foreign allies and to leverage diplomatic ties with other countries in its pushback against China. Vietnam has been one of the more vocal countries protesting incursions to its territorial waters. It has also been generally focusing its weapons acquisition on systems related to maritime security since the US arms embargo against Vietnam was lifted in 2016.[136]

For years, Vietnam has been trying to build an unmanned aerial vehicle to patrol its territorial waters. It tested six drones with minimal success in 2013.[137]

Regional Responses to International Regimes and Norms on LAWS

Despite Southeast Asia's complex security environment and the evolving military capabilities of several countries in the region, there is currently little to signify their views on LAWS. Nevertheless, some clarity can be provided on possible future attitudes and motivations regarding LAWS.

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129 Lubang, A. (2019). Personal communications with government officials of Timor Leste.

130 SIPRI. (2009-2018). Arms Transfers Database. Retrieved from https://www.sipri.org/databases/armstransfers.

131 Lubang, A. (2019). Personal communications with government officials of Timor Leste.

132 Wezeman, S. (2019, December). *Arms flows to Southeast Asia*. Stockholm: Stockholm International Peace Research Institute. Retrieved from https://www.sipri.org/sites/default/files/2019-12/1912_arms_flows_to_south_east_asia_wezeman.pdf.

133 Abuza, Z. & Nguyen, N.A. (2016, October 28). Vietnam's military modernization. *The Diplomat*. Retrieved from https://thediplomat.com/2016/10/vietnams-military-modernization/.

134 Niekawa, S. & Ito, Y. (2019, February 11). Coast guard eyes closer tie-ups with S.E. Asia to counter China. *The Asahi Shimbun*. Retrieved from http://www.asahi.com/ajw/articles/AJ201902110023.html.

135 Parameswaran, P. (2018, October 16). What's in the new Vietnam-Israel defense dialogue? *The Diplomat*. Retrieved from https://thediplomat.com/2018/10/whats-in-the-new-vietnam-israel-defense-dialogue/.

136 Gardner, H. (2016, May 23). Vietnam arms embargo to be fully lifted, Obama says in Hanoi. *The New York Times*. Retrieved from https://www.nytimes.com/2016/05/24/world/asia/vietnam-us-arms-embargo-obama.html.

137 Gady, F.S. (2015, December 28). Vietnam reveals new drone for patrolling South China Sea. *The Diplomat*. Retrieved https://thediplomat.com/2015/12/vietnam-reveals-new-drone-for-patrolling-the-south-china-sea/.

In the 2017 CCW-GGE Meetings on LAWS, Cambodia shared the view of the European Union (EU) and Australia and called for regular national weapons reviews and more transparent exchange of weapons assessment between countries.[138] Cambodia has also stated in the meeting the life or death decisions should not be left to LAWS.[139] Other Southeast Asian countries have not expressed their views publicly on LAWS, although this is not uncommon in ASEAN. Most ASEAN countries prefer to evaluate their capacity to implement international agreements before making a decision about them.[140]

Perhaps the closest ASEAN collective statement regarding LAWS can be gleaned from the statements of NAM to the GGE meetings. NAM is an association of developing countries who maintain independence from the influence of major powers, especially during the Cold War. All Southeast Asian countries are members of NAM. Though some have at some point allied themselves with either the US, Russia or China, NAM itself has maintained its nonalignment.

In the GGE meeting on November 2017, NAM submitted a working paper to guide discussions during the GGE. In it NAM stated that discussions about LAWS and semi-autonomous weapons should consider how such weapons can be operated under IHL. NAM believes that states are ultimately responsible for illegal acts committed by LAWS and that this should in turn lead to reflections about its ethical and moral use. NAM further expressed concerns about the vertical proliferation of LAWS among states, driving them towards an arms race. This could have negative implications on international peace and security. Finally, NAM indicated that discussions should try to touch upon a legally binding instrument that regulates LAWS.[141]

Outside of the GGE meetings, no Southeast Asian state has articulated an official national position on LAWS, though, as discussed in the previous chapter, plans to develop LAWS in some countries are underway. The Philippines held a national workshop on LAWS convened by Nonviolence International Southeast Asia (NISEA), which was attended by key government agencies. Throughout these dialogues, the Philippines has emphasized that it observes IHL. The tech industry in the country has been generally mum about the topic. Though Thailand does not yet have an official position, a representative of the Royal Thai Police inquired about LAWS used in police operations where risks are high for police personnel at a press conference of the regional launch of the Stop Killer Robots Campaign in Bangkok in July 2019.

In Southeast Asia, no regional governmental meetings on LAWS within the ASEAN framework have taken place. Statements have been issued by Cambodia and NAM CCW GGE meetings, though the agenda has not been adopted in ASEAN fora or ministerial

138 Acheson, R. (2017, November 14). Confronting reality: We can build autonomous weapons but we can't make them smart. *Reaching Critical Will CCW Report*, 5(2). Retrieved from http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/ccw/2017/gge/reports/CCWR5.2.pdf.

139 Acheson, R. (2017, November 14). Confronting reality: We can build autonomous weapons but we can't make them smart. *Reaching Critical Will CCW Report*, 5(2). Retrieved from http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/ccw/2017/gge/reports/CCWR5.2.pdf.

140 NISEA (2016-2019). Personal communication with government officials of Southeast Asian countries.

141 UN. (2017, November 13). General principles on lethal autonomous weapons systems: Submittedby the Bolivarian Republic of Venezuela on behalf of the Non-Aligned Movement (NAM) and other states parties to the Convention on Certain Conventional Weapons. Retrieved from https://www.unog.ch/80256EDD006B8954/(httpAssets)/A980151CB5E662D4C12581D80025D4F3/$file/2017_GGEonLAWS_WP9_NAM.pdf.

meetings for discussion. In terms of the region's collective efforts towards disarmament, each country's participation in key international agreements on conventional arms can be examined to determine trends. 3 out of 10 ASEAN Member-States are States Parties to the CCW, 6 out of 10 to the Mine Ban Treaty, 2 out of 10 for the Convention on Cluster Munitions and 5 out of 10 are signatories to the ATT.

There is an emerging network of CSOs in the region who are actively working on these concerns, however. A Southeast Asian civil society meeting organized by NISEA was held in Bangkok, Thailand in July 2019. To date, several country campaigns have been launched in Cambodia, Indonesia, Philippines, and Thailand. A key principle agreed among this informal network of Asian CSOs is apart from ensuring meaningful human control over LAWS is maintained, and the development of such weapons should also be banned.

Country campaigns are working on increasing awareness on the issue and actively engaging states in the region. As an example, NISEA is assisting the Philippine government in crafting its national position, and together has convened a national meeting at the end of February 2020 in Manila with over 15 national agencies and relevant committees of both the Congress and Senate of the Philippines.

SOUTH ASIA

South Asia is a region rich with culture, history and diversity, but it is also plagued by protracted and devastating conflicts. Conflicts and security risks will likely drive the development of LAWS forward. In addition, India works towards maintaining its military dominance in the region, building a stronger army and navy and putting significant resources in the research and development of military technology. It will be important to keep watch over developments in the security field in this region.

LAWS Development and National Position on LAWS

Afghanistan

The war in Afghanistan turned the country into an unwilling testing ground for warfare technology. The country has been called the "most drone-bombed country in the world." The Afghan air campaign typified the new "virtual war" in which technologically sophisticated, high altitude aerial bombardments are employed against even the most limited targets in an effort to avoid combat casualties. This resulted in a heavy reliance on aerial electronic surveillance and intelligence operatives, some of whom proved unreliable and contributed to the faulty targeting that killed or injured civilians . In 2018, US forces reportedly dropped over 7,000 bombs in Afghanistan. By August 2019, independent monitors found out that the number of air strikes for that year – most of which emanating from drones – was more than double the 2018 annual total.

A report by the UN special rapporteur on extrajudicial, summary or arbitrary executions and shares his concern with respect to lethal autonomous robotics as well as his respective recommendations to the United Nations and respective stakeholders. As

the special rapporteur demonstrated in his report, robotic systems with various degrees of autonomy and lethality are currently in use by some countries.[142]

One clear lesson from military experience in Afghanistan is that human judgment during the trigger-pull decision is imperfect in design and not precise. Misidentifications were the reason for about half of all U.S.-caused civilian casualties in Afghanistan, with specific examples painfully abundant. These incidents resulted in a significant outcry from CSOs and the media.

Afghanistan has not made any public statement on LAWS within the CCW framework. However, being a victim-state it would be in their best interest to actively participate in a ban.

Bangladesh

Bangladesh is the most densely populated country in the world and poverty remains the biggest issue that they are facing. Despite having issues with multiple armed groups and facing the threat of ISIS-inspired groups, Bangladesh's priority is focused on poverty alleviation and socio-economic development.[143]

Bangladesh has not made specific strides to engage in the dialogue on LAWS within the CCW framework. The government of Bangladesh in its statement issued on 29 October 2018, stated, "Bangladesh remains committed to fulfilling their obligations under the Certain Conventional Weapons Convention (CCW) and its Protocols that she is a party to. We commend the work accomplished by the Group on Governmental Experts (GGE) on Lethal Autonomous Weapons System (LAWS), culminating in the consensus adoption of its Reports, including the Possible Guiding Principles."[144]

India

In 2016, the Carnegie Endowment lined out the importance of LAWS in India's developing defense environment. In its report, it sees the indigenous production of new military technologies as beneficial for India, especially to position itself as a major arms exporting country.[145] The Centre for Land Warfare Studies, a think tank headed by a former general in the Indian army, supports India's plans to expand its defense and arms export capabilities stating that "until nations develop and evolve their technology with time and stay ahead of the curve, they will be preyed upon".[146] The center also argues for LAWS, saying that "warheads attached to these weapons can hit targets with precision, in turn avoiding collateral damage."[147] The Defense Research and Development Organization

142 Statement of Iran, Human Rights Council, Geneva, 30 May 2013. http://www.stopkillerrobots.org/wp-content/uploads/2013/05/HRC_Iran_10_30May2013.pdf As delivered by Mr. Mohsen Ghanei. https://www.stopkillerrobots.org/wp-content/uploads/2013/03/KRC_CountryStatus_14Mar2014.pdf

143 NISEA. (2019). Personal communication with government officials and civil society organizations.

144 Campaign to Stop Killer Robots. (2018, November 12). UN head calls for a ban Retrieved from https://www.stopkillerrobots.org/2018/11/unban/.

145 Reddy, R. S. (2016, April 1). *India and the challenge of autonomous weapons.* Washington DC: Carnegie Endowment for International Peace. Retrieved from https://carnegieendowment.org/files/CEIP_CP275_Reddy_final.pdf.

146 Ashok, A. (2019, August 17). *Emerging technologies: Lethal autonomous weapons systems.* New Delhi: Centre for Land Warfare Studies. Retrieved from https://www.claws.in/emerging-technologies-lethal-autonomous-weapons-systems/.

147 Ibid.

(DRDO), the research arm of India's military organization, announced the development of what they called robotic soldiers with complex intelligence, capable of distinguishing between enemy and friendly combatants in 2013.[148] Such robots could be deployed in conflict areas such as the Line of Control. That same year, the then-chairman of the DRDO stated that these systems would be ready for deployment around 2023.[149] After Prime Minister Narendra Modi's government came to power in May 2014, it established a 17-member taskforce to formulate plans and strategies for the use of AI in national security and defense applications.[150] The taskforce has since proposed the development of AI technology in order to: deter potential threats in the region, further the peaceful and commercial use of such technologies, have a vision for the future regarding the transformation and evolution of weaponry, provide as effective defense systems against non-state actors, improve data collection and analysis capabilities and strengthen the cyber defense capabilities of the government.[151] In April 2018, Modi said at the Defense Expo 2018, a biennial arms fair event hosted by the Ministry of Defence, that LAWS will be crucial in building offensive and defensive military capabilities. He highlighted the fact that India is already a world leader in Information Technology and can thus lead the global trend of AI application in weapons.[152]

Among the DRDO's first autonomous weapons is the Muntra UGV series, an armored platform with variants catering to different kinds of operations. Under the Centre for Artificial Intelligence and Robotics (CAIR), the DRDO has also reportedly developed other unmanned systems, including "gun-mounted vehicles, [...] a swarm-based, self-healing dynamic mine deployment system" and UGVs that are capable of wall climbing and flight.[153] It is currently developing a Multi Agent Robotics Framework (MARF) that will allow an operator to issue different commands to a number of robots in a distributed and asynchronous system as opposed to swarm robots that are linked to a central control and are given only a single behavioral command.[154] In addition, for the first time, India and Japan are working together to develop UGVs, robotics and AI. The Acquisition, Technology and Logistical Agency (ATLA) of Japan and the DRDO launched a joint project to develop UGVs and robotics.[155] India's robotics project seems like an attempt on not only the integration of AI in weapons, but also the creation

148 The Hindu. (2013, June 10). Soon, robotic soldiers to assist humans in warfare. *The Hindu Newspaper*. Retrieved from https://www.thehindu.com/news/national/soon-robotic-soldiers-to-assist-humans-in-warfare/article4799688.ece.

149 Express News Service. (2013, July 7). Robotic soldiers working in groups to be reality by 2023: DRDO chief. *The Indian Express*. Retrieved from https://indianexpress.com/article/technology/technology-others/robotic-soldiers-working-in-groups-to-be-reality-by-2023-drdo-chief/.

150 Bhatia, S. (2018, July 6). India looking to step up its AI game in defence. *BusinessWorld*. Retrieved from http://www.businessworld.in/article/India-Looking-to-Step-Up-Its-AI-Game-in-Defence/06-07-2018-154131/.

151 Ministry of Defence India. (2018, May 21). Raksha Mantri inaugurates workshop on AI in national security and defence. Retrieved from https://pib.gov.in/newsite/PrintRelease.aspx?relid=179445#:~:text=The%20Raksha%20Mantri%20Smt%20Nirmala,Use%20Cases'%2C%20here%20today.&text=Most%20of%20this%20progress%20is,of%20Machine%20Learning%20(ML).

152 Rajat P. (2018, May 21). India now wants artificial intelligence-based weapon systems. *Times of India*. Retrieved from http://timesofindia.indiatimes.com/articleshow/64250232.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst.

153 Ashok, A. (2019, August 17). Emerging technologies: Lethal autonomous weapons systems. New Delhi: Centre for Land Warfare Studies. Retrieved from https://www.claws.in/emerging-technologies-lethal-autonomous-weapons-systems/; Bhatia, S. (2018, July 6). India looking to step up its AI game in defence. *BusinessWorld*. Retrieved from http://www.businessworld.in/article/India-Looking-to-Step-Up-Its-AI-Game-in-Defence/06-07-2018-154131/.

