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

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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.

8 Dance, G.J.X., LaForgia, M., & Confessore, N. (2018, December 18). As Facebook raised privacy wall, it carved an opening for tech giants. *The New York Times*. Retrieved from https://www.nytimes.com/2018/12/18/technology/facebook-privacy.html.

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.

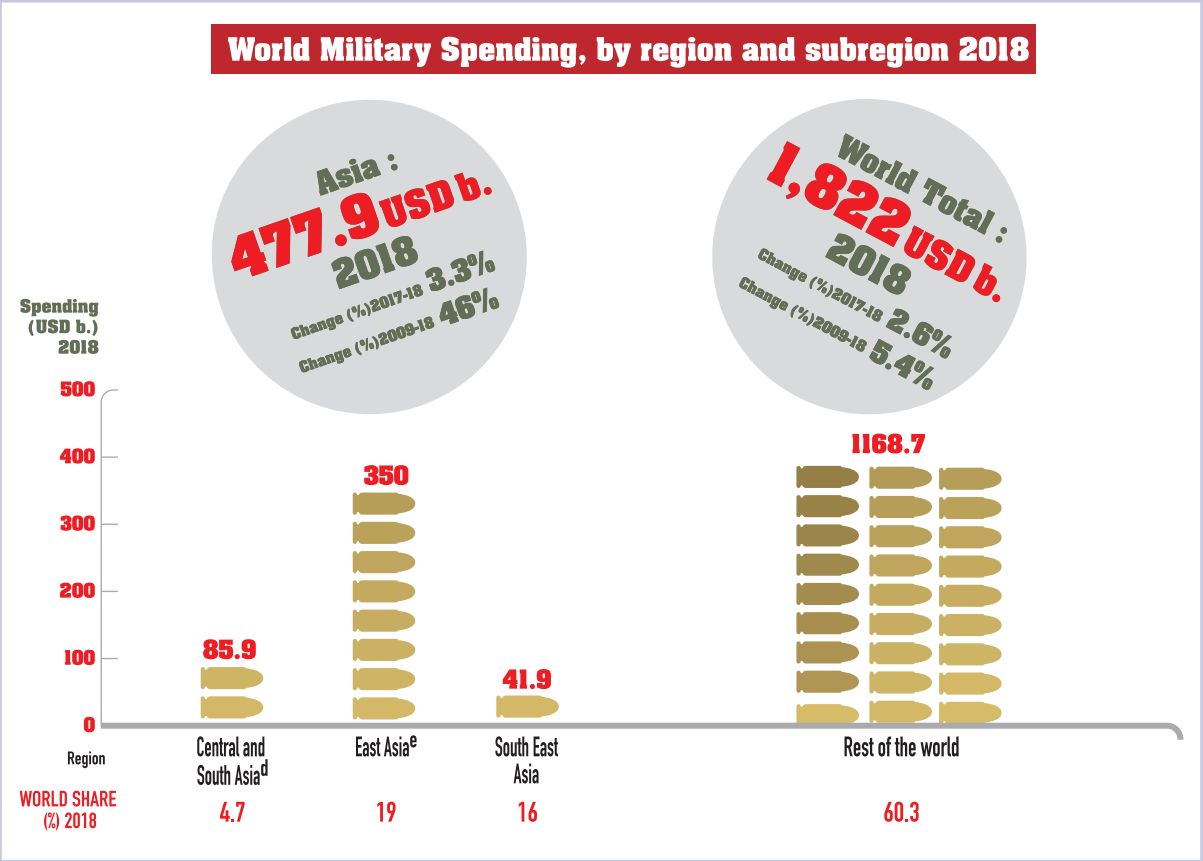
Overview of Arms Trends in Asia

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.

