Usage of Autonomous Weapon Systems (AWS) in Armed Conflict: Military Necessity and Ethical/Legal Implications

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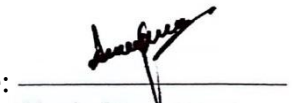
Name of Dean/HOD: Dr. Ansar Jamil Signature: 

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DEDICATION

To my dearest friend, Shahid Ashfaq, your guidance, wisdom, motivation, and unwavering belief in me made this journey possible. I would like to dedicate my work to you, with the deepest gratitude. May you get eternal peace hereafter.

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Last but not least, I would like to appreciate the huge efforts of my family, especially, my Mama, Baba, and uncle who provided me with all the resources to pursue this degree, and then my friends Heem, A&Z, Ariba Sameen, Fatima Ayaz, Shamoon Mirza who provided me their constant support throughout this journey.

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List of Acronyms

1.	AWS	Autonomous Weapon Systems
2.	AD	Anomaly Detection
3.	ACTUV	AWS Continuous Trialed Unmanned Vessel
4.	AI	Artificial Intelligence
5.	CCW	Convention on Certain Conventional Weapons
6.	COP	Common Operating Pictures
7.	DOD	Department of Defense
8.	GGE	Group of Governmental Experts
9.	HRI	Human-Robot Interaction
10	HRW	Human Rights Watch
11.	ICRC	International Committee of Red Cross
12.	IEDs	Improvised Explosive Devices
13.	IRS	Intelligence, Reconnaissance, and Surveillance
14.	IHL	International Humanitarian Law
15.	LAWS	Lethal Autonomous Weapons
16.	LOAC	Law of Armed Conflict
17.	MDOs	Multidomain Operations
18.	MTR	Military Technical Revolution
19.	NGOs	Non-Governmental Organizations
20.	PR	Pattern Recognition
21.	PTSD	Post Traumatic Stress Disorder
22.	RMA	Revolutionary Military Affairs
23.	SIPRI	Stockholm International Peace Research Institute
24.	TRADOC	Training and Doctrine Command
25.	UAV	Unmanned Armed Vehicle
26.	UN	United Nations Human Rights Council
27.	UUV	Unmanned Underwater Vehicle

ABSTRACT

Rapid technological advancement has revolutionized the concept of modern warfare. The deployment of AWS has become a new high for military forces around the globe to get a comparative advantage over an adversary in any combat mission. The purpose of this research is to explain the military necessity and ethical/legal implications of the Autonomous Weapon System (AWS) in an armed conflict. This study adopted the qualitative explanatory approach, whereas the data was collected from structured interviews, official reports, and journals. On the other hand, the two case studies Iran-Israel Missile Exchange and the Russia-Ukraine War have been considered to support the thematic analysis. Moreover, the study utilized two theories (RMA and Kantian Ethics) that provide an understanding of the dual impacts of the usage of AWS in combat missions. However, the study's findings reveal that the deployment of the AWS ensures military necessity for the forces in an armed conflict based on the tactical and strategic advantages. The deployment of the AWS enhances the overall operational effectiveness and gives forces leverage over their foe. Similarly, the findings further highlighted their various implications. This weapon system poses ethical dilemmas for humanity and legal challenges for the states, especially when it comes to accountability and compliance with IHL. In addition, the key findings of the study are aligned with the hypothesis. Finally, the study sheds light on the need to keep humans in the loop to increase their operational effectiveness and address ethical concerns.

Keywords: Autonomous Weapon Systems, Semi-autonomous Systems, Military Necessity, Ethical/Legal Implications, International Humanitarian Law, Armed Conflict

INTRODUCTION

1. Background of the Study

The rapid evolution of artificial intelligence has introduced in this new era is in every sector of life and the military is no exception to it. The advancement of AI-based autonomous weapon systems has revolutionized warfare techniques. Now the military is leading the deployment of autonomous weapon systems (AWS) in armed conflict. This progression is driven by the expectation of various benefits, including minimum human casualties, increased accuracy, expanded operational adequacy, and enhanced cost efficiency.[1] However, the multiplication of AWS raises critical legal and ethical concerns, especially with respect to the challenges of recognizing targets and the potential dangers related to automated decision-making.[2]