154 Panwar, R.S. (2019, January 31). Artificial intelligence in military operations: Technology, ethics, and an Indian perspective. New Delhi: United Service Institution of India. Retrieved from https://usiofindia.org/publication/usi-journal/artificial-intelligence-in-military-operations-technology-and-ethics-indian-perspective/.

155 Siddiqui, H. (2018, October 26). India and Japan to co-develop unmanned ground vehicles, robotics and artificial intelligence. *Financial Express*. Retrieved from https://www.financialexpress.com/defence/india-and-japan-to-co-develop-unmanned-ground-vehicles-robotics-and-artificial-intelligence/1362502/.

of robotic soldiers that are able to replace human soldiers in battle.[156] The Centre for Artificial Intelligence (CAIR) is now in the process of developing a Multi Agent Robotics Framework (MARF), a system that enables different robots to operate as a team. Robot sentries deployed with other robots that provide support will be able to perform patrols and surveillance with greater efficiency and stealth even in dense urban areas.[157] Such developments are also undertaken with private enterprises and government initiatives through programs such as "Make in India," a military initiative started in 2014 that seeks to increase India's defense capabilities through cooperation with private defense contractors.[158]

India is fourth in the world in terms of military spending and is among the top importers of military defense equipment.[159] According to the Make in India website, the government has opened the defense sector to private sector participation.[160] Towards this end, the Defence Acquisition Council (DAC) of the Ministry of Defence encouraged defense deals that supported the collaboration of the government and private sector defense contractors that are focused on surveillance and profiling. Other uses for such technology could be the provision of air, ground and underwater support for troops and to assist in simulation exercises and war games.[161]

India had in the past imported heavily from Russia and Israel but its capacity to develop its own weapons has seen massive leaps in the last decades, especially in the field of AI with the help of the private sector.[162] Calls are now made under "Make in India" to invest in talent needed to build and use Autonomous Systems suited to the needs of the military.

India has acquired the Israel-developed IAI Harpy, "also called "loitering munition," a drone designed to identify and destroy anti-air defenses" that has also been sold to many countries in Asia that include China and South Korea.[163] While it remains to be seen if India will deploy LAWS by 2023, India is gradually moving toward greater automation of missile defense shields including the Prithvi Air Defense and the Advanced Air Defense.[164]

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156 NISEA. (2019). Personal communication with local civil society organizations based in India.

157 Kumar, C. (2018, July 14). Army to get self-reliant, autonomous robots soon. *The Economic Times*. Retrieved from https://economictimes.indiatimes.com/news/defence/army-to-get-self-reliant-autonomous-robots-soon/articleshow/57466543.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst.

158 Ashok, A. (2019, August 17). Emerging technologies: Lethal autonomous weapons systems. New Delhi: Centre for Land Warfare Studies. Retrieved from https://www.claws.in/emerging-technologies-lethal-autonomous-weapons-systems/.; India Brand Equity Foundation [IBEF]. (2019, May 7). Make in India. New Delhi: India Brand Equity Foundation. Retrieved from https://www.ibef.org/economy/make-in-india.

159 Tian, N. et al. (2019, April). *Trends in world military expenditure, 2018*. Stockholm: Stockholm International Peace Research Institute, p.2. Retrieved from https://sipri.org/sites/default/files/2019-04/fs_1904_milex_2018_0.pdf.

160 Ministry of Defence India. (2016). Defence manufacturing sector achievement report. Retrieved from http://www.makeinindia.com/article/-/v/defence-manufacturing-sector-achievement-report.

161 Bhatia, R. (2018, January 6). India's plan on LAWS showcases that it wants to play a bigger role in the AI arms race. *Analytics India Magazine*. Retrieved from https://analyticsindiamag.com/indias-plan-on-laws-showcases-that-it-wants-to-play-a-bigger-role-in-the-ai-arms-race/.

162 Ray, T. (2018, December 14). Beyond the "lethal" in lethal autonomous weapons: Applications of LAWS in theatres of conflict for middle powers. Occasional Paper. New Delhi: Observer Research Foundation. Retrieved from https://www.orfonline.org/research/beyond-the-lethal-in-lethal-autonomous-weapons-applications-of-laws-in-theatres-of-conflict-for-middle-powers-46259/.

163 Picard, M. (2019, July 6). Weaponized AI in Southeast Asia: In sight yet out of mind. *The Diplomat*. Retrieved from https://thediplomat.com/2019/07/weaponized-ai-in-southeast-asia-in-sight-yet-out-of-mind/.

164 Peck, M. (2019, December 15). This means drama: Indian missile defense is raising tensions with Pakistan. *The National Interest*. Retrieved from https://nationalinterest.org/blog/buzz/means-drama-indian-missile-defense-raising-tensions-pakistan-104992.

Nepal

Having experienced armed conflict, Nepal has been supportive of humanitarian disarmament both domestically and internationally. However, Nepal is a developing country still experiencing post-conflict issues and is trying to strike a balance between development and disarmament. The transition from conflict to post-conflict at the national level is considered the priority, and taking on any leadership role at any international fora, especially on issues deemed distant on realities on the ground such as LAWS are not a priority for the public, but could be something that the government can take on if they find allies and support.

In the 2018 UNGA Session, Government of Nepal for the first time raised concerns on LAWS. "Nepal raised serious ethical and moral questions and called for a sound regulatory framework" at the 2018 UNGA Session.[165] At the same meeting, Nepal further stated that "Technology has been a powerful agent of change and transformation. At the same time, human control over new and automated technology has become even more important for international peace and security. Weaponization of drones, 3-D printers, artificial intelligence, automated robots and cyberspace poses serious threat to humanity. Misuse of technological advancement is bound to raise serious ethical and moral questions. It calls for a sound regulatory framework at national and international level and the need for promoting responsible behaviour among States and Non-State actors."[166]

Pakistan

In a statement to CCW on Disarmament given on 28 August 2018, Pakistan stated, "Pakistan believes that the absence of human control over weapons with autonomous functions will fundamentally change the nature of war. Any weapon that delegates the power to make life and death decisions to machines, which inherently lack compassion and intuition, would be unethical. They will make war even more inhumane."[167]

Pakistan has categorically called for a pre-emptive ban on autonomous weapons, stating that LAWS are unethical, and that irrespective of their sophistication, they "cannot be programmed to comply with International Humanitarian Law."[168] Such weapon systems, in Pakistan's opinion, would deprive combatants of the protection of international law and would also greatly risk the lives of civilians and non-combatants. Pakistan has argued for a legally binding CCW protocol definitively banning the development and use of such weapons.[169] Pakistan is a party to the CCW and all of its five protocols, and has declared that it remains fully compliant with their provisions. It presided over the 5th Review Conference of the CCW in 2016 where significant decisions on several substantive arms control issues were passed, including on LAWS. Pakistan further

165 Campaign to Stop Killer Robots. (2018, November 12). UN head calls for a ban. Retrieved from https://www.stopkillerrobots.org/2018/11/unban/.

166 Ibid.

167 Permanent Mission of Pakistan to the United Nations in Geneva. (2018, August 28). Statement to the second session of the CCW group of governmental experts (GGE) on lethal autonomous weapons systems. Retrieved from http://pakistanmission-un.org/?p=2711.

168 Ibid.

169 Ibid.

stated that consideration of LAWS within the CCW framework must lead to a legally binding instrument that effectively regulates the issue.[170]

Sri Lanka

Sri Lanka is a country experiencing both post-war and post-terroristic activities. The most recent was the April 21, 2019 Easter Sunday bombing which killed over 250 people.[171] Many believe that the root causes of the conflict between the armed group Liberation Tigers of Tamil Eelam, also known as Tamil Tigers and the state, which lasted over 26 years have not yet been addressed.[172] Ongoing efforts by both the state and a vibrant civil society in the country working towards peace are trying to address these root causes to prevent further armed escalation. These very real threats to their peace and security could put Sri Lanka both on the side of being a champion state and also a future market for LAWS and LAWS precursors.

The government of Sri Lanka in their statement to the UN stated, "Sri Lanka believes that due consideration should be given, when seeking to regulate a dual use technology such as robotic technology or taking any other form of pre-emptive action, to ensuring its potential benefits in peaceful use, such as in rescue operations, intelligence, mine clearance, logistical operations, and other areas like in agriculture, or health."[173]

Sri Lanka also was concerned of the possible impact of use of LAWS on international peace and security and stated, "Autonomous systems have the potential to escalate the pace of warfare and undermine the existing arms controls and regulations, to aggravate the dangers of asymmetric warfare, and destabilize regional and global security. Possession of autonomous weapons by some States, combined with their possible asymmetric usages in war, may compel other States also to abandon their policies of restraint or moratorium and ignite an arms race."[174]

Regional Responses to International Regimes and Norms on LAWS

South Asia Association of Regional Cooperation is the only regional body in South Asia that takes up issues that concerns the region as a whole. However, the India-Pakistan conflict over Kashmir has affected the regional platform's functions.[175] Hence, there is at the moment no regional factor in determining policy of LAWS. The stand of governments on the issue of LAWS have been elaborated earlier. Several think tanks in India and abroad such as Observer Research Foundation, Centre for Land Warfare

170 UN. (2016, December 7). Fifth review conference. Retrieved from https://www.unog.ch/80256EE600585943/(httpPages)/9F975E1E06869679C1257F50004F7E8C?OpenDocument#:~:text=The%20Fifth%20CCW%20Review%20Conference,Ambassador%20Tehmina%20Janjua%20of%20Pakistan.

171 BBC News. (2019, April 18). Sri Lanka attacks: What we know about the easter bombings. *BBC News*. Retrieved from https://www.bbc.com/news/world-asia-48010697.

172 NISEA. (2019). Personal communication with civil society organizations in Nepal.

173 Permanent Mission of Sri Lanka to the United Nations in Geneva. (2015, April 21). Sri Lanka cautions that autonomous weapons could compel states to abandon restraint and ignite an arm race. Retrieved from https://www.mfa.gov.lk/sin/sri-lanka-cautions-that-autonomous-weapons-could-compel-states-to-abandon-restraint-and-ignite-an-arms-race/.

174 Ibid.

175 The Economic Times. (2019, December 24). India, Pakistan enmity main reason why SAARC is not prospering: Bangladesh. *The Economic Times*. Retrieved from https://economictimes.indiatimes.com/news/politics-and-nation/india-pakistan-enmity-main-reason-why-saarc-is-not-prospering-bangladesh-fm/articleshow/72954461.cms?from=mdr.

Studies and Carnegie writes about LAWS but they write mostly from the perspective of encouraging India to be a part and even lead in the field of LAWS production and use.

Several disarmament CSOs such as Control Arms Foundation of India, Sustainable Peace and Development Organization and others exist that are members of the international Campaign to Ban Killer Robots.[176] However, similar to their Southeast Asian counterparts, with little resources given to South Asian CSOs in this field, the campaign is at a low pace despite a more urgent need to raise awareness on the issue.

Several South Asian governments such as India want all issues of LAWS to be within the framework of the CCW only. Countries in South Asia are divided over the issue as seen in earlier analysis. For an effective awareness raising on the issue and to ensure that policy makers and parliamentarians get involved, more work needs to be done on the ground.

176 Campaign to Stop Killer Robots. (N.d.) Members by country. Retrieved from https://www.stopkillerrobots.org/members/, accessed March 2, 2020.

CHAPTER IV

Implications of LAWS and Emerging Technologies on Political Developments in Asia

Though LAWS and AI-enabled systems are at the forefront of a technically complex and cutting-edge technology developed for military and enforcement use, the nature of their use has grave political, ethical, and moral implications on governance, democracy, human rights and international humanitarian law. These implications are examined further in this section.

Democracy and Transparency

LAWS can theoretically determine or assess threat levels autonomously in combat zones and act accordingly. In the event of mistakes or civilian deaths, the chain of responsibility and accountability among human decision-makers is obscured and placed squarely on the LAWS. This complicates the public's ability, as represented by political leaders, to affect their government's conduct in conflicts, by watering down the accountability structures that democratic governments rely upon. The autonomous decisions that can potentially be made by LAWS weaken democratic chains of accountability so that wartime atrocities and failures ultimately become no one's responsibility.

Weapons development has always been a secretive state operation. No one critically questions a weapon system until it has been created. The debates on LAWS prior to its development impacts on how weapons systems are being developed in a democratic setting, but discussions on its actual impact on non-exporting states is not being properly highlighted. Asia is still a region that continues to experience armed conflicts, with large parts of its population continuing to suffer from the misuse of weapons. The possible attacks on freedom, transparency and human rights if the development and use of LAWS are normalized will have devastating effects on the fragile security of some states.

Human Rights and Accountability

International human rights groups have raised concerns about machines killing humans without human involvement. The Japanese government pointed out that "significant human involvement," such as ensuring the involvement of humans with sufficient knowledge of the weapon system, is essential.[177] Yet these concerns are impeded by ambiguity over what constitutes human control, technical risks such as AI misjudgment, malfunction, and runaway, and how these are different from risks caused by human control. This requires deeper discussions, especially with those who envision LAWS as a weapons system that is more precise and discriminate. Even if a robot can think more independently, and hypothetically, more ethically compared to that of "humans", a mechanism that is still controlled by "humans" (such as an emergency abort program) should be included. There is a fundamental link between accountability and human rights. Human control can also be perceived as a tool, a part of the weapons system, but it is acknowledged that human control gives allows the recognition of the rights of an individual, as opposed to the logical programming of AI-powered machines.

Autonomous weapons systems do not need to be "lethal" to have the same tragic impact. AI technologies that can be applied to shape public opinion is in itself a threat to basic human rights, especially freedom of expression, freedom of the press, and right to information, all basic tenets of a functioning democracy. In a region where some states have control over access to information and controls the content allowed to be consumed by the public, discussions are limited and biased. From this point forward, who will be accountable for the violations that LAWS will commit in the future? How are verification missions going to be carried out, when the conception and the actual production of LAWS are half way across the globe? From where and when does the process start? These are questions that must be addressed openly, taking great consideration of which mechanisms will effectively regulate LAWS development and use, who should be responsible for them, and what the effects of such weapons systems will be on an insecure region and oppressed peoples.