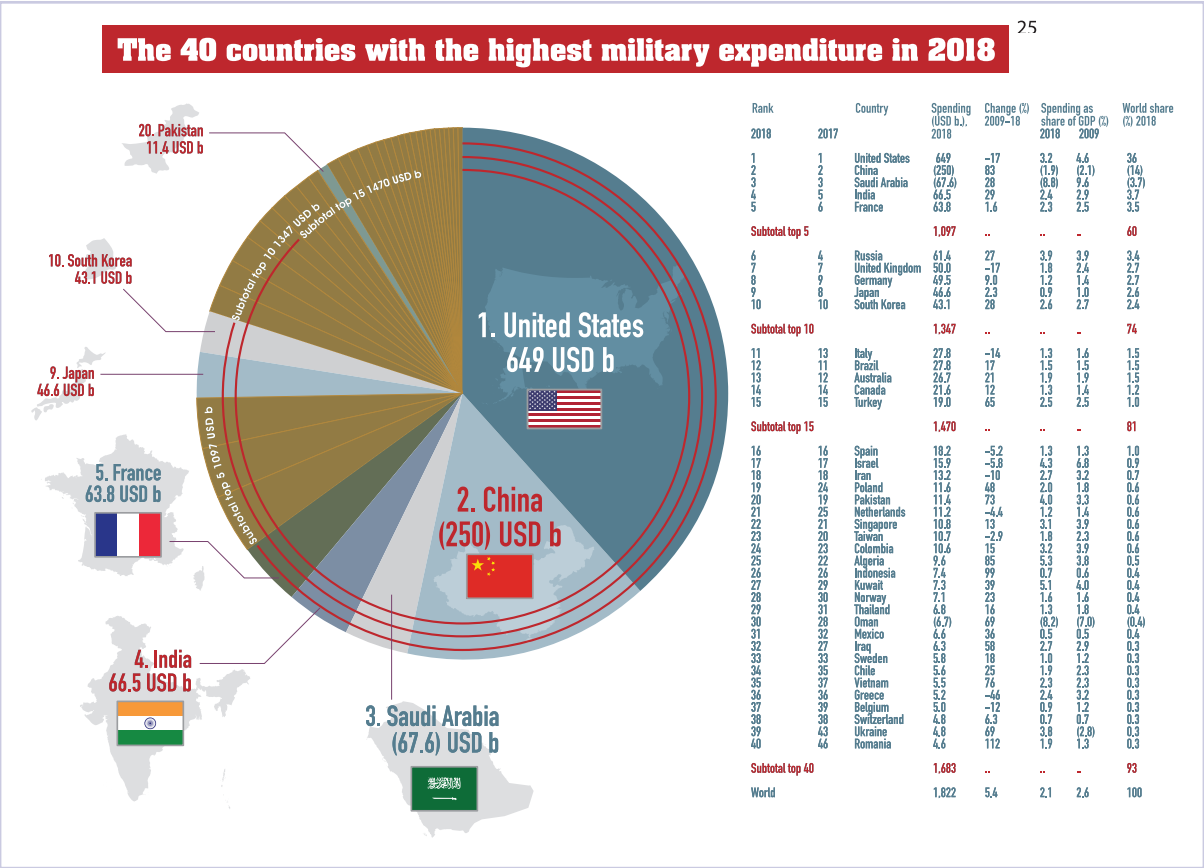
Figure 1a:[29]



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]