In this setting, the primary objective of this study is to comprehensively assess the current state of autonomous weapons systems. To achieve this objective, it is basic to recognize the existing level of autonomy in military robots, exemplified by control with human administrators. Despite the predominant use of semi-autonomous systems, long-standing time envisions a worldview move towards higher autonomy, where AWS can make choices autonomously, including target discovery and engagement.[3] This move towards autonomous weapons, prepared with progressed artificial intelligence competent of independent decision-making, presents exceptional challenges and moral dilemmas yet to be completely realized.[4]

As the researcher delves into this research endeavor, it points to shed light on the perplexing exchange between innovative development, military technique, and the legal implications of autonomous weapons systems. Through a comprehensive examination of the existing literature and an assessment of the current state of AWS, this study looks to contribute

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1 Diego Mauri, "Autonomous Weapons Systems and the Protection of the Human Person: An International Law Analysis," Edward Elgar Publishing. 2022.

2 Chantal Grut, "The Challenge of Autonomous Lethal Robotics to International Humanitarian Law," *Journal of Conflict & Security Law 18*, no. 1, (2013): 5–23.

3 Brendan Gogarty, Meredith. Hagger, "The Laws of Man over Vehicles Unmanned: The Legal Response to Robotic Revolution on Sea, Land, and Air," *JL Inf. & Sci 19*, no. 73, 2008.

4 Robert Sparrow, "Killer Robots," *Journal of Applied Philosophy 24*, no. 1, (2007): 62-77.

important experiences to the progressing discourse on the moral and legitimate measurements of autonomous weapons development.

The advancement of AWS requires a nuanced examination of the moral and legal implications related to their deployment. Past advancements in autonomation, such as teleoperated robots for hazardous gadget location (e.g., PackBot) and unmanned vehicles for surveillance and combat missions (e.g., Guardium, Claw, MQ-1 Predator), have been met with limited objections. In any case, the entry of AWS into the global arena has altogether modified this scene, as these frameworks are outlined to choose and engage in targets without human interference once activated.[5] [6] This move poses essential questions about the moral boundaries of independent weaponry, requesting a careful examination of the ethical and legitimate contemplations encompassing AWS deployment.

The development and deployment of autonomous weapons systems (AWS) marks a paradigm shift in warfare techniques, showing a range of preferences and challenges. This study also considers evaluating the military needs, pros, and cons of utilizing autonomous weapons in comparison to traditional conventional weapons. A thorough investigation of the existing literature divulges a multifaceted scene encompassing the usage of AWS, highlighting both benefits and complicated legal and ethical considerations.

Nevertheless, the utilization of AWS has provoked noteworthy legal and ethical contemplations. An open letter released in 2015, marked by powerful figures like Elon Musk, Steve Wozniak, Stephen Selling, and Noam Chomsky, calls for a boycott of hostile autonomous weapons due to the rising potential for an AI arms race and the considerable dangers to humankind.[7] The UN's Extraordinary Rapporteur on extrajudicial, summary, and subjective executions prescribed a ban on lethal autonomous weapons (LARs) until a global system is set up.[8] Engineers, AI specialists, and researchers from 37 nations reverberated this concern, emphasizing the lack of evidence for robots' precise decision-making in high-stakes

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5 Mark. Gubrud, "Stopping Killer Robots," *Bulletin of the Atomic Scientists 70*, no. 1, (2014): 32-42.

6 Daniele Amoroso, Guglielmo Tamburrini, "Autonomous Weapons Systems, and Meaningful Human Control: Ethical and Legal Issues," *Current Robotics Reports, 1*, (2020): 187-194.

7 Open Letter, "International Joint Conference on Artificial Intelligence 2015," July 2015. https://www.stopkillerrobots.org/wp-content/uploads/2013/03/FLI_LtrJuly2015.pdf

8 Christopher Heyns, "Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions," UN Doc. A/HRC/23/47, 17, 9 April 2013.

circumstances and calling for a boycott of autonomous deadly robots.[9] The attribution of life-or-death decision-making to non-human operators, particularly in terms of autonomous weapons systems able to select their own targets, raises significant ethical concerns. The potential trouble of AI in recognizing between civilians and combatants poses a critical challenge, driving specialists like Noel Sharkey to call for a boycott on "autonomous lethal targeting" due to infringement of the principal 'distinction' of the IHL Rule in armed conflict.[10]

Against this background, this research points to basically assessing the military need, preferences, and drawbacks of using autonomous weapons, and also recognizing the complex interaction between innovative progressions, key contemplations, and the ethical and lawful implications of AWS.