Public Health and AI

Several issues emerged at the outbreak of the novel coronavirus in December 2019, particularly on the readiness of national governments to protect their populations from a pandemic. Weapons systems cannot physically defend against a virus, leading at least some sectors in the US and some European countries to reevaluate their military spending for the upcoming years.[178] Some CSOs have pointed out that the pandemic has exposed the disparity between military spending and socio-economic development. The lack of funds for health crises and emergencies, insufficient protective gear for healthcare workers, poorly-equipped intensive care units and lack of public safeguards, appear grossly inadequate compared to enormous budgetary allocations to military spending. The link between military spending and the socio-economic welfare of society should underscore discussions on weapons development in the future.

177 Komeito. (2019, May 15). LAWS（自律型致死兵器システム） 規制論議の現状と課題. Komeito. Retrieved from https://www.komei.or.jp/komeinews/p29363/.

178 Amaro, S. (2020, May 13). Coronavirus could hit defense spending and spark NATO tensions once again. *CNBC* . Retrieved

One of the ways AI has been used to provide public safety measures during the pandemic has been the use of robot dogs to remind people to maintain social distancing, as seen in Singapore recently.[179] Another is monitoring of citizens with facial recognition through contact tracing, which has seen more acceptance recently in order to mitigate community transmissions. Development of an IT infrastructure that would support a national ID system in developing countries has also seen more support, especially as national governments realize that implementing cash assistance programs could be deployed more efficiently with a reliable national database of citizens.[180] AI will likely see more uses in a post-COVID19 world as part of the "new normal". The question will be how boundaries can be set regarding the use of personal data for the benefit of the common good.

Marginalization, Gender Discrimination, and AI

If not addressed at the onset, AI and emerging technology development is an area that could widen the gap for gender discrimination and marginalization. The argument that says AI will be more objective will not hold ground as half of the population remains marginalized in this field — and women and girls will have an even lesser voice in these new platforms. It is a fact that women and girls are marginalized and discriminated across Asia, either in developing or developed states. The region has received criticisms on the structural inequalities posed by tradition and societal norms that are often patriarchal and put more importance on the status of men and preference for sons over women and daughters. AI and emerging technology are no different as it is reflective of the societal norms where developers are, in an opinion piece by the ASEAN Post: "When it comes to technology, it is still a male-driven job market where only 22 percent of professionals globally are women. In Singapore, 28 percent of the AI talent pool is female, which is only slightly above the global average."[181] The inherent bias and discrimination of people against women and girls, and other genders for that matter will most likely be transferred from people to AI and emerging technology as participation in their development remains almost exclusive to men.

Inclusivity and equal representation in development and policy are crucial to help push for equality and marginalization. Development in AI and emerging technology that supposedly helps address societal problems will not include problems faced by women and marginalized groups as they are not currently involved in the development itself. Any system developed with the status quo will support the current system that already discriminates and marginalizes on people's gender and identity. Development in the field should have the perspectives of women and marginalized groups to include the issues and challenges they face to help address them.

from https://www.cnbc.com/2020/05/13/what-coronavirus-means-for-nato-and-defense-spending.html.

179 BBC News. (2020, May 11). Coronavirus: Robot dog enforces social distancing in Singapore park [video file]. Retrieved from https://www.bbc.com/news/av/technology-52619568/coronavirus-robot-dog-enforces-social-distancing-in-singapore-park.

180 NISEA. (2020). Personal communications with government representatives.

181 The ASEAN Post. (2020, July 31). Is Tech Threatening Women's Jobs? The ASEAN Post. Retrieved from https://theaseanpost.com/article/tech-threatening-womens-jobs

CHAPTER V

Conclusion

Asia has historically been a market for weapons systems. This study has shown that LAWS development in Asia may be motivated by several factors. It may be driven by political tensions within and among countries, territorial disputes and transnational security concerns, emerge out of domestic socio-political strife, or brought on by insecurity in government capabilities to defend the state. AI research and development in the area of autonomous weaponry has remained concealed from the public eye, limiting the discussions to those in-the-know and highly technical experts.

The scoping study has also shown that Asia will likely be divided between producers-suppliers and recipients-buyers of LAWS. Lower middle income countries[182] such as Vietnam and middle income countries[183] such as Thailand may be attempting to develop their own UGVs but will ultimately be behind countries such as China, South Korea, Singapore and Japan who may spend millions of dollars in AI technology. Consequently, the knowledge and expertise on LAWS is confined mostly to the technologically capable countries. For the rest of the countries in Asia, understanding of LAWS, how they may be manufactured and operated, remains narrow. The complexity of the parts and components of LAWS will likely contribute to some confusion and misunderstandings about what kinds of weapons systems require additional regulations. This results in the ambiguous position most of the countries have on LAWS development and use. Despite this, based on the research and the personal communication of the writers and researchers with country representatives, there does not seem to be any objection to the banning of LAWS yet. A few have determined that regulatory policies in place on dual-use goods serve as a good foundation and may be strengthened.

Though majority of countries in Asia are less likely to manufacture LAWS due to lack of expertise and capability, these countries can still be suppliers of parts, components, or software, making regulatory policies a necessary standard for the entire region. In addition, some of the technologically advanced countries already have existing capacities to build the infrastructure that can support the development of LAWS, as illustrated by the collaboration between KAIST and Hanwha Systems.

The researchers examined publicly available data as well as interacted with a few government representatives to determine their position on LAWS, as shown in this

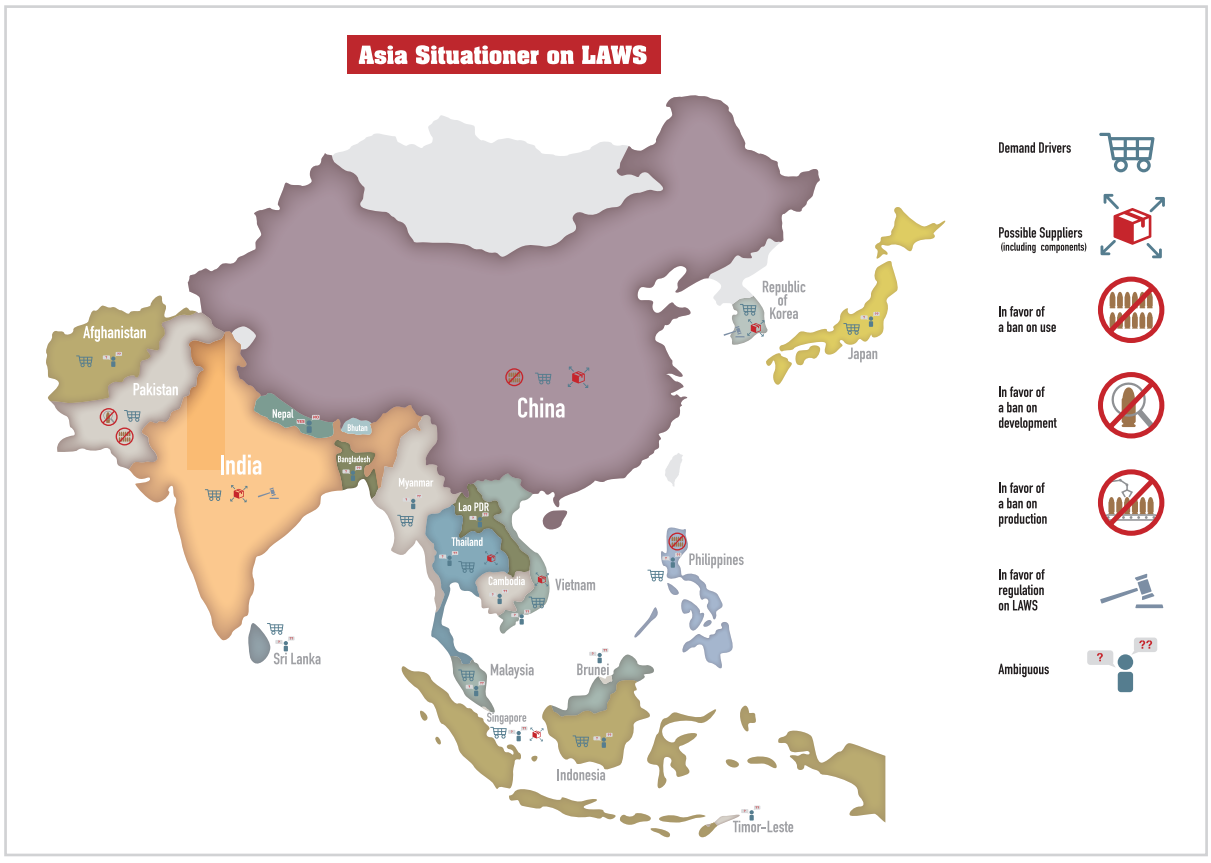
182 Lower middle income countries are defined by the World Bank as those with a GNI per capita of USD 1,006 to USD 3,955, based on 2016 data. Retrieved from https://datatopics.worldbank.org/world-development-indicators/images/figures-png/world-by-income-sdg-atlas-2018.pdf.

183 Retrieved from https://datatopics.worldbank.org/world-development-indicators/images/figures-png/world-by-income-sdg-atlas-2018.pdf.

study. A summary of the positions, classified according to subregion, is shown here. This figure shows the following: (a) the presence of drivers to the development of LAWS; (b) potential suppliers of LAWS, including parts and components; (c) whether the country is in favor of a ban on the development of LAWS; (d) whether the country agrees to the ban on the use of LAWS; (e) whether the country is in favor of the ban on LAWS production; (f) if the country is in favor of regulating LAWS; or (g) if the country's position is currently ambiguous.

In East Asia, demand drivers to the production of LAWS are present, due to regional insecurity and domestic strife. China and South Korea are already making headway in AI development and its incorporation in weapons systems. Out of the three countries, China has declared publicly that it will support a ban on the use of LAWS, though its activities undermine this statement, while South Korea is amenable to regulation. Japan has warned of the dangers of LAWS but the national position remains ambiguous.

Figure 6: *Summary of Asia's views on LAWS*



Most of the countries in Southeast Asia do not have national positions on LAWS as of yet, though the demand drivers for LAWS production or acquisition are present in some countries. The motivations for Southeast Asia are driven by national defense considerations especially against transnational threats.

In South Asia, India will be a dominant player in any future development on LAWS as it is the only country taking steps in AI development. Pakistan has stated that it supports a ban on both the development and use of LAWS, while other countries remain ambiguous or silent.

CHAPTER VI

Recommendations

As LAWS development is not widely understood, certain steps could be made to spread awareness and encourage countries to confront issues that may emerge from it. States may be engaged at the international, regional and national levels to determine their level of awareness on LAWS and its discussion in the international debates.

At the international level, more efforts should be made to have clarity on the definition of LAWS. Misunderstandings are mostly on the level of autonomy required for a weapon to be considered autonomous. The central defining feature of LAWS is the absence of human control over the use of force. Inputs from the scientific and engineering communities are crucial in creating a standard definition. It is especially critical for definitions to be decided in order to increase understanding on the development and use of LAWS and its implications on conflict, warfare and human rights. A standard definition will enable states to formulate concrete responses. This void must be addressed as it may be used by opponents to stall meaningful steps towards negotiating a treaty on LAWS.

It would be useful for countries if more inter-sectoral discussions between the scientific and engineering community, government representatives and civil society are encouraged. This would provide clarity between AI and Robotics workers, state, defense, arms industries, and civil society and urge them to find a unified position. Steps should be taken to map out the possible "life cycle" of a LAWS, similar to defining the life cycle of conventional weapons, which includes various aspects of conceptualization, development, up to its disposal (end of life). This will enable the identification of points in LAWS development and production where regulatory frameworks or a ban could intervene, without preventing positive technological advancement.

As standards are important in contributing to a wider understanding of LAWS, a legally-binding international instrument must take into consideration the humanitarian impact of LAWS. Such an instrument should also have considerable space for the views of states who have no intention to develop, possess or use LAWS. Global meetings among the military leadership of states, civil society and experts would facilitate this international process. Formal discussions at the international level have been beneficial in various other humanitarian disarmament discussions and contributed to progress towards new international laws.

At the regional level, regulatory policies are important. The production and distribution of LAWS and relevant AI technology will most likely not be confined to a single country. The complexity of LAWS components, each with its own international development and distribution process, points even more to the necessity of a regional policy response. For Southeast Asia, the Association of Southeast Asian Nations (ASEAN) will be an

important vehicle for regional discussions; for South Asia, this role can be fulfilled by the South Asian Association for Regional Cooperation (SAARC). LAWS is one of the first few global issues that will likely test the effectivity of regional policies, especially in setting arms control regimes, related technology and data. Regional initiatives will also draw states that consider LAWS a priority issue. In order to engage states at the regional level, multilateral discussions must be initiated. Regular dialogue will help states develop their own positions, something civil society organizations can provide assistance in.

States in the region should be encouraged to take on LAWS as an emerging security and humanitarian issue and step up its leadership towards a common regional position. The nature of emerging technologies and the security threats it will pose in the future cannot be addressed by any single state effort, and this should be highlighted in discussions and engagements with states.

In addition to each subregional grouping, NAM should be encouraged to participate in global discussions regarding LAWS. NAM is an association of developing countries who have chosen not to align themselves with any global power. NAM has 120 members, including all the countries in South and Southeast Asia. It has already expressed its reservations regarding LAWS and its implications on the proper observance of IHL, as well as the moral and ethical concerns attached to the use of LAWS, during a Meeting of Governmental Experts in 2018.[184] The Movement's reach and membership are wider than subregional groupings, making it an effective channel to engage regarding LAWS concerns.

At the national level, it is important to fully engage governments to prepare for a future in which LAWS become more prevalent in military capabilities. National policies can only be effective if policymakers and implementing agencies understand the nature and feature of LAWS. Policies need not be built from the ground up. They can be built up in a parallel process, though not necessarily towing the same line, of existing policies on conventional weapons and dual-use goods. This will prevent the creation of overlapping layers of laws and policies that seem to be comprehensive but are less efficient and less regulatory.

In the development of its own national policy on LAWS, states should be encouraged to identify gaps in their laws and policies. It would be useful for states to conduct further studies on the implications of LAWS in the national security, public order and safety situation vis-à-vis positive technological advancements. Awareness-raising efforts should be supported. As mentioned in the previous chapter, few states are discussing these issues at the national level due to lack of resources and exchange of experts on this field. This means that any national process on LAWS regulation or ban must involve various stakeholders in preparation for a global diplomatic conference negotiating a new international law governing LAWS.

184 UN. (2018, March 28). Group of governmental experts of the high contracting parties to 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. Retrieved from https://www.unog.ch/80256EDD006B8954/(httpAssets)/E9BBB3F7ACBE8790C125825F004AA329/$file/CCW_GGE_1_2018_WP.1.pdf.