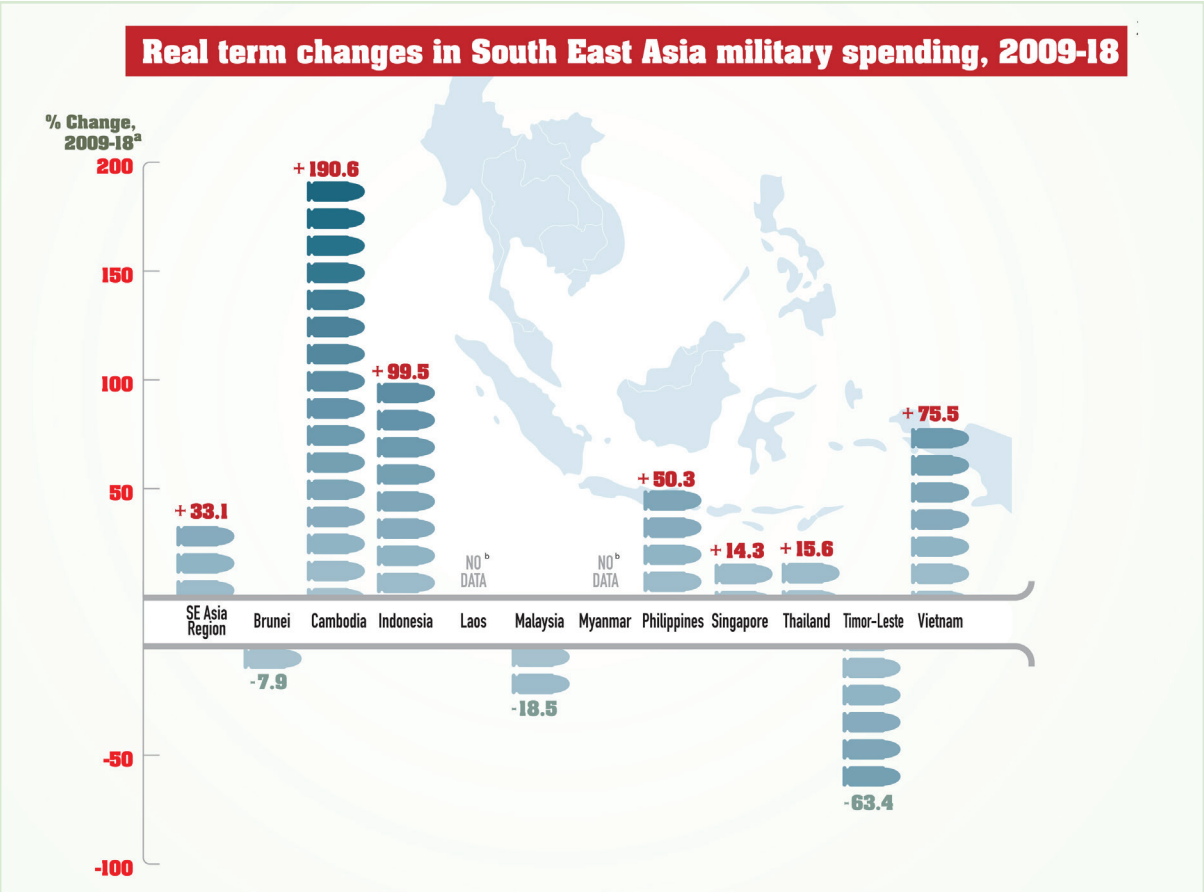
Rank 2018	Rank 2017	Country	Spending (USD b.) 2018	Change (%) 2009–18	Spending as share of GDP (%) 2018	Spending as share of GDP (%) 2009	World share (%) 2018
1	1	United States	649	–17	3.2	4.6	36
2	2	China	(250)	83	(1.9)	(2.1)	(14)
3	3	Saudi Arabia	(67.6)	28	(8.8)	9.6	(3.7)
4	5	India	66.5	29	2.4	2.9	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.

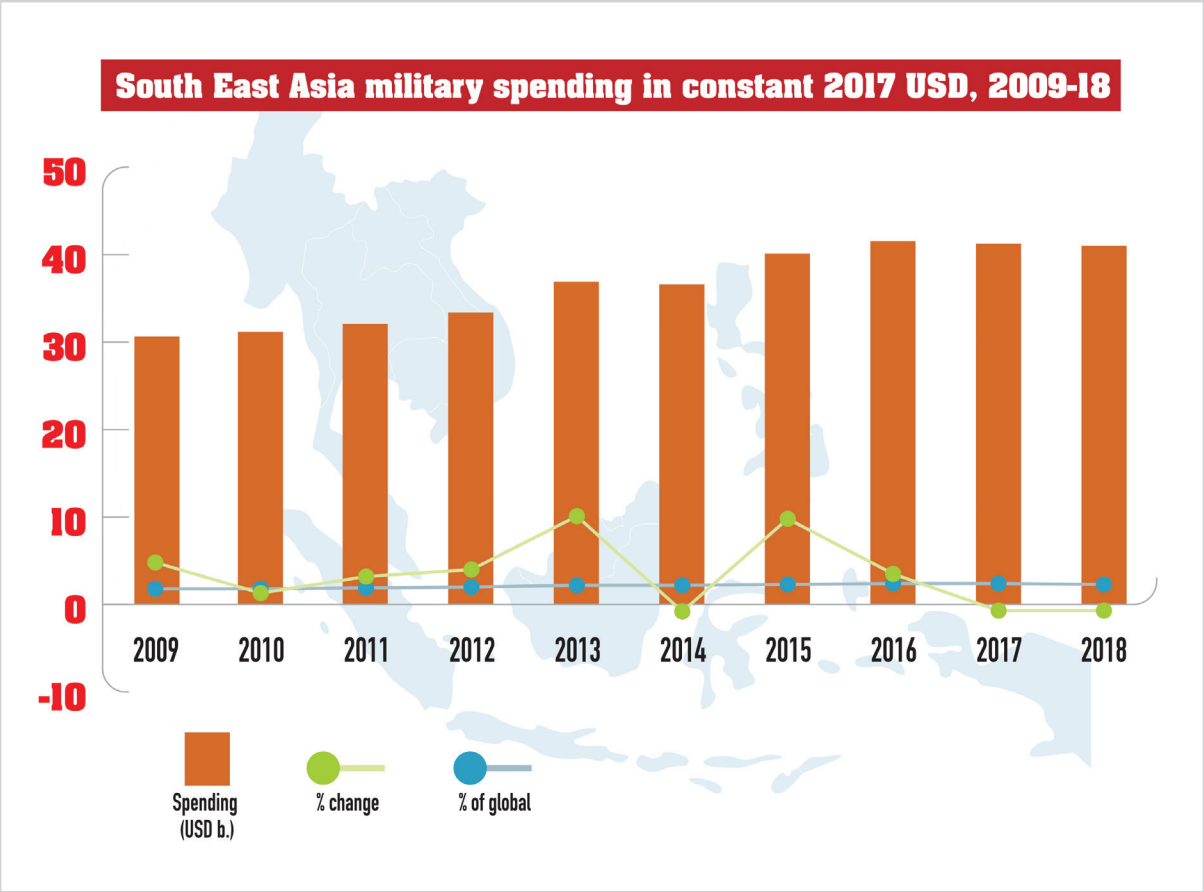
Figure 2a:[31]