2. Statement of the Problem

The rapid advancement of technology has also revolutionized a modern period in armed conflict. Weapons based on advanced technology are being deployed in armed conflict to get a comparative advantage over the adversary. Likewise, Gen. Robert Cone – head of the US Army Training and Doctrine Command (TRADOC) said in an interview that the US Army will send robots instead of humans to the battlefield by the time of 2030, he further added, in the future, one-quarter of the soldier will be replaced with the robots and drones.[11] Moreover, the increasing causality rate of soldiers compels the militaries to replace human soldiers with advanced technologies to increase the effectiveness of combat missions. As every invention has its pros and cons, AWS is no exception to it. The emerging usage of AWS is also displaying a bunch of moral and legal challenges.[12] The advancement of artificial intelligence and the expanding autonomy of weapons frameworks raise significant questions about the ethical implications of designating life-or-death choices to non-human substances.[13]

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9 ICRAC (International Committee for Robot Arms Control, Scientists' call to ban autonomous lethal robots, 2013.

10 Noel E. Sharkey, "The Evitability of Autonomous Robot Warfare," *International Review of the Red Cross 94*, no. 886, (2012): 787-799.

11 US Army, "U.S. Army general says robots could replace one-fourth of combat soldiers by 2030," CBC News, January 2014, https://www.cbsnews.com/news/robotic-soldiers-by-2030-us-army-general-says-robots-may-replace-combat-soldiers/.

12 Anderson, Kenneth. Mathew, Waxman. "Law And Ethics for Autonomous Weapon Systems: Why a Ban won't Work and How the Laws of War Can," Stanford University, *Hoover Institution,* 2013.

13 Lucas Jr, George Jr. Lucas, "Engineering, Ethics, And Industry: The Moral Challenges of Lethal Autonomy," *Killing by Remote Control: The Ethics of An Unmanned Military*, (2013): 211-228.

Furthermore, the call for a ban on lethal autonomous weapons past important human control, as voiced by powerful figures and reverberated in international forums, underscores the criticalness of tending to these concerns. The non-existence of clear administrative systems and the advancing nature of robotics technology advances contribute to a complex scene where ethical contemplations slack behind technological advancement.[14] The issue at the center of this study is to comprehensively comprehend the current state of autonomous weapons systems being deployed in modern warfare and to analyze the military advantage and the ethical and legal challenges posed by the progress of autonomous weapons.

3. Objectives of the Study

These are the following research objectives of this study.

a. To evaluate the current state of autonomous weapons systems.

b. To assess the military necessity of utilizing autonomous weapons.

c. To analyze the ethical and legal implications of the uses of Autonomous weapons.

4. Research Questions

These are the following research questions of this study.

a. What is the current state of the deployment of autonomous weapons systems in armed conflict?
b. How are autonomous weapons a necessity of the military in armed conflict?
c. What are the legal and ethical implications of deploying AWS in armed conflict?

5. Significance of the Study

This study on autonomous weapons systems holds profound implications for understanding the current state, military necessity, and legal complexities encompassing the use of advanced technologies in armed conflict. By investigating knowledge gained by experts, and legal systems, the study looks to contribute significant information for academics, the military, and policymakers. The discoveries have the potential to illustrate military advantage, moral

[14] Noone, Noone DC, "The Debate over Autonomous Weapons Systems," *Case W. Res. J. Int'l L. 47*, no. 25, 2015.

contemplations, legal constraints, and strategic decision-making related to the advancement and utilization of autonomous weapons, guaranteeing a more comprehensive and educated approach to this rapidly advancing field.

6. Ethical Consideration

The researcher ensures the ethical research norms and practices. In this way, before taking any interview, each participant has given informed consent. Their confidentiality is the key priority of the researcher, particularly, the privacy of the participants providing key sensitive information.

7. Limitation and Delimitation

This study faces certain limitations, including potential sampling predisposition due to the accessibility and willingness of participants, limiting the representation of key participants. Moreover, the qualitative nature of the study constrains the generalizability of discoveries past the chosen sample. The rapidly advancing nature of autonomous weapons innovation poses a transient challenge, therefore, only those weapons discussed that are already being in use or invented. Delimitations incorporate a focus on particular case studies of war where these weapons are deployed, a concentration on certain sorts of autonomous weapons for clarity, and narrower expertise opinions as compared to the general population. Recognizing these limitations and delimitations is significant for understanding the scope and appropriateness of the study for accurate findings of the research.