To this end, civil society organizations can play a significant role. CSOs can serve as intermediaries between different sectors of society including government, private and technological sectors. They can engage and encourage states to participate actively in international meetings towards developing their own national positions. Civil society's efforts must thus be supported, especially those from developing countries who do not have the resources to constantly engage governments or participate in the global discussions on LAWS. In the same vein, experts, particularly tech workers and AI and robotics experts, who have led inter-sectoral discussions on LAWS at the national and potentially regional and international levels, should lead discussions to improve the understanding on LAWS and be encouraged to join the campaign. Some initiatives have already been launched by scientists and academics to inform policy discussions on security with sound science.[185]

Humanitarian disarmament advocates and campaigners should be given equal opportunity to share their views at various levels of discussions. Resources at the global meetings fora are limited. For example, only 2-3 Asian CSOs are invited in global meetings, which does not properly represent the diversity of the region. An Asian regional platform on humanitarian disarmament can be strengthened to help build a stronger unified position of CSOs working on this issue. Knowledge materials should be developed and produced to assist CSOs in raising the awareness of the public and their respective governments. CSOs can work together on developing a unified position and message, and will be able to identify the very real threats that LAWS will pose to their communities.

185 NISEA. (2019). Personal communication with arms control researcher in Japan.

Nonviolence International, an NGO in Special Consultative Status with the Economic and Social Council (ECOSOC) of the United Nations since 2005, has been working on peacebuilding, conflict transformation, humanitarian disarmament, & peace processes.

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KEN MORIYASU and ALEX FANG, Nikkei staff writers
May 26, 2021 04:45 JST ● Updated on May 27, 2021 00:32 JST

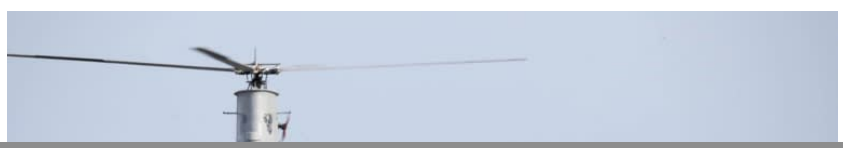
NEW YORK -- Autonomous weapons systems, or "killer robots," have no fear, no anger, and no guilt or hesitation about pulling the trigger. They do as their programming tells them to.

But say a robot is tasked with hunting for Scud missiles from among a "library" of targets, choosing from those it sees. Who, or what, would keep it from attacking a Scud near a school?

How much is the machine allowed to do on its own, and who among its human overlords takes responsibility for unintended engagements? These questions of "machine permissibility" and "machine accountability" are just some of what countries will wrestle with as lethal autonomous weapons are increasingly deployed in theaters of war.

Autonomous weapons systems are expected to play a major role in future combat, since all three players in the great-power competition have incentives to switch to them from humans. The U.S. has just endured a grueling two-decade war on terrorism in Iraq and Afghanistan, where many lives were lost. Russia has a declining population and will need robots to sustain its forces.

China, due to its past one-child policy, has a military almost entirely made up of each family's only child.



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Two MH-60S Sea Hawk helicopters and an MQ-8B Fire Scout unmanned aerial vehicle conduct hover checks at the Mid-Atlantic Regional Spaceport's Unmanned Aircraft Systems Airfield at NASA Goddard's Wallops Flight Facility in Virginia. (Photo courtesy of the U.S. Navy)

From U.S. operations in Afghanistan to the recent Israel-Hamas conflict, unmanned vehicles have been in heavy use. But the impact of drones in the autumn 2020 clash between Azerbaijan and Armenia in the Nagorno-Karabakh region caught the eye of many military experts around the world.

"The Azerbaijanis used drones to incredible new effect," Peter Singer, a strategist at the New America think tank and author of "Burn-In: A Novel of the Real Robotic Revolution," told Nikkei Asia. "They took out over 40% of Armenia's tanks and armored fighting vehicles, and over 90% of their artillery and missiles, utilizing a mix of airstrikes and drones."

"Fifteen years ago, the question in war was, 'Will there be a role for drones?'" he said.

"Coming out of that war, no one's questioning whether drones are going to be used in war," Singer said. "They're questioning, 'Do tanks still have a role?'"

The drones used by Azerbaijan included equipment purchased from Turkey and Israel that helped identify, target and attack Armenian defensive positions and armored units, according to a January report by the Congressional Research Service.

In an April paper titled "Principles for the Combat Employment of Weapon Systems with Autonomous Functionalities," former U.S. Deputy Secretary of Defense Robert Work wrote of the need to "develop, debate, and agree upon some commonly accepted principles for the employment of weapon systems with autonomous functionalities in armed conflict."

Work opposed mandating human oversight over every step of the kill chain. For example, if a munition dispenser released 40 skeets over a group of targets, the time between the release of the skeets and their attacks is measured in seconds.

"Requiring a human-in-the-loop would therefore require 40 human operators to monitor the action of one skeet and permit or abort its attack -- a prohibitive personnel requirement," Work wrote.

An unmanned aerial vehicle of U.S. Customs and Border Protection stands by ready for patrol along the southern border. (Photo courtesy of the CBP)

Still, Work's paper suggests that there should be "a responsible chain of human command and control" to guide the use of weapon systems with autonomous functionalities, and that it should be clear that human responsibility for decisions over the use of force can never be transferred to machines.

But unlike targeting an enemy destroyer or submarine at sea -- a clear-cut decision for a

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machine -- governing autonomous weapons in urban warfare will be more complex.

In a 2019 podcast with the Modern War Institute at West Point, Work gave the example of an autonomous weapons system confronted with four people in a city.

"Two people are holding a rifle, but two people are not. Am I going to kill all four, or am I just going to kill the two with the rifles?" The army fights among the people, so the burden on U.S. Army autonomous systems will be much higher than going out after a ship, he said.

"It's much, much more difficult in things like compartmented terrain in megacities."

Similar debates have also taken place in China, where scholars often express concerns over frequent American use of drones.

Defense analysts Chen Dongheng and Li Xin'an argued in an article for the official People's Liberation Army Daily last year that intelligent combat systems should adhere to the basic principle of "people in the loop," and prioritize human judgment, operation and control.

In a 2019 PLA Daily article, analysts Zhao Xiangang and Liu Xiaoxing argued that unmanned combat could incentivize big military powers to use force, further dehumanize the enemy and gamify the act of killing, and lead to high collateral damage.

A Vanilla ultraendurance land-launched unmanned aerial vehicle operates in the Pacific Ocean on April 24. (Photo courtesy of the U.S. Navy)

Zhao and Liu argued that even a highly intelligent system would be hard-pressed to discern intentions on the battlefield -- when faced with enemies who have been injured or disarmed or are using civilians as human shields, for instance. Surrendering such judgments to machines will seriously challenge the civilian-combatant distinction in international humanitarian law, as well as the rule that members of armed forces who have laid down their weapons shall not be made the object of attack, they wrote.

The Washington-based think tank Brookings Institution and the Beijing-based Tsinghua University, together with the Berggruen Institute in Los Angeles and the Minderoo Foundation in Perth, Australia, have been conducting track two (unofficial) dialogues on the issue over the past two years.

In a joint report, Tsinghua's Fu Ying, a former Chinese vice minister of foreign affairs, wrote that AI has limitations, including the inability to interpret intuition, emotion, responsibility and value. In the human-machine collaborative process, the machine's deficiencies could lead to escalations of international crises, she said.

"China is ready to work with the U.S. and the rest of the world on the governance of AI," she wrote.

Brookings President John Allen wrote that, "There is certainly more agreement than disagreement among national security technology experts in the U.S. and China over the risks and challenges posed by AI."

New America's Singer says that these are "new legal ethical questions that humans have never really dealt with before" and that they are not limited to future warfare. "They aren't just taking place on an imaginary future battlefield -- they're taking place on our highways, right now," he said.

In one scenario posed by Singer, your self-driving car -- without you inside -- gets into a

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wreck and someone dies.

"Are you responsible? Is the company responsible that made the car?" he asks.

The Pentagon does have guidance on autonomy in weapon systems: Directive No. 3000.09, which was issued in 2012 and extended in 2017. Commanders and operators should exercise "appropriate levels of human judgment over the use of force," it states.

Singer called for more clarity in a 2016 opinion piece he co-wrote: "The words 'appropriate' and 'judgment' are pretty loaded terms here, given that people might reasonably debate their meanings in all sorts of contexts. In short, if something is going to be banned or not, our definitions of it need to be much more clear and accessible."

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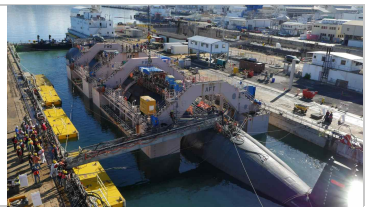

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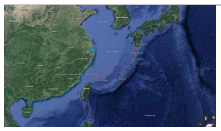

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Clash of Killer Robots? Japan's Role in Preventing AI Apocalypse

Japan has a responsibility to spearhead discussions on the legal regulation of lethal autonomous weapons systems.

By Daisuke Akimoto
December 10, 2019


Credit: Wikimedia Commons/ Mztourist

Civil society organizations have warned that if "killer robots" or "lethal autonomous weapons systems" (LAWS) reminiscent of the famous film *The Terminator* are created, such weapons would cause serious problems with regards to human rights. In science fiction, artificial intelligence (AI) technology often surpasses human beings, bringing about an apocalyptic scenario. Indeed, it is fair to consider that the combination of AI technology and nuclear weapons might bring about such a devastating conflict in the future. Although no "fully autonomous" weapon exists at this stage, several countries, such as the United States, Russia, China, South Korea, and Israel, are thought to have developed "semi-autonomous" weapons equipped with artificial intelligence.

LAWS issues have been a part of international discussions in the United Nations, and the Japanese government has actively participated in these conferences. Japanese politicians have also discussed the issues in the National Diet since 2015. This article examines Japan's role in the international regulation of LAWS and attempts to explore possible solutions in international law.

In 2013, the United Nations decided to discuss concerns about LAWS within the framework of the "Convention on Certain Conventional Weapons" (CCW), which prohibits or restricts the use of specific weapons. Parties at the discussions on the CCW can be divided into those supporting early regulation or prohibition of LAWS and those against such measures. In particular, the United States, Russia, and China have shown reluctance in supporting the legal prohibition of the development of LAWS because they fear that such a regulation could be disadvantageous for their military strategy. Indeed, it has been considered that the United States, China, Israel, Russia, South Korea, and the United Kingdom have already developed "semi-autonomous" weapons systems.

Japan has supported the CCW framework and the annexed Protocols. Internationally, the Japanese government has dispatched delegations to the international discussions on the LAWS issues. At a CCW conference in November 2013, it was decided that LAWS issues should be discussed. In May 2014, Japanese Ambassador to the Conference on Disarmament Toshio Sano, officials from Japan's Ministry of Foreign Affairs (MOFA), Ministry of Defense (MOD), and

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Ministry of Economy, Trade and Industry (METI), as well as Professor Heigo Sato of Takushoku University as an expert on arms control and disarmament, attended the CCW to discuss LAWS. In the CCW conference held in Geneva on May 13, 2014, Japanese Ambassador Toshio Sano explained Japan's stance on LAWS and expressed deep appreciation for the role of civil society in contributing to awareness of humanitarian concerns related to the development of LAWS. Sano stressed that the Japanese government was taking an interest in the LAWS issue and would like to engage in international discussions. He also stated that Japan would continue to research and develop "non-lethal autonomous technology for defense purposes" but that the government would not develop "fully autonomous" weapons systems. In the CCW conference on November 13, 2014 which took place in Geneva, Sano explained Japan's stance on LAWS in a speech.

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Sano commended the French ambassador at the informal meeting of experts on LAWS in May 2014, calling his leadership "fruitful and insightful," and expressed Japan's support for further discussions on LAWS within the framework of the CCW. The second informal meeting of experts on LAWS in the CCW was held in Geneva on April 13, 2015. The Japanese government expressed its support for the meeting to facilitate a discussion of the core concepts regarding LAWS, such as its definition, the implications of autonomy, and "meaningful human control." Furthermore, the government stated that Japan had no plan to develop "fully autonomous" weapons systems.

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On October 26, 2015 in New York, Sano delivered a speech at the first committee of the 70th Session of the United Nations General Assembly. Sano stated that Japan commended the "leadership of Germany in the second informal meeting of experts" and that Japan would support further discussion, particularly on the definition of LAWS, for the Fifth CCW Review Conference in 2016. On November 12, 2015, Sano made a speech at the CCW conference in Geneva and expressed Japan's view that it is important to reach a consensus on a certain definition of LAWS. The third CCW meeting of experts on LAWS chaired by German Ambassador Michael Biontino was held in Geneva on April 11, 2016. In the meeting, the Japanese government submitted its working paper on LAWS and stressed the importance of the meeting.

On November 13, 2017, the first meeting of the "Group of Governmental Experts" (GGE) on LAWS as a subsidiary body of the CCW was held in Geneva. The mandate of the GGE is decided based on the High Contracting Parties to the CCW, and the experts widely discussed issues related to LAWS from legal, ethical, military, and technological perspectives. The 2017 CCW conference was held in Geneva on November 20, 2017. Ambassador Nobushige Takamizawa and officials from MOFA and MOD attended the meeting to discuss the arguments expressed in the first GGE session. Takamizawa, MOFA and MOD officials, and Professor Heigo Sato participated in the second GGE meeting on April 9, 2018. The Japanese ambassador and officials from the MOFA and the MOD also attended the third GGE meeting on August 27, 2018, where they argued that the Japanese government would not develop LAWS and that "meaningful human control" over weapons should be required.

On November 19, 2018, Takamizawa and Japanese foreign affairs and defense officials attended the CCW conference to discuss concerns about LAWS in Geneva. From March 25-29, 2019, the GGE on LAWS was held within the framework of the CCW in Geneva. The Japanese government submitted a working paper to the GGE on March 21, 2019, in which the government requested the GGE facilitate a "direction towards possible future actions of the international community on LAWS," reach a "mutual understanding" on the definition of LAWS and meaningful human control, and reach a consensus on an "outcome document." In the GGE held on August 20-21, 2019, the Japanese

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delegation headed by Takamizawa joined the international discussion on the legal regulation of LAWS in international law. On November 19, 2019, Takamizawa and Japanese officials attended the CCW conference in Geneva. In the conference, it was decided that the GGE would be held on June 22-26 and August 10-14, 2020. Thus, the Japanese government has actively participated in the international discussions to regulate LAWS in the framework of the CCW.