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.

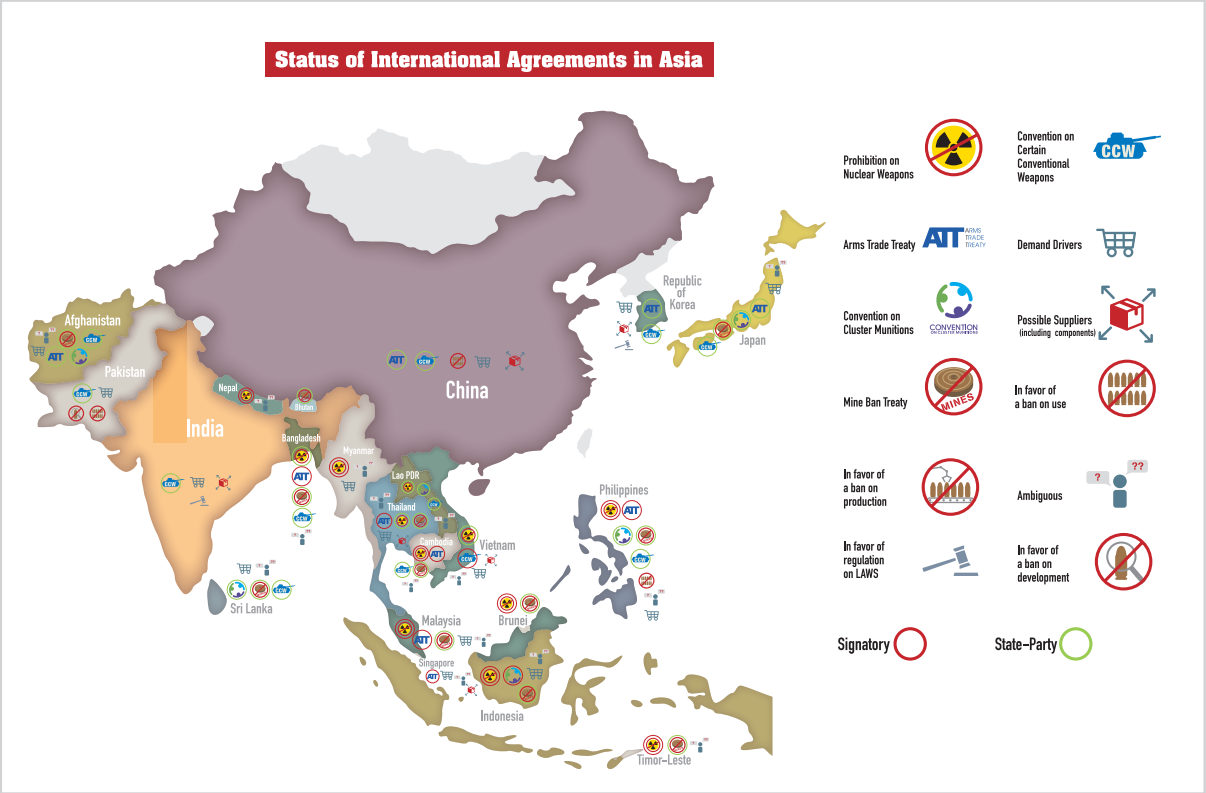
In East Asia, Japan is the most consistent proponent of major international arms control instruments, bar one due to its use of nuclear power (see Figure 5). Interestingly, China, Japan and South Korea have all ratified/acceded to the Arms Trade Treaty and the CCW.