8. Literature Review

Autonomous Weapon System

The international definition of autonomous weapon systems is vague, deterring meaningful regulation due to a lack of shared understanding of the technological processes involved. Firstly, Sayler says the Surviving definitions commonly plunge into three extensive collections for general understanding.[15] Verbruggen and Boulanin say machine autonomy

[15] Kelley Sayler, "Defense Primer: US Policy on Lethal Autonomous Weapon Systems," *Congressional Research SVC,* 2020.

with the role of human operators.[16] According to the United States, it refers to such weapon systems that can be activated once by humans and can engage targets without any further human intervention.[17] Docherty posits that AWS includes human intervention to operate the operation of weapons but further, it can select and engage targets without further human input after activation.[18] According to Human Rights Watch, engagement in human operation varies and depends on whether a human is "in the loop," "on the loop," or "out-of-the-loop". For them, the term "fully autonomous weapon" refers "to both out-of-the-loop weapons and those that allow a human on the loop, effectively, these are out-of-the-loop weapons because the command is so restricted.[19] Secondly, some states delineate autonomous weapon systems on the capabilities of the systems themselves. Such as, the United Kingdom defines it as a system that can comprehend high-level intent and direction.[20] From this understanding and its perception of their environment, such a system can take appropriate action to bring about a desired target. Thirdly, Docherty highlights the nature of the responsibilities to be accomplished autonomously and the legitimate repercussions of autonomous action.[21] For example, according to the International Committee for the Red Cross (ICRC) this system "has autonomy in its 'critical functions,' meaning a weapon that can select (i.e. search for or detect, identify, track) and attack (i.e. intercept, use force against, neutralize, damage or destroy) it required targets without human mediation. Reeves further says critical functions are central to targeting, decision-making, and ensuring compliance with international humanitarian law.[22]

Convincingly, this research mentioned an "autonomous weapon" a system once activated, can select, and engage targets with limited or without further intervention by a human operation or involvement.

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16 Maaike Verbruggen, V. Boulanin, "Mapping the Development of Autonomy in Weapon Systems," 2017.

17 John Cherry, Durward Johnson, "Maintaining Command and Control (C2) of Lethal Autonomous Weapon Systems: Legal and Policy Considerations," *Sw. J. Int'l L. 27*, no. 1, 2021.

18 Bonnie Docherty, "Losing Humanity: The Case Against Killer Robots*,"* 2012.

19 Human Rights Watch, "Losing Humanity: The Case against Killer Robots," 2012.

20 Daniele Amoroso, Guglielmo Tamburrini, "Autonomous Weapons Systems, and Meaningful Human Control: Ethical and Legal Issues," *Current Robotics Reports, 1,* (2020): 187-194.

21 Bonnie Docherty, "Losing Humanity: The Case Against Killer Robots*,"* 2012.

22 Shane Reeves, Ronald Alcala, Amy McCarthy, "Challenges in Regulating Lethal Autonomous Weapons Under International Law," *Sw. J. Int'l L. 27*, no. 101, 2021.

The Current State of Autonomous Weapons System

Some of the developed nations devoted most of their resources to the development of autonomous weapons with the effect that the HRW-led call for a ban seems doomed to fail. These include China, Japan, India, Israel, Russia, South Korea, the UK, and the USA.[23] Allen (2019) elaborated, that China's leadership prioritizes artificial intelligence for global military power, with an estimated $4.5 billion spent on drone technology, including autonomous ones, according to the Stockholm International Peace Research Institute.[24] According to Bendett, Russia owns the 'Foundation for Advanced Studies defense research organization, focusing on autonomy and robotics, and has launched an annual conference on the 'Robotization of the Russian Armed Forces'.[25] The Chairman of the Federation Council's Defense and Security Committee stated that autonomous systems will soon substitute soldiers on the battlefield and pilots in aircraft cockpits. [26]

In 2017, Russia was developing AI-guided missiles that could change their target mid-flight without requiring a human "pilot".[27] Since 2012, armament with integrated autonomy has been a key component of the American national security policy (Defense, 2012). In 2019, the US Department of Defense and Gettinger reported spending $866 million on "autonomy, teaming, and swarms" under Directive No. 3000.09.[28] The Stockholm International Peace Research Institute (SIPRI) Verbruggen & Boulanin[29] presented supplementary divisions among types of existing AWS: (i) air defense systems (e.g., Phalanx, MANTIS, Iron Dome,[30] (ii) active protection systems: that safeguard armored vehicles by detecting and seizing anti-tank missiles and rockets (e.g., LEDS-150) (iii) robotic sentries: like The Super Aegis II static robotic boards are being used for surveillance in the demilitarized zone between North

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23 Justin Haner, Denise Garcia, "The Artificial Intelligence Arms Race: Trends and World Leaders in Autonomous Weapons Development," *Global Policy 10*, no. 3, (2019): 331-337.