At the same time however, the Japanese government has been cautious about creating a legally binding treaty to ban LAWS due to its national interests in the dual use nature of AI technology as well as the strategic importance of AI-equipped defense capabilities as "semi-autonomous" defense systems. Moreover, as the joint development of "military drones" between Japan and the United States and Israel indicates, Japan's policy on the development of AI weapons seems to be under the influence of U.S. military strategy. Nevertheless, it is possible for the Japanese government and other UN member states to facilitate international discussions and agree on a "political declaration" to regulate LAWS as a first step. Such a declaration can be upgraded into an international agreement that provides a legally binding framework.

It may be difficult for the international community to completely regulate or illegalize LAWS once such weapons systems are created and deployed. The development of LAWS could transform the nature of future military conflicts in an inhumane and catastrophic manner. Therefore, Japan, as a former militarist state that invaded countries of the Asia Pacific region, as a pacifist state with a Peace Constitution, as the sole state to have suffered from nuclear attacks, and as a leader in technology, has a responsibility to spearhead further international discussions on the legal regulation of LAWS.

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August 10, 2020

Stopping Killer Robots

Country Positions on Banning Fully Autonomous Weapons and Retaining Human Control

Available In English Français

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Summary

August 10, 2020 | News Release

Killer Robots: Growing Support for a Ban

Weapons systems that select and engage targets without meaningful human control are unacceptable and need to be prevented. All countries have a duty to protect humanity from this dangerous development by banning fully autonomous weapons. Retaining meaningful human control over the use of force is an ethical imperative, a legal necessity, and a moral obligation.

In the period since Human Rights Watch and other nongovernmental organizations launched the Campaign to Stop Killer Robots in 2013, the question of how to respond to concerns over fully autonomous weapons has steadily climbed the international agenda.[1] The challenge of killer robots, like climate change, is widely regarded as a grave threat to humanity that deserves urgent multilateral action.[2]

A growing number of legislators, policymakers, private companies, international and domestic organizations, and ordinary individuals have endorsed the call to ban fully autonomous weapons.[3] Since 2018, the United Nations Secretary-General António Guterres has repeatedly urged states to prohibit weapons systems that could, by themselves, target and attack human beings, calling them "morally repugnant and politically unacceptable."[4]

This report shows how 97 countries have responded to this challenge and elaborated their views on lethal autonomous weapons systems since the matter

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was first discussed at the Human Rights Council in 2013.[5] It surveys where these countries stand on calls to ban fully autonomous weapons and retain meaningful human control over the use of force.

Such a legally binding instrument could come in the form of a new protocol to the Convention on Conventional Weapons (CCW), which has discussed this concern since 2014.[6] Or, with sufficient political leadership, killer robots could be banned by a treaty negotiated via a standalone process similar to the initiatives that successfully prohibited antipersonnel landmines in 1997 and cluster munitions in 2008.

The report draws on publicly available information, including statements made in various fora, such as the United Nations (UN) General Assembly. It tracks country participation in eight CCW meetings on lethal autonomous weapons systems held at the UN in Geneva in 2014-2019.[7]

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Killer Robots: Growing Support for a Ban

Shared Concerns, Desire for Human Control Should Spur Regulation

Key Findings

Since 2013, a total of 97 countries have publicly elaborated their views on fully autonomous weapons in a multilateral forum.[8] They have expressed a wide array of serious ethical, legal, operational, proliferation, moral, and technological concerns over removing human control from the use of force.

Two-thirds are among the 125 High Contracting Parties ("states parties") to the Convention on Conventional Weapons.[9] Most participated in CCW meetings on lethal autonomous weapons systems in 2014-2019.[10]

Their active engagement in the CCW talks on killer robots demonstrates growing awareness of and concerns about removing human control from the use of force. There is widespread acknowledgment that technological developments are enabling militaries to incorporate autonomy into weapons systems. China, Israel, Russia, South Korea, the United Kingdom, and the United States are investing heavily in the development of various autonomous weapons systems, while Australia, Turkey, and other countries are also making investments.

Despite this development, the vast majority of countries that have spoken to date regard human decision-making, control, or judgment as critical to the

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acceptability and legality of weapons systems. There is now widespread agreement about the need to retain some form of human control over the use of force, including over individual attacks. In 2018, Austria, Brazil, and Chile recommended launching negotiations on a legally binding instrument to ensure meaningful human control over the critical functions of weapons systems.[11]

Banning fully autonomous weapons means prohibiting weapons systems that lack meaningful human control. Since 2013, 30 countries have called for a ban on such fully autonomous weapons: Algeria, Argentina, Austria, Bolivia, Brazil, Chile, China, Colombia, Costa Rica, Cuba, Djibouti, Ecuador, Egypt, El Salvador, Ghana, Guatemala, Holy See, Iraq, Jordan, Mexico, Morocco, Namibia, Nicaragua, Pakistan, Panama, Peru, State of Palestine, Uganda, Venezuela, and Zimbabwe. China has called for a treaty to ban the use of lethal autonomous weapons systems, but not their development or production, which is unsurprising given that it is also among the nations most advanced in pursuing such weapons.[12]

Several groups of states have endorsed statements calling for a ban on killer robots. The Non-Aligned Movement (NAM), which is comprised of approximately 125 member states, has called for a "legally binding international instrument stipulating prohibitions and regulations on lethal autonomous weapons systems" several times since 2018.[13] Benin spoke in April and August 2018 on behalf of a group of African states to recommend launching negotiations on a legally binding instrument on fully autonomous weapons "at the earliest" as weapons systems "that are not under human control should be banned."[14]

All CCW meetings on killer robots in 2014-2019 saw strong interest or convergence on the importance of retaining human control over weapons systems and the use of force. This is reflected in a principle on human-machine interaction that CCW states agreed to in 2019.[15] Human-machine interaction attracted the greatest interest by far during the virtual Berlin Forum on lethal autonomous weapons systems attended by more than 60 countries on April 1-2, 2020. There was widespread recognition at the Rio Seminar on autonomous weapons on February 20, 2020 that human control is where states should focus their collective work.

While the CCW talks were formalized in 2016, they have yielded little in the way of a lasting multilateral outcome. Decisions at the CCW are taken by consensus, which allows just a few or even a single state to block an agreement sought by a majority – and often results in lowest-common denominator decision-making. A handful of military powers, most notably Russia and the United States, have firmly rejected proposals to negotiate a new CCW protocol or standalone international treaty. At the last CCW meeting in August 2019, Russia and the United States again opposed proposals to negotiate a new treaty on killer robots, calling such a move "premature."[16]

The CCW meetings have heard proposals for political declarations and codes of conduct, as well as for greater transparency. Such measures have value, but are, by themselves, insufficient to deal with this serious threat to humanity. Some of the measures could be more productively undertaken after the international legal framework on killer robots has been put in place. A set of "guiding principles" was agreed to by states at the CCW in 2018 and 2019, but these were merely intended to guide their deliberations and, on their own, are not an adequate or appropriate response to the multiple concerns raised by increasing autonomy in weapons systems.

At the end of 2019, states agreed to hold four weeks of CCW meetings in 2020-2021 to discuss developing "a normative and operational framework" for lethal autonomous weapons systems.[17] They committed to strive for results by the CCW's Sixth Review Conference in December 2021.

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However, the onset of the Covid-19 pandemic has postponed the 2020 CCW meetings on killer robots. In the interim, the chair has urged CCW states to provide written commentaries or working papers.

Focused deliberations would help lay the groundwork for the international ban treaty that is urgently required to retain meaningful human control over the use of force. To achieve progress, states should identify factors to help determine the necessary kind and extent of human control over weapons systems and the use of force.[18] They should comment on their preferred normative international framework.

A legally binding instrument is the optimal framework for dealing with the many serious challenges raised by fully autonomous weapons. A new international ban treaty could lay down explicit rules to ensure appropriate constraints on autonomy in weapons systems and resolve differing views on human control over the use of force. Most importantly, a new treaty would show that states are serious about responding appropriately and with urgency to this existential threat to humanity.

Recommendations

Human Rights Watch calls on all states to:

- **Work with other concerned states to launch and swiftly conclude negotiations on a new international treaty to retain meaningful human control over the use of force and prohibit weapons systems that lack such human control; and**
- **Adopt national laws and policies committing to retain meaningful human control over the use of force and establishing prohibitions on the development, production, and use of fully autonomous weapons.**

Country Positions on Killer Robots

Algeria

At a Human Rights Council debate on lethal autonomous weapons systems in May 2013, Algeria said it sees "a need to adopt appropriate measures so that the use of this technology respects human rights."[19] Algeria has expressed numerous ethical, legal, and moral concerns over killer robots and has warned of the potential for an arms race and proliferation to non-state armed groups.[20] In April 2016, Algeria called for "a prohibition of acquisition, design, development, testing, deployment and transfer and use of lethal autonomous weapons systems through an international legally binding instrument."[21] Algeria recommends that the concept of meaningful human control be at the center of the treaty's negotiations.[22] Algeria participated in every CCW meeting on killer robots in 2014-2019.

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Argentina

At the Human Rights Council in May 2013, Argentina delivered a statement on behalf of the Group of Latin American and Caribbean Countries (GRULAC) that raised several concerns over fully autonomous weapons, including the potential to foster reprisal, retaliation, and terrorism.[23] Argentina sees a need "to preserve meaningful human control at all phases of the development and use" of weapons systems.[24] It called for a "preemptive prohibition of the development of lethal autonomous weapons systems" in December 2016.[25] Argentina participated in CCW meetings on killer robots held in 2014-2019.

Australia

When Australia supported a proposal to begin multilateral talks on lethal autonomous weapons systems in November 2013, it expressed interest in discussing applicable international humanitarian law, definitions, military utility, and humanitarian aspects.[26] Australia does not see a need for a new international treaty to address concerns over such weapons. In March 2018, foreign minister Julia Bishop said it is "premature" to consider banning fully autonomous weapons.[27] Australia is developing and testing various autonomous weapons systems. It argues that "autonomous technology has distinct benefits for the promotion of humanitarian outcomes and avoidance of civilian casualties."[28] Australia participated in every CCW meeting on killer robots in 2014-2019.

Austria

At the Human Rights Council in May 2013, Austria expressed interest in discussing the "multi-sectoral nature" of lethal autonomous weapons systems.[29] It has serious ethical and legal concerns with such weapons and sees destabilizing implications.[30] Austria called for a ban on autonomous weapons that are not under meaningful human control in April 2018.[31] It participated in every CCW meeting on killer robots in 2014-2019. At the CCW in August 2018, Austria, Brazil and Chile formally proposed launching negotiations on a legally binding instrument to ensure meaningful human control over the critical functions of weapons systems.[32] At the UN General Assembly in September 2019, Foreign Minister Alexander Schallenberg called for a ban "on weapons that are fully autonomous," stating, "we cannot allow machines to decide over human life and death."[33] Austria has announced its intent to convene an international meeting on killer robots in Vienna in early 2021.

Bangladesh

Bangladesh expressed its support for multilateral talks on lethal autonomous weapons systems at the UN General Assembly in October 2016.[34] However, it has never expressed its views on calls to ban them through a new international treaty. Bangladesh participated for the first time in CCW meetings on lethal autonomous weapons systems in 2019, but did not make any statements.

Belarus

Belarus said in May 2014 that it was "flexible" regarding calls to negotiate a new treaty on lethal autonomous weapons systems.[35] In November 2019, it expressed its opposition to the "indiscriminate, disproportionate use of fully autonomous weapons and use against the civilian population."[36] However, Belarus has not supported calls for a new international ban treaty to retain meaningful human

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control over the use of force. Belarus participated in every CCW meeting on killer robots in 2014-2019.

Belgium

Belgium supported a proposal to begin multilateral talks on lethal autonomous weapons systems in November 2013.[37] It says that "from an ethical and humanitarian point of view," it "fully shares the concerns on the possible risks and dangers" posed by such weapons.[38] In Belgium's view, killer robots raise several problems for international law, particularly the notion that "humans would not intervene in the final decision to be taken with lethal consequences."[39] In July 2018, Belgium's national parliament adopted a resolution endorsing a ban on the use of lethal autonomous weapons.[40] Belgian officials have not explicitly proposed negotiating new international law, but in November 2019 acknowledged the need for international support to prohibit lethal autonomous weapons.[41] Belgium participated in every CCW meeting on killer robots in 2014-2019.

Bolivia

Bolivia said the right to life "should not be delegated to a machine" and called for a ban on lethal autonomous weapons systems in April 2015.[42] This was its first and only comment on killer robots to date. Bolivia participated in one CCW meeting on lethal autonomous weapons systems, in 2015.

Botswana

At the UN General Assembly in October 2015, Botswana expressed serious doubts that fully autonomous weapons would meets key standards of international humanitarian and human rights law.[43] In October 2018, it said that "critical decisions involving use of weapons of war and taking of human lives should not be abdicated to machines."[44] Botswana has not elaborated its position on calls for a new treaty to ban or restrict fully autonomous weapons. It is not a CCW state party and did not participate in CCW meetings on lethal autonomous weapons systems in 2014-2019.

Brazil

Brazil expressed several concerns over lethal autonomous weapons systems at the Human Rights Council in May 2013, including "the consequences of a lowered human cost of conflicts like the trivialization of war" and "uncertainties surrounding the accountability for killings committed by autonomous weapons."[45] Brazil has warned that "technology is not always the best solution for our challenges" and has raised ethical, legal, moral, and other serious objections to killer robots.[46] Brazil called for a ban on fully autonomous weapons in November 2017, stating that certain weapons systems with autonomous capabilities "will prove to be incompatible with international humanitarian law and international human rights law."[47] Brazil participated in every CCW meeting on killer robots in 2014-2019. Austria, Brazil, and Chile formally proposed negotiating a legally binding instrument to ensure meaningful human control over the critical functions of weapons systems in August 2018.[48] Brazil held an international symposium on autonomous weapons systems in Rio de Janeiro in February 2020 that was one of the first multilateral meetings on killer robots to be organized by government outside of UN auspices.[49]

Bulgaria

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Bulgaria supported multilateral talks on present and future developments of weapons technology at the UN General Assembly in October 2014.[50] In Bulgaria's view, a human "must make the ultimate decision of taking another human being's life," as "such moral resolution cannot be delegated to an autonomous weapon system."[51] However, it has not supported proposals to negotiate a new international ban treaty to retain meaningful human control over the use of force. Bulgaria participated in every CCW meeting on killer robots in 2014-2019.

Burkina Faso

At the UN General Assembly in October 2017, Burkina Faso highlighted the "essential" need to "search for durable solutions to the emergence of new challenges resulting from fully autonomous weapons systems."[52] In Burkina Faso's view, "development and projections of the use of weapons not requiring human intervention" is "a serious source of concern."[53] Burkina Faso has not supported calls for an international ban treaty to retain meaningful human control over the use of force. Burkina Faso is a CCW state party, but did not attend CCW meetings on lethal autonomous weapons systems in 2014-2019.