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

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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

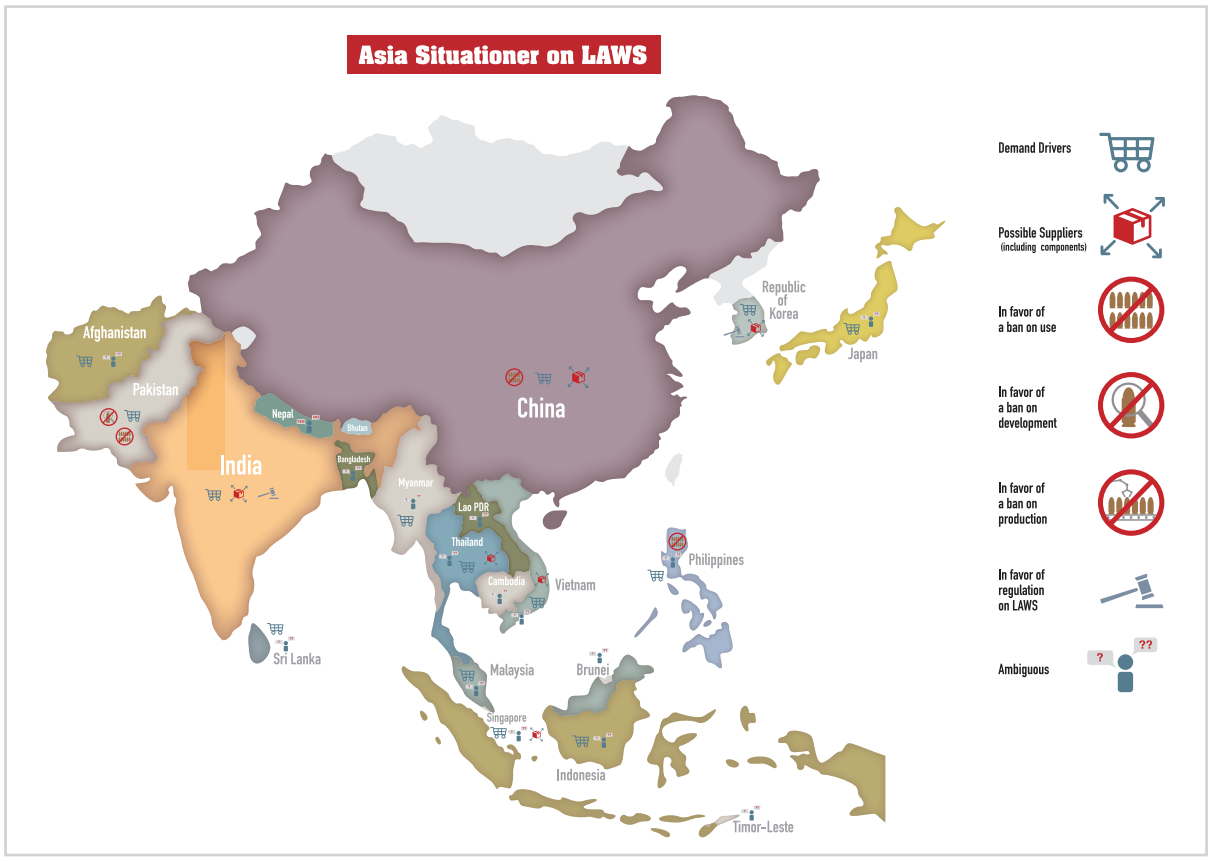
182 Lower middle income countries are defined by the World Bank as those with a GNI per capita of USD 1,006 to USD 3,955, based on 2016 data. Retrieved from https://datatopics.worldbank.org/world-development-indicators/images/figures-png/world-by-income-sdg-atlas-2018.pdf.

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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