24 Cyril Allen, "Understanding China's AI Strategy: Clues to Chinese Strategic Thinking on Artificial Intelligence and National Security," 2019.

25 Samuel Bendett, "Red Robots Rising: Behind the Rapid Development of Russian Unmanned Military Systems," *The Strategy Bridge 12*, 2017.

26 Samuel Bendett, "Red Robots Rising: Behind the Rapid Development of Russian Unmanned Military Systems," *The Strategy Bridge 12*, 2017.

27 Samuel Bendett, "Red Robots Rising: Behind the Rapid Development of Russian Unmanned Military Systems," *The Strategy Bridge 12*, 2017.

28 Dan Gettinger, "Summary of Drone Spending in the FY 2019 Defense Budget Request," *Center for the Study of the Drone at Bard College, New York, NY*. 2018.

29 Maaike Verbruggen, V Boulanin, "Mapping the Development of Autonomy in Weapon Systems," 2017.

30 R. H. Stoner, "R2D2 with attitude: the story of the Phalanx Close-In Weapons," 2009.

and South Korea.[31] (iv) guided munitions: the aircraft can autonomously identify and engage targets that are not visible to the attacking aircraft. (e. g., the Dual-Mode Brimstone)[32]; and (v) loitering munitions: such as the Harpy NG, [33] The drones are aiming to target and destroy targets while flying over a designated area.

This cataloging wants recurrent development on account of military research programs, focusing on developing unmanned vehicles capable of making targeted judgments, with swarm intelligence technology enabling the creation of compact, inexpensive unmanned armed systems, requiring continuous extension of this categorization.[34] [35]

The Necessity of Autonomous Weapons in Armed Conflict

The Pentagon Defense Science Board suggests six areas for future autonomy research in Autonomous Weapons Systems (AWS): perception, preparation, and learning. Perception involves creating complex sensing algorithms while planning focuses on developing autonomous decision-making algorithms for systems in distant locations like space or the ocean. Learning, though considered superior to human software engineering, is primarily used in robots and ground vehicles, with limited application in aircraft and marine vehicles.

The studies highlight the need for more research on human-robot interaction (HRI) and machine learning for different AWS platforms as it looks beyond technical constraints and takes into account disciplines like communications, psychology, and cognitive science. It also emphasizes how crucial natural language training is for self-governing systems since it facilitates natural human-autonomous system communication and encourages the advancement of AWS capabilities in support of this viewpoint. Beyond specific teleoperation, this technique enables the communication of many high-level goals and strategies. In conclusion, the assignment of tasks to several robots is considered a crucial concern in multi-agency coordination. This cooperative endeavor assumes more than just fundamental collaboration; it also assumes that agents have cognitive comprehension, the ability to

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31 Simon Parkin, "Killer Robots: the Soldiers that Never Sleep," BBC Future, (2015, July 16).

32 UK Royal Air Force," *Aircraft & weapons 87,* 2007.

33 Dan Gettinger, "Summary of Drone Spending in the FY 2019 Defense Budget Request," *Center for the Study of the Drone at Bard College, New York, NY*. 2018.

34 Paul Scharre, "Robotics on the Battlefield Part II," *Center for New American Security, 2014.*

35 Maya Breham, Wheele De Courcy, "Swarms," *The Convention on Certain Conventional Weapons (CCW),* 36. 2018.

monitor the accomplishment of goals, and the willingness to engage in more cooperative behavior akin to that of humans. Because the jobs are dispersed, synchronization across AWS systems may be scheduled centrally or negotiated directly.