Cambodia

Cambodia warned in November 2017 that "the short-term benefits of lethal autonomous weapons systems could be far outweighed by the long-term consequences" and regards meaningful human control as key to ensuring accountability and ethical use of weapons systems.[54] Cambodia believes that "machinery alone should not be making life and death decisions."[55] However, it has not supported proposals to negotiate an international ban treaty to retain meaningful human control over the use of force. Cambodia participated in a CCW meeting on lethal autonomous weapons systems in 2017.

Cameroon

Cameroon supported continuing multilateral talks on lethal autonomous weapons systems in December 2016 and suggested future meetings should explore ethical and legal concerns.[56] Cameroon has not commented on calls to ban fully autonomous weapons and retain meaningful human control over the use of force. Cameroon participated in CCW meetings on killer robots in 2016 and 2017.

Canada

Canada supported a proposal to begin multilateral talks on lethal autonomous weapons systems in November 2013.[57] It says it has "no plans to ever acquire" such weapons systems, but Canadian officials have not supported calls to negotiate a new international treaty.[58] The Canadian Armed Forces say they are "committed to maintaining appropriate human involvement in the use of military capabilities that can exert lethal force."[59] In December 2019, Prime Minister Justin Trudeau instructed his Minister of Foreign Affairs, François-Philippe Champagne, to advance international efforts to ban fully autonomous weapons systems.[60] Canada participated in every CCW meeting on killer robots in 2014-2019.

Chile

Chile said in April 2015 that it is "unacceptable for a machine to decide who lives and who dies."[61] Chile has expressed multiple serious concerns over removing

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human control from the use of force.[62] Chile called for a ban on fully autonomous weapons in April 2016, arguing that existing international law is insufficient to regulate such weapons and highlighting the precedent provided by the ban on blinding lasers.[63] In August 2018, Austria, Brazil, and Chile formally proposed negotiating a legally binding instrument to ensure meaningful human control over the critical functions of weapons systems.[64] Chile participated in every CCW meeting on killer robots in 2014-2019.

China

At the Human Rights Council in May 2013, China supported beginning multilateral talks on lethal autonomous weapons systems, which it described as "highly complex."[65] China has highlighted the potential for fully autonomous weapons to upset the international strategic balance and affect arms control.[66] In December 2016, China said it that such weapons "present considerable uncertainties" for compliance with international humanitarian law and expressed its desire for precautionary measures, highlighting the precedent provided by the ban on blinding lasers.[67] In April 2018, China called for a ban on fully autonomous weapons, but later clarified its call was limited to use only and not development and production.[68] Since then, China has not explicitly repeated its call for a new international treaty to ban fully autonomous weapons. China participated in every CCW meeting on killer robots in 2014-2019.

Colombia

Colombia said in April 2015 that that lethal autonomous weapons systems require regulation "at the multilateral level in order to ensure the control by humans persists at all times, so that no machine makes life or death decisions."[69] Colombia has called such weapons "unethical, and a military and legal threat."[70] Former Colombian president Juan Manuel Santos endorsed a 2017 declaration by Nobel Peace laureates that calls for a ban on fully autonomous weapons.[71] Colombia participated in every CCW meeting on killer robots in 2014-2019. It called for a new international treaty to retain meaningful human control over the use of force in April 2018.[72]

Costa Rica

At the UN General Assembly in October 2013, Costa Rica warned that "many problems identified with the use of armed drones would be exacerbated by the trend toward increasing autonomy in robotic weapons."[73] Costa Rica has proposed that critical functions of weapons systems be subject to meaningful human control.[74] It called for a preemptive ban on lethal autonomous weapons systems in April 2016, advocating a preventive approach and citing the precedent provided by the ban on blinding lasers.[75] Costa Rica participated in CCW meetings on killer robots in 2016-2019.

Croatia

Croatia supported a proposal to begin multilateral talks on lethal autonomous weapons systems in November 2013.[76] It is concerned such weapons could potentially cause "significant humanitarian impact."[77] In Croatia's view, it "is not acceptable that fundamental moral judgments over life and death fall into the hands of automated technical systems."[78] Croatia seriously doubts the capacity of existing international humanitarian and human rights law to deal with the challenges raised by fully autonomous weapons, but it has not called for a new international ban treaty to retain human control over the use of force. Croatia

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participated in every CCW meeting on killer robots in 2014-2019.

Cuba

At the Human Rights Council in May 2013, Cuba warned that lethal autonomous weapons systems could potentially result in "a large and perpetual battlefield."[79] In Cuba's view, it is "completely unethical and unacceptable to give a weapon or machine the 'capacity' to make life-and-death decisions."[80] Cuba called for a ban on fully autonomous weapons in May 2014 and it has vigorously promoted that goal ever since.[81] In June 2017, Cuban Foreign Minister Bruno Rodríguez Parrilla said that existing international law is insufficient to deal with the killer robots challenge and called for it to be strengthened through the creation of a legally binding instrument.[82] Cuba participated in every CCW meeting on killer robots in 2014-2019.

Czech Republic

The Czech Republic warned in May 2014 that lethal autonomous weapons systems "could fundamentally change the way of fighting wars" and "could pose a serious threat for civilians."[83] In the Czech Republic's view, "the ultimate decision to end somebody's life must remain under meaningful human control."[84] It has not supported calls for a new international ban treaty to retain meaningful human control over the use of force, but has suggested that certain critical autonomous features of weapons systems be regulated or prohibited.[85] The Czech Republic participated in every CCW meeting on killer robots in 2014-2019.

Denmark

Denmark affirmed in April 2015 that "all use of force must remain under meaningful human control."[86] It has expressed interest in determining "the necessary type and degree of human involvement to ensure that deployment and use of all weapons systems is compatible with the requirements of international humanitarian law."[87] Denmark has not supported calls to ban fully autonomous weapons and retain meaningful human control over the use of force. Denmark participated in CCW meetings on killer robots in 2015-2016 and 2018-2019.

Djibouti

Djibouti called for a ban on fully autonomous weapons in April 2018.[88] It participated in CCW meetings on lethal autonomous weapons systems in 2016 and 2018-2019.

Ecuador

At the UN General Assembly in October 2013, Ecuador highlighted serious ethical, humanitarian, legal and other concerns with fully autonomous weapons.[89] In Ecuador's view, "it is unacceptable that fundamental decisions about life and death could be assigned to lethal autonomous weapons."[90] In May 2014, Ecuador became the second country to call for a ban on fully autonomous weapons, citing the precedent provided by the blinding lasers ban.[91] Ecuador has promoted a ban since then and supported an August 2018 proposal to negotiate a legally binding instrument to ensure meaningful human control over the critical functions of weapons systems.[92] Ecuador participated in CCW meetings on killer robots in 2014-2016 and 2018-2019.

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Egypt

At the Human Rights Council in May 2013, Egypt warned that lethal autonomous weapons systems have "possible ramifications on the value of human lives [and] the calculation of the cost of war."[93] Egypt was the third country to call for a ban on lethal autonomous weapons systems in May 2014, proposing specific prohibitions on acquisition, research and development, testing, deployment, transfer, and use.[94] Egypt often cites the precedent provided by the preemptive ban on blinding lasers and states that "technology should not overtake humanity."[95] Egypt is not a state party to the CCW, but participated in CCW meetings on killer robots in 2014-2016 and 2018-2019.

El Salvador

At the UN General Assembly in October 2018, El Salvador said that "a machine that has the responsibility to decide about a person's life is of great concern, and it raises great ethical and legal challenges."[96] El Salvador called for an international ban on lethal autonomous weapons systems in November 2018.[97] El Salvador participated in CCW meetings on killer robots in 2014-2019.

Estonia

Estonia expressed support for continuing multilateral talks on lethal autonomous weapons systems in August 2016.[98] It considers them to be "any weapon system that can select and engage targets without human intervention," and says that "lethality is, in our view, not a defining feature of any weapon system, autonomous or otherwise."[99] Estonia has expressed interest in exploring how to retain meaningful human control over the use of force, but says it is "unpersuaded" on the need for a new international treaty.[100] Estonia participated in every CCW meeting on killer robots in 2014-2019.

Finland

At the UN General Assembly in October 2014, Finland expressed interest in continuing multilateral talks on lethal autonomous weapons systems, which it called "a complex issue."[101] Finland says that the "development of weapons and means of warfare where humans are completely out of the loop would pose serious risks from the ethical and legal viewpoint."[102] It says that "humans should always bear the ultimate responsibility when dealing with questions of life and death."[103] Finnish officials have not supported proposals to negotiate a new international treaty to ban or restrict killer robots. However, in June 2019, Finland's new government released a coalition platform that seeks to ban weapons systems based on artificial intelligence.[104] Finland participated in every CCW meeting on killer robots in 2014-2019.

France

At the Human Rights Council in May 2013, France said that "it does not possess and does not intend to acquire robotized weapons systems with the capacity to fire independently."[105] It considers killer robots to be "weapon systems that have no human supervision once they are activated."[106] France acknowledges that removing human control from the use of force raises complex ethical legal, operational, and technological concerns.[107] It has affirmed that "humans must retain the ability to take the final decision over the use of lethal force."[108] In April 2019, Minister of Defense Florence Parly rejected calls to ban "weapons systems which would be able to act without any form of human supervision,"

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while also stating that "France refuses to entrust the decision of life or death to a machine that would act in a completely autonomous manner and would be beyond any human control."[109] As CCW president, France launched multilateral talks on lethal autonomous weapons systems in November 2013 and chaired the first CCW meeting on the topic in May 2014. France participated in every CCW meeting on killer robots in 2014-2019. France and Germany have proposed the CCW agree to a non-legally binding political declaration.

Germany

At the Human Rights Council in May 2013, Germany urged states to be transparent with respect to their development of new weapons technologies.[110] In Germany's view, it is "indispensable to maintain meaningful human control over the decision to kill another human being."[111] The last two German government coalition agreements have committed to work toward a ban on weapons systems that lack human control. In September 2018, Germany's foreign minister, Heiko Maas, called for a ban on fully autonomous weapons.[112] However, German officials have not supported proposals to launch treaty negotiations. Germany participated in every CCW meeting on killer robots in 2014-2019 and chaired the CCW meetings in 2015-2016. Germany and France have proposed the CCW agree to a non-legally binding political declaration. In April 2020, Germany convened the first online multilateral meeting on lethal autonomous weapons systems.[113]

Ghana

In November 2013, Ghana supported a proposal to open multilateral talks on lethal autonomous weapons systems.[114] Ghana called for lethal autonomous weapons systems to be prohibited in April 2015, affirming the need for a preemptive ban as "it is obvious that proponents of these systems believe they will not be the victims, but that others will."[115] Ghana is not a CCW state party, but attended CCW meetings on lethal autonomous weapons systems in 2014-2016 and 2018-2019.

Greece

Greece supported a proposal to begin discussing lethal autonomous weapons systems in October 2013.[116] Greece has expressed discomfort with "the fundamental question of whether humans should delegate life and death decisions to machines."[117] It defines killer robots as "a type of weapons that once launched or deployed (human decision) its mission cannot be terminated by human intervention," and that "has the capacity to learn and undertake on its own a range of critical functions, such as detection and engagement of targets."[118] Greece has expressed skepticism that international humanitarian and human rights law is sufficient to deal with the challenges raised by fully autonomous weapons. It has repeatedly emphasized the need to "ensure the appropriate human judgment over the use of force."[119] However, Greece has not supported proposals to ban fully autonomous weapons and retain meaningful human control over the use of force. Greece participated in every CCW meeting on killer robots in 2014-2019.

Guatemala

Since May 2014, Guatemala has raised a host of concerns over fully autonomous weapons, warning of risks to "the most basic human rights" and their lack of compliance with "the standards and principles of international humanitarian

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law."[120] Guatemala called for a ban on fully autonomous weapons in December 2016.[121] It participated in CCW meetings on lethal autonomous weapons systems in 2014 and in 2017-2019.

Holy See

In November 2013, the Holy See expressed grave ethical concerns over the inability of pre-programmed, automated technical systems to make moral judgments over life and death, respect human rights, and comply with the principles of humanity.[122] It regards killer robots to be "a weapon system capable of identifying, selecting and triggering action on a target without human supervision."[123] The Holy See called for lethal autonomous weapons systems to be prohibited in May 2014, citing the precedent provided by the preemptive ban on blinding lasers, and warning of their potential to "increase the dehumanization of warfare."[124] The Holy See provided the CCW with a ten-page statement in April 2015 outlining its ethical objections to lethal autonomous weapons systems.[125] The Holy See participated in every CCW meeting on killer robots in 2014-2019.

Honduras

Honduras first and last commented on killer robots in April 2018, when it expressed interest in exploring concerns relating to proportionality, proliferation, deployment, use, accountability, and human-machine interaction.[126] Honduras has not commented on calls for a new international ban treaty to retain meaningful human control over the use of force. Honduras attended CCW meetings on lethal autonomous weapons systems in 2015-2017 and 2019.

Hungary

In 2016, Hungary acknowledged that lethal autonomous weapons systems warrant "substantial consideration" and supported continuing diplomatic talks on the concerns.[127] Hungary attended most CCW meetings on killer robots in 2015-2019. However, it has not elaborated its views on concerns over removing human control from the use of force or commented on calls to ban or restrict fully autonomous weapons.

India

At the UN General Assembly in October 2013, India supported a proposal to begin multilateral talks on lethal autonomous weapons systems.[128] India has stated several times that challenges over such weapons must be resolved "in a manner that does not further widen the technology gap between states or encourage the use of lethal force to settle international disputes."[129] India has expressed concern that using the concept of meaningful human control could risk legitimizing such weapons systems.[130] In March 2019, India said that "responsibility for development, production and deployment" of lethal autonomous weapons systems "should rest with the concerned state" but also said that "associated risks as regards proliferation (including to non-state actors), need to be covered under dual responsibility of the state and by strengthening international regulations."[131] India is investing in the development of various autonomous weapons. However, in September 2019, Defense Minister Rajnath Singh reportedly stated that "the final attack decisions should be made by humans in the military, not by artificial intelligence."[132] India participated in every CCW meeting on killer robots in 2014-2019 and chaired the CCW meetings in 2017-2018.