Marchant highlights the advantages of deploying AWS, including its role as a force multiplier, enhancing troop viability, and reducing fatality rates.[36] The Pentagon's Unmanned Systems Roadmap 2007-2032 encourages its use in dangerous, dull, and dirty operations, reducing troop requirements and increasing productivity.[37]

The Fiscal Times highlights the significant financial burden of retaining soldiers compared to the minimal expense of creating and managing AWS, such as the Talon robot.[38] Gen. Robert Cone suggests that the use of "back robots" can effectively reduce the size of military groups without compromising their sufficiency.[39] Captain Michael Byrnes and Major Jason DeSon discuss the advantages of autonomous aerial weapons systems, highlighting that human pilots experience physical and psychological strain, while autonomous aircraft function well without these limitations.[40] Byrnes suggests that a single Unmanned Aerial Vehicle (UAV) could potentially destroy an entire fleet of human-piloted aircraft.[41]

As technology advances, new autonomous weapon systems are increasingly being used in combat due to advancements in sensor and analytical capabilities, integration into military operations, and political pressure to defend civilians and property, as well as the rapid pace of military operations.[42] Automation will be present in weapon systems and battlefields, but true

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36 GE Marchant, B. Allenby, R. Arkin, E.T. Barrett, J. Borenstein, L.M. Gaudet, et al. "International Governance of Autonomous Military Robots," *Columbia Science & Technology Law Review* 12, (2011): 272–315.

37 Johan Clapper, James Young, Cartwright, James, Grimes. "Unmanned System Roadmap 2007-2023," *Pentagon*, 2007.

38 David Francis, "How A New Army of Robots Can Cut the Defense Budget," The Fiscal Times, 2013.

39 Evan Ackerman, "U.S Army Considers Replacing Thousands of Soldiers with Robots," IEEE Spectrum, (2014).

40 Jason DeSon, "Automating the Right Stuff – The Hidden Ramifications of Ensuring Autonomous Aerial Weapon Systems Comply with International Humanitarian Law," *Air Force Law Review* 72, (2015): 85–122.

41 Michael Byrnes, "Nightfall: Machine Autonomy in Air-to-Air Combat," *Air and Space Power Journal 28*, no. 3, (2014): 48-75.

42 Kenneth Anderson, Daniel Reisner, Waxman Mathew, "Adapting the Law of Armed Conflict to Autonomous Weapon Systems," 2014.

autonomy in weaponry will likely remain rare due to unique considerations like tempo and speed requirements for specific operations.[43]

Ethical/Legal Implications of Autonomous Weapons

Globally, civil society stresses their states to start dialogues for the legal and ethical framework for the deployment, development, and usage of autonomous weapons systems. The dialogues started in 2014 in Geneva by the United Nations within the official framework of the Convention on Certain Conventional Weapons (CWW). Unofficial meetings of experts were conducted between 2014 to 2016 on the lethal autonomous weapons systems, and a Group of Government Experts (GGE) was created, they discussed and developed a possible legal structure to ban and stop the suffering of common masses due to the usage of lethal autonomous weapons. The group of experts remains till 2020, and they talk about the issue at the international level.[44] Numerous researchers from the robotics community have also participated in the meetings of the Group of Government Experts (GGE). The outcome was to develop a mutual consensus on the 11 Guiding Principles of lethal Autonomous Weapons Systems. The board also gave suggestions and recommendations on the human responsibility principles ((b) and (d)) and interaction between humans and machines (Principle (c)).

In the current ethical and legal considerations, the technological issue of autonomous weapons systems is very critical. This is vital for both: for more implications for the users and the obedience to international humanitarian law (IHL). The weapon systems that are free from human intervention in their decision, have the technical abilities to follow international humanitarian law, as it is possible the develop technically to follow the law precisely and provide safeguarding as like a conventional soldier. Sassoli raises an essential question of whether it is possible for a machine to independently make a decision and focus on the target in armed conflict under the consideration of international humanitarian law.[45]

Furthermore, with current technologies, most people are in favor of it is not possible to build robots or manufacture such autonomous weapons that target the accurate target and avoid other massive distractions. On the other hand, some experts stated that with the help of

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43 Peter Warren Singer, "Wired for War: The Robotics Revolution and Conflict in the 21st Century," 2018.

44 M Wareham, "Stopping Killer Robots: Country Positions on Banning Fully Autonomous Weapons and Retaining Human Control," *Human Rights Watch.* 2020.

45 Marco Sassoli, "Autonomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions, and Legal Issues to Be Clarified," *International Law Studies 90,* no. 1, (2014): 1.

current technology, it can be possible to manufacture autonomous weapons such as reboots that can make complex decisions and perform correctly.[46] William Boothby, a prominent weapons law expert with strong military experience, stated that autonomous weapons should not be left to function autonomously with high restrictions and fixed situations. It is broadly assumed that the autonomous weapons system's high restrictions will influence the scope of the operation even though it targets legitimate targets.[47] It is unclear if it is possible to build a programming system for the computer with contextual intelligence that can figure out the widespread range of situations that can occur during conflicts. The question is whether these autonomous weapons can react according to the situations that the programmer has predefined or if they can be capable of handling those situations that are undefined by programmers.[48] On the other hand, is it these weapons have the potential to learn if the programming for every situation turns out to be impossible.[49]

Moreover, it is very hard to develop computer programming based on international law such International Committee of the Red Cross's Interpretive Guidelines on Direct Participation in Hostilities. The practical implementation of the principle is different when people are involved in real-world current conflicts. Cryer elaborated that the impediment between autonomous weapons and human soldiers should be overcome.[50] In this debate, there is unclarity about the technical possibilities of adaptation. However, the core discussion based is on the conviction of the misguided knowledge of International Humanitarian Law (IHL) or lack of perspective. The advancement of autonomous weapons within the limitation of international humanitarian principles will persistently depend on the examination of the technical potentiality, legal complications, and ethical issues. To bring conformity in the enhancement and deployment of autonomous weapons systems, it is critical to bring equilibrium between technical revolutions, moral considerations, and legal framework, as the ongoing discussion unfolds.

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46 Markus Wagner, "The Dehumanization of International Humanitarian Law: Legal, Ethical, and Political Implications of Autonomous Weapon Systems," *Vanderbilt Journal of International Law 47,* no. 1371, (2014): 1371-1424.

47 William Boothby, "*Weapons and the Law of Armed Conflict*," Oxford University Press. 2016.

48 RE. VanLandingham, "Directive 2311.01 on the Law of War Program US Dept. Defense," *International Legal Materials 61*, no. 2, (2022): 193-206.

49 Alan Backstrom, Ian Henderson, "New Capabilities in Warfare: An Overview of Contemporary Technological Developments and The Associated Legal and Engineering Issues," Article 36 Weapons reviews. *International Review of the Red Cross 94,* no. 886, (2012): 483-514.

50 Robert Cryer, "*The International Committee of the Red Cross Interpretive Guidance on the Notion of direct participation in hostilities': See a Little Light*," Humanizing the Laws of War: The Red Cross and the Development of International Humanitarian Law, Cambridge University Press. 2017: (113-138).

Furthermore, moral concern arises with autonomous weapons from the perspective of international humanitarian law. It seems looks like understandable that robots are not able to behave morally and immorally. Sharkey says it would never claim that robots would be more humane than humans, but it is convincible that only humans can be humane.[51] In addition, autonomous weapons create fear of war because there is no risk of losing soldiers, despite the civilians opposing the war. Yoo highlighted this danger is comparatively relieved by the details that it is extremely implausible that one side fighting against the robots- autonomous weapons.[52]

Many people find it terrifying only to think that a robot could murder a human. A philosopher goes so far as to say that an implicit condition of IHL is that a person must make the conscious decision to murder. Some question if "letting autonomous machines decide who and when to kill" is intrinsically unethical. However, if this were the case, any weapons—including mines and missiles—that can be aimed at combatants and military objectives but that don't let the operator know precisely who will be killed would also be outlawed. Furthermore, Hammond says modern computers are now able to open the bomb pods of bomber aircraft and choose which targets to attack when the Aegis naval defense system is automatically activated.[53]

9. Research Gaps

Various scholars have studied the development and deployment of the AWS by different states, but the literature is limited regarding the detailed assessment of the current operational status of these weapon systems. Likewise, there is a need to examine specific situations that manifest the pragmatic deployment and advantages of the usage of these weapons. Also, there is a need to explore the challenges to the current status of AWS. Moreover, the literature is found on the advantages of the usage of AWS, especially, in terms of ensuring force multiplication and reduction in human resources lost for the military. However, a comprehensive analysis is required to check their tactical and strategic effectiveness. The data is limited to why the military around the globe is using these weapons and what are the main

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51 Noel Sharkey, "Saying 'no!' to Lethal Autonomous Targeting," *Journal of Military Ethics* 9, no. 4, (2012): 369–383.

52 John Yoo, "Embracing the Machines: Rationalist War and New Weapons Technologies," *Calif. L. Rev 105*, no. 443, 2017.

53 Daniel Hammond, "Autonomous