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Indonesia

At the Human Rights Council in May 2013, Indonesia highlighted legal and other challenges raised by lethal autonomous weapons, particularly, "the possible, far-reaching effects on societal values, including … the protection and value of life and on international stability and security."[133] At the UN General Assembly in October 2019, Indonesia delivered a statement on behalf of the Non-Aligned Movement that asserted, "there is an urgent need to pursue a legally binding instrument on lethal autonomous weapon systems."[134] Indonesia is not a CCW state party and did not attend CCW meetings on killer robots in 2014-2019.

Iran

At the Human Rights Council in May 2013, Iran expressed interest in opening multilateral talks on lethal autonomous weapons systems.[135] Iran has not commented on the concerns raised by removing human control from the use of force or supported proposals to negotiate a new international ban treaty. Iran is not a CCW state party, but it attended CCW meetings on killer robots in 2016 and 2018-2019.

Iraq

In November 2015, Iraq warned that fully autonomous weapons could generate "an arms race which could have catastrophic results," and asserted that "no decision that could lead to the death of any human being can be given or entrusted to a machine; all decisions must remain under human control."[136] Iraq called for a preemptive ban on lethal autonomous weapons systems in November 2017 and has repeatedly expressed its support for a prohibition since then.[137] Iraq participated in CCW meetings on killer robots in 2016-2019.

Ireland

At the UN General Assembly in October 2013, Ireland expressed interest in starting multilateral talks on lethal autonomous weapons systems.[138] Ireland has expressed concern at the "eventual use of these technologies outside of traditional combat situations, for example in law enforcement."[139] It questions the relevance of lethality in considering fully autonomous weapons. Ireland has consistently emphasized the need for weapons systems to "remain under meaningful human control."[140] Ireland has not supported calls to ban fully autonomous weapons or proposed a new international treaty, but expressed interest in the "regulation" of "weapon systems that incorporate emerging technologies with increasingly autonomous functions" in November 2019.[141] Ireland participated in every CCW meeting on killer robots in 2014-2019.

Israel

In November 2013, Israel said that lethal autonomous weapons systems "do not exist currently."[142] It has urged states to keep "an open mind regarding the positive capabilities of future lethal autonomous weapons systems," as it finds they "might ensure better compliance with the laws of armed conflict in comparison with human soldiers."[143] Israel has rejected calls to negotiate a new international treaty to ban or restrict fully autonomous weapons. It is developing, testing, producing, and using weapons systems with autonomous functions. Israel participated in every CCW meeting on killer robots in 2014-2019.

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Italy

Italy supported a proposal to begin multilateral talks on killer robots in November 2013.[144] In April 2018, it said that "existing automated weapons systems… are not LAWS [lethal autonomous weapons systems]" and asserted that "weapon systems do not present accountability gap issues, as long as responsibility for their effects can be ascribed to the human operators who decided to field and activate them."[145] In October 2019, Italy emphasized that "any existing or future weapon system must be subject to human control, particularly in relation to the ultimate decision to use lethal force."[146] Italy has not acknowledged ethical and moral concerns over removing human control from the use of force or supported proposals to ban fully autonomous weapons. Italy participated in every CCW meeting on killer robots in 2014-2019.

Japan

At the UN General Assembly in October 2013, Japan supported a proposal to begin multilateral talks on lethal autonomous weapons systems.[147] It regards killer robots as weapons systems that, "once activated, can effectively select and engage a target without human intervention."[148] Japan urges the peaceful use of robotics and says it has "no plan to develop robots with humans out of the loop, which may be capable of committing murder."[149] Japan has not supported calls for a new international ban treaty to retain meaningful human control over the use of force. Japan participated in every CCW meeting on killer robots in 2014-2019. In February 2020, Japan's Foreign Ministry announced its intent to hold a regional meeting on killer robots concerns in December 2020.[150]

Jordan

In August 2016, Jordan emphasized the "urgent need to retain human control over the use of force."[151] Jordan has warned that weapons systems that operate without effective human control could "trigger an arms race" and lead to a "clear change in the rules of war and the code of conduct for armed conflict," with "pernicious consequences for all."[152] Jordan called for a legally binding instrument to ban lethal autonomous weapons systems in August 2019.[153] Jordan participated in every CCW meeting on lethal autonomous weapons systems in 2014-2019.

Kazakhstan

Kazakhstan supported continued multilateral talks on concerns over killer robots in November 2015.[154] It sees a need to maintain human control over weapons systems and has expressed doubt that lethal autonomous weapons systems would comply with key principles of international humanitarian law.[155] In November 2017, Kazakhstan said there is an "obvious" need to adopt a legally binding measure to prohibit or regulate fully autonomous weapons.[156] Kazakhstan participated in the CCW meetings on killer robots in 2014-2019.

Kuwait

At the UN General Assembly in October 2015, Kuwait stated that lethal autonomous weapons systems "pose moral, humanitarian, and legal challenges" for the international community.[157] Kuwait has expressed interest in developing legislative controls to prevent "the potentially destructive effects" of fully autonomous weapons, but it has not explicitly called for a ban. Kuwait participated in CCW meetings on killer robots in 2017-2019.

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Latvia

Latvia first commented on killer robots at the UN General Assembly in October 2016, where it supported continuing multilateral talks on lethal autonomous weapons systems.[158] Latvia has not elaborated its views on removing human control over the use of force or supported calls to prohibit or restrict fully autonomous weapons. A CCW state party, Latvia participated in every CCW meeting on lethal autonomous weapons systems in 2014-2019 and will chair CCW meetings on the topic in 2020.

Lebanon

At the UN General Assembly in October 2015, Lebanon urged that "human rights and international humanitarian law should remain our guiding principles" regarding new developments such as lethal autonomous weapons.[159] Lebanon has not elaborated its views on concerns over removing human control from the use of force or commented on calls to ban fully autonomous weapons. Lebanon ratified the CCW in 2017 and participated in CCW meetings on killer robots in 2018-2019.

Libya

At the UN General Assembly in October 2019, Libya expressed concern at the fast pace of technological developments and potential threats for peace and security.[160] Libya is not a CCW state party, but participated in CCW meetings on lethal autonomous weapons systems in 2014-2015.

Liechtenstein

Liechtenstein said that "technical developments clearly point to a need for new legal obligations" for lethal autonomous weapons systems at the UN General Assembly in October 2018.[161] It also proposed "stronger collective action" to "establish binding standards to ensure a human component in the decision-making processes of [weapons] systems." Liechtenstein says it wants "regulation in the area of lethal autonomous weapons systems … to legally ensure a human component in the decision-making processes of such systems."[162] It has not commented on calls to ban fully autonomous weapons. Liechtenstein is a CCW state party, but did not attend CCW meetings on lethal autonomous weapons systems in 2014-2019.

Lithuania

Lithuania supported a proposal to begin multilateral talks on lethal autonomous weapons systems in November 2013.[163] Lithuania has not elaborated its views on concerns over removing human control from the use of force or commented on calls to ban such weapons. It participated in every CCW meeting on lethal autonomous weapons systems in 2014-2019.

Luxembourg

In April 2018, Luxembourg said that "humans should continue to be able to make the ultimate decision in regards to the use of lethal force."[164] It recommended developing a political declaration on lethal autonomous weapons systems, but cautioned it "should be viewed as a first step, and not an end in itself." In March

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2019, Luxembourg called for the development of a legally binding instrument with a positive obligation to maintain human control over the use of force.[165] Luxembourg participated in CCW meetings on killer robots in 2014 and 2017-2019.

Madagascar

Madagascar supported a proposal to begin multilateral talks on lethal autonomous weapons systems in November 2013 and suggested states "consider moral and ethical values in the use of these weapons."[166] Madagascar has not elaborated its views on concerns over removing human control from the use of force or supported proposals to ban lethal autonomous weapons systems. It attended CCW meetings on killer robots in 2014-2015, but not those held in 2016-2019.

Mali

In May 2014, Mali expressed concern that lethal autonomous weapons systems may not be able to discriminate between soldiers and civilians, calling them "a step backwards for the international community."[167] Mali participated in one CCW meeting on lethal autonomous weapons systems in 2014.

Mexico

Mexico warned that lethal autonomous weapons systems "might decide arbitrarily on the life and death of human beings" at the Human Rights Council in May 2013.[168] Mexico has expressed doubts such weapons systems would comply with key principles of international humanitarian law and sees a need to retain "a significant level of human control" in the use of force.[169] In April 2016, Mexico said that it favors "the negotiation of a legally binding instrument to preemptively ban fully autonomous weapons," describing the proposal as preventive "since the weapons still do not exist" and noting that negotiations "should not necessarily be done through CCW."[170] Mexico participated in every CCW meeting on killer robots in 2014-2019.

Moldova

The Republic of Moldova said in December 2016 that "all weapons must remain under effective (or meaningful) human control."[171] It has not commented on calls to ban lethal autonomous weapons systems. The Republic of Moldova participated in CCW meetings on killer robots in 2014-2015 and 2017-2019.

Montenegro

Montenegro has supported continuing multilateral talks on killer robots on several occasions since December 2016.[172] It has not elaborated its views on concerns over removing human control from the use of force or commented on calls to ban fully autonomous weapons. Montenegro participated in CCW meetings on lethal autonomous weapons systems in 2014 and 2017-2019.

Morocco

Morocco expressed serious concern over allowing machines to "have the right to determine the life of human beings" at the Human Rights Council in May 2013 and expressed interest in discussing the "moral and legal implications" of lethal autonomous weapons systems.[173] Morocco called for a ban on lethal autonomous weapons systems in November 2018 because "the absence of a legal framework

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could leave the door wide open to the development and acquisition" of such weapons.[174] Morocco participated in every CCW meeting on killer robots in 2014-2019.

Myanmar

At the UN General Assembly in October 2017, Myanmar said that lethal autonomous weapons systems constitute "a security issue warranting serious consideration."[175] In October 2019, it noted "growing concerns on new types of weapons such as lethal autonomous weapon systems and their destructive power."[176] Myanmar has not commented on calls to ban fully autonomous weapons. Myanmar is not a CCW state party, but participated in CCW meetings on killer robots in 2017-2018.

Namibia

Namibia called for a ban on fully autonomous weapons at the UN General Assembly in October 2019, calling them "totally incompatible with international humanitarian law."[177] Namibia is not a CCW state party and did not attend CCW meetings on lethal autonomous weapons systems in 2014-2019.

Nepal

Nepal said at the UN General Assembly in October 2018 that "a sound regulatory framework" is needed for artificial intelligence and "automated robots" that "pose serious threat to humanity."[178] Nepal is not a CCW state party and did not attend CCW meetings on lethal autonomous weapons systems in 2014-2019.

The Netherlands

At the UN General Assembly in October 2013, the Netherlands supported a proposal to begin multilateral discussions on killer robots, which it said raise "many legal, ethical and policy questions."[179] The Netherlands said it considers "*fully* autonomous weapon systems, which can change their goal-function themselves or alter pre-programmed conditions and parameters, not to be under meaningful human control and considers them therefore prohibited under international law."[180] National policy is based on a 2015 report by two advisory councils and finds that meaningful human control in the programming phase before deployment of weapons systems is sufficient and not necessary over the selection and attack of targets.[181] The Netherlands has said it "has no plans for the development of completely autonomous systems."[182] It has rejected calls to ban fully autonomous weapons as "inexpedient and unfeasible, mainly due to the fact that most artificial intelligence technology comes from civilian developments."[183] In May 2019, the national parliament adopted a resolution calling for a legally binding instrument on new weapons technologies, including autonomous weapons.[184] The Netherlands participated in every CCW meeting on lethal autonomous weapons systems in 2014-2019.

New Zealand

At the UN General Assembly in October 2013, New Zealand said that governments should work with civil society to develop and implement effective solutions to challenges raised by new technologies such as fully autonomous weapons.[185] In May 2019, Minister for Disarmament and Arms Control Winston Peters said, "New Zealand has…concerns about the legal, ethical and human rights challenges posed by the development and use of lethal autonomous weapons systems."[186]

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He said, "our view is that international law already sets limits" on such weapons and said New Zealand would focus on using existing law "to make sure there will always be meaningful human control over weapons incorporating autonomy."[187] New Zealand participated in every CCW meeting on killer robots in 2014-2019.

Nicaragua

In November 2015, Nicaragua expressed concern that fully autonomous weapons would "not guarantee the distinction between civilians and combatants, nor the assessment of proportionality and precaution established by international humanitarian law."[188] It has warned that such weapons "will be incompatible with human rights law."[189] Nicaragua called for a preemptive ban on lethal autonomous weapons systems in April 2016.[190] Nicaragua participated in every CCW meeting on killer robots in 2014-2019.

North Macedonia

North Macedonia first commented on killer robots in 2019, when its representative chaired the CCW talks on lethal autonomous weapons systems. North Macedonia supports the development of "a normative and operational framework" to address rising concerns over killer robots.[191] North Macedonia

Norway

In May 2014, Norway acknowledged ethical and legal concerns raised by lethal autonomous weapons systems, which it warned "could blur lines of responsibility and accountability."[192] Norway considers such weapons to be "weapons systems that would search for, identify, and attack targets, including human beings, using lethal force and without a human operator intervening."[193] Norway said in August 2018 that it has not decided if lethal autonomous weapons systems "warrant the development of a new international instrument."[194] Norway participated every CCW meeting on killer robots in 2014-2019. The ethics committee of the Norwegian Government Pension Fund Global recommended in June 2020 that the Fund add lethal autonomous weapons systems to the exclusion list of weapons that it will not invest in.[195] The Norwegian parliament will consider and vote on the proposal in 2021.

Pakistan

At the Human Rights Council in May 2013, Pakistan said that lethal autonomous weapons systems "raise complex moral, ethical, and legal dilemmas" and became the first nation to call for them to be prohibited, citing the precedent provided by the preemptive ban on blinding lasers.[196] Pakistan also delivered a statement on behalf of the Organization of the Islamic Conference, representing more than 50 states, which warned that removing human control from the use of force "fundamentally changes the nature of war" and raises the potential for an "accountability gap."[197] Pakistan has repeatedly called for a new international ban treaty since then and has rejected lethal autonomous weapons systems as "illegal, unethical, inhumane, and unaccountable as well as destabilizing for international peace and security."[198] Pakistan participated in every CCW meeting on killer robots in 2014-2019.

State of Palestine

The State of Palestine listed several concerns over removing human control from

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the use of force in November 2014.[199] Palestine called for a preemptive ban on fully autonomous weapons in November 2015. Palestine ratified the CCW in 2015 and participated in the CCW meetings on lethal autonomous weapons systems in 2015-2019.

Panama

Panama called for a preemptive ban on lethal autonomous weapons systems in December 2016, stating such weapons are "contrary to international humanitarian law."[200] Panama has expressed ethical, legal, and technical concerns with such weapons, arguing, "it is inadmissible that mere machines can take independent decisions on the life and death of people," and it cites the precedent provided by the CCW's preemptive ban on blinding lasers.[201] In November 2019, Panama warned that fully autonomous weapons would not comply with international humanitarian law or international human rights law, would lead to an arms race and undermine international security, as well as be at risk from technical failures and cyber attacks.[202] Panama participated in every CCW meeting on killer robots in 2016-2019.

Peru

In December 2016, Peru called for an international treaty to prohibit development, acquisition, and use of fully autonomous weapons.[203] In November 2017, it called such weapons a threat to human rights and said that weapons systems that lack meaningful human control should be prohibited.[204] Peru has warned that lethal autonomous weapons systems could lead "a new arms race and an exacerbation of armed conflict," with "a negative impact on our efforts to maintain international peace and security."[205] Peru says it as "fundamental to have a certain level of human control" over the use of force.[206] Peru participated in CCW meetings on killer robots in 2014 and 2016-2019.

The Philippines

In April 2016, the Philippines supported continuing multilateral talks on lethal autonomous weapons systems and suggested that future meetings consider how to retain meaningful human control over the use of force.[207] The Philippines says that new technologies pose "an immense challenge to the disarmament community," but it has not supported proposals to ban fully autonomous weapons.[208] The Philippines participated in CCW meetings on killer robots in 2016-2019.

Poland

Poland said that human beings must maintain control over "kill decisions" in April 2015, asking, "can a machine be allowed to decide whether to kill?" and answering, "the military answer to that question is simply NO, we want and have to be in control."[209] Poland says "the type and degree of human control needs to be evaluated to establish limits on autonomy in weapons systems."[210] At the UN Security Council in August 2019, Poland's President and Minister for Foreign Affairs Jacek Czaputowicz flagged challenges posed by "new developments in contemporary armed conflict," particularly "artificial intelligence and autonomous weapons" that "are reducing the role of humans more broadly."[211] Poland has not supported calls to ban fully autonomous weapons. Poland participated in every CCW meeting on killer robots in 2014-2019.

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Portugal

At the UN General Assembly in October 2014, Portugal supported continuing multilateral talks on lethal autonomous weapons systems.[212] Portugal says it "shares specific humanitarian, moral, and legal concerns" over such weapons and sees a need to retain human control over critical functions of weapons systems.[213] Portugal has not supported proposals to ban fully autonomous weapons and instead suggested in March 2019 that states focus on examining how existing international law applies to such weapons.[214] Portugal participated in every CCW meetings on killer robots in 2014-2019.

Romania

At the UN General Assembly in October 2015, Romania supported continuing multilateral talks on lethal autonomous weapons systems.[215] Romania has not elaborated its views on concerns over removing human control from the use of force or commented on calls to ban fully autonomous weapons. Romania participated CCW meetings on killer robots in 2014 and 2016-2019.

Russia

At the Human Rights Council in May 2013, the Russian Federation said that lethal autonomous weapons systems "could have serious implications for societal foundations, including the negating of human life," and could "significantly undermine the ability of the international legal system to maintain minimal legal order."[216] Russia has consistently opposed proposals to negotiate a legally binding instrument on such weapons or other measures, as it says "existing international law, including international humanitarian law, has some very important restrictions that fully cover weapons systems that have high degrees of autonomy."[217] Russia says it disagrees that lethal autonomous weapons will be "a reality in the near future," but it is researching, developing, and investing in autonomous weapons systems and has made military investments in artificial intelligence and robotics a top national defense priority.[218] In November 2019, Russia argued that the concepts of "human control" and "human involvement" involve subjective assessments and are irrelevant.[219] Russia participated in every CCW meeting on killer robots in 2014-2019.

San Marino

At the UN General Assembly in October 2019, San Marino said it "believes that meaningful human control is required over life and death decisions" and called for the development of new international standards on lethal autonomous weapons systems.[220] San Marino is not a CCW state party and did not participate in CCW meetings on killer robots in 2014-2019.

Sierra Leone

At the UN Human Rights Council in May 2013, Sierra Leone expressed support for national moratoria on lethal autonomous weapons "until an internationally agreed-upon framework is established."[221] Sierra Leone has articulated several concerns over removing human control from the use of force, such as lack of accountability, "vulnerability to cyber attacks," and "human rights and humanitarian impacts."[222] It has expressed interest in developing a legally binding instrument to address concerns raised by lethal autonomous weapons systems.[223] Sierra Leone attended every CCW meeting on killer robots in 2014-2019.

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Slovakia

In December 2016, Slovakia supported a proposal to formalize multilateral talks on lethal autonomous weapons systems.[224] Slovakia has not elaborated its views on concerns over removing human control from the use of force or commented on the call to ban fully autonomous weapons. Slovakia participated in every CCW meeting on killer robots in 2014-2019.

Slovenia

Slovenia supported formalizing multilateral talks on lethal autonomous weapons in December 2016.[225] It concurs that "such weapons raise a number of ethical, legal, moral, and technical, as well as international peace and security related questions."[226] At the UN General Assembly in October 2016, Slovenia said it was "concerned" by "the growth of new weapon technologies" and stressed the "necessity for human control over all autonomous weapon systems."[227] It has not commented on calls to ban fully autonomous weapons. Slovenia participated in every CCW meeting on killer robots in 2015-2019.

South Africa

At the UN General Assembly in October 2013, South Africa expressed interest in beginning multilateral deliberations on lethal autonomous weapons systems.[228] In South Africa's view, the possibility of weaponizing artificial intelligence and robotics "raises fundamental ethical, legal, operational, and political questions."[229] It has expressed concern at the "humanitarian implications" of fully autonomous weapons, their potential impact on human rights, and doubts they could comply with "basic international humanitarian law rules of distinction, proportionality, and military necessity."[230] South Africa has affirmed the "necessity for human control in the selection of targets to enforce accountability."[231] Since April 2018, it has called for a legally binding instrument to regulate lethal autonomous weapons systems.[232] South Africa attended every CCW meeting on killer robots in 2014-2019.

South Korea

In November 2013, South Korea, also known as the Republic of Korea, supported a proposal to open multilateral talks on lethal autonomous weapons systems.[233] South Korea said in April 2015 that it is "wary of fully autonomous weapons systems that remove meaningful human control from the operation loop, due to the risk of malfunctioning, potential accountability gap, and ethical concerns."[234] South Korea said in April 2018 that it is "premature" to negotiate a legally binding instrument on lethal autonomous weapons systems and requested more meetings "to enhance our common understanding…without prejudging specific policy outcomes."[235] South Korea is researching, developing, and investing in military applications of artificial intelligence and weapons systems with autonomy in their functions, but says it does not possess lethal autonomous weapons systems and does not intend to develop or acquire them.[236] South Korea participated in every CCW meeting on killer robots in 2014-2019.

Spain

Spain supported a proposal to begin multilateral talks on lethal autonomous weapons systems in November 2013 and expressed interest in exploring ethical and legal concerns.[237] Spain said in April 2018 that it does not possess lethal

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autonomous weapons systems and "does not intend to develop or acquire them in the future."[238] Spain says that "all lethal weapons with some degree of autonomy should be subject to meaningful human control."[239] Spain has not supported proposals to ban fully autonomous weapons. It instead "reiterates that the respect of IHL requires sufficient human control on all weapons systems."[240] Spain participated in every CCW meeting on killer robots in 2014-2019.

Sri Lanka

In April 2015, Sri Lanka expressed numerous accountability, ethical, and other concerns with fully autonomous weapons, including their potential to negatively affect international security, "escalate the pace of warfare," and "undermine the existing arms controls and regulations, to aggravate the dangers of asymmetric warfare, and destabilize regional and global security."[241] At the UN General Assembly in October 2019, Sri Lanka proposed the negotiation of a legally binding framework on lethal autonomous weapons systems, "with meaningful human control as its central thrust."[242] Sri Lanka participated in every CCW meeting on lethal autonomous weapons systems in 2015-2019 and served as CCW president in 2016, when the CCW talks were formalized.

Sweden

Sweden said in 2014 that it could not "foresee a situation in the near future in which a weapon system would be operated without any human control or oversight" thereby providing "full combat autonomy to machines."[243] Sweden has expressed its desire for humans to always be in the decision-making loop for decisions to use force against persons.[244] Sweden's officials have not supported proposals to negotiate a legally binding instrument on killer robots.[245] However, in November 2019, Foreign Minister Ann Linde and Deputy Prime Minister Isabella Lövin acknowledged, "we have a responsibility to act while there is time," and established a committee to make "concrete proposals on how to achieve an effective ban" on lethal autonomous weapons systems.[246] Sweden participated in every CCW meeting on killer robots in 2014-2019.

Switzerland

At the Human Rights Council in May 2013, Switzerland said that "in no circumstances may states delegate their responsibility when it comes to the use of lethal force."[247] In November 2013, Switzerland supported a proposal to open multilateral talks on lethal autonomous weapons systems, which it said raise "complex" political, military, technological, legal, and ethical questions.[248] Switzerland has expressed concern over "development of weapons systems in which their acquisition, identification and attack of targets, including human ones, are not subject to meaningful human control."[249] In Switzerland's view, "lethality" should not be conceptually regarded as a prerequisite characteristic of autonomous weapons systems.[250] Switzerland has expressed interest in practical measures aimed at preventing weapons systems that would violate international law, but it has not supported calls to ban fully autonomous weapons.[251] Switzerland participated in every CCW meeting on killer robots in 2014-2019.

Thailand

At the UN General Assembly in October 2018, Thailand expressed concern at the "wide and understudied implications" of lethal autonomous weapons systems and affirmed "the importance of respecting and evolving international humanitarian law."[252] It has not commented on calls to ban such weapons and retain

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meaningful human control over the use of force. Thailand is not a CCW state party. It attended CCW meetings on killer robots in 2014-2015, but not in 2016-2019.

Tunisia

At the UN General Assembly in October 2018, Tunisia said that with regard to lethal autonomous weapons systems, "we hope the appropriate measures will be taken to avoid militarization" and appealed for "regulation of the use of artificial intelligence for military purposes."[253] Tunisia has not commented on calls to ban fully autonomous weapons and retain meaningful human control over the use of force. Tunisia participated in CCW meetings on killer robots in 2015-2017, but not in 2014 or 2018-2019.

Turkey

In November 2013, Turkey supported a proposal to begin multilateral talks on lethal autonomous weapons systems.[254] In April 2016, Turkey said that "such weapon systems do not exist and we are working on an issue which is still hypothetical," therefore, "we hesitate on the accuracy of a general prohibition preemptively."[255] It also affirmed the "need for human control and accountability" of weapons systems.[256] Turkey is developing, producing, and using various weapons systems with autonomous functions. Turkey participated in every CCW meeting on killer robots in 2014-2019.

Uganda

Uganda called for a preemptive ban on lethal autonomous weapons systems in November 2017.[257] It also aligned itself with a statement by the Non-Aligned Movement calling for a legally binding instrument on such weapons. Uganda participated in every CCW meeting on killer robots in 2014-2019.

Ukraine

In November 2013, Ukraine supported the proposal to commence multilateral talks on lethal autonomous weapons systems.[258] It has never elaborated its views on concerns over removing human control from the use of force or commented on calls to ban fully autonomous weapons. Ukraine participated in CCW meetings on killer robots in 2015-2016, but not in 2014 or 2017-2019.

United Kingdom

At the Human Rights Council in May 2013, the United Kingdom said it considers existing international humanitarian law to be "sufficient to regulate the use" of lethal autonomous weapons and "therefore has no plans to call for or to support an international ban on them."[259] In 2011, the UK Ministry of Defence said it has "no intention to develop systems that operate without human intervention in the weapon command and control chain, but it is looking to increase levels of automation where this will make systems more effective."[260] The UK said in November 2017 that "there must always be human oversight and authority in the decision to strike" and said that responsibility lies "with the commanders and operators."[261] The UK is developing various weapons systems with autonomous functions. In the 2019 general elections in the UK, the Scottish National Party called for a ban on lethal autonomous weapons.[262] The UK participated in every CCW meeting on killer robots in 2014-2019.

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United States

At the Human Rights Council in May 2013, the United States said that lethal autonomous weapons systems raise "important legal, policy, and ethical issues" and recommended further discussion in an international humanitarian law forum.[263] A 2012 Department of Defense policy directive on autonomy in weapons systems was renewed without substantive amendments in 2018 for another five years.[264] The policy permits the development of lethal autonomous weapons systems, but the US insists that "it neither encourages nor prohibits the development of such future systems."[265] The US is investing heavily in military applications of artificial intelligence and developing air, land, and sea-based autonomous weapons systems. In August 2019, the US warned against stigmatizing lethal autonomous weapons systems because, it said, they "can have military and humanitarian benefits."[266] The US regards proposals to negotiate a new international treaty on such weapons systems as "premature" and argues that existing international humanitarian law is adequate.[267] The US participated in every CCW meeting on killer robots in 2014-2019.

Venezuela

In December 2016, Venezuela called for a ban on the "development, acquisition, trade, deployment, and use of lethal autonomous weapons systems."[268] Venezuela opposes entrusting machines to make life and death decisions without any human intervention and says that human life "cannot be programmed."[269] As president of the Non-Aligned Movement (NAM) in 2016-2019, Venezuela often reiterated NAM's call for a legally binding instrument stipulating prohibitions and regulations on lethal autonomous weapons systems.[270] Venezuela participated in every CCW meeting on killer robots in 2016-2019.

Zambia

In April 2015, Zambia said that delegating "life and death decisions to machines" is "against human rights."[271] Zambia said in April 2016 that existing international humanitarian law is inadequate and insufficient to address concerns raised by lethal autonomous weapons systems and said "a ban must be on the table."[272] Zambia called for the negotiation of a new international treaty on lethal autonomous weapons systems in November 2017.[273] Zambia participated in CCW meetings on killer robots in 2015-2017, but not in 2014 or 2018-2019.

Zimbabwe

In November 2015, Zimbabwe affirmed the need to "maintain meaningful human control over military weapons or weapons with a dual use" and called for a preemptive ban on lethal autonomous weapons systems.[274] Zimbabwe is not a CCW state party and did not participate in CCW meetings on killer robots in 2014-2019.

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the arms division at Human Rights Watch. Wareham coordinates the Campaign to Stop Killer Robots, the international coalition of more than 160 nongovernmental organizations in 65 countries working to prohibit fully autonomous weapons and retain meaningful human control over the use of force.[275]

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Summary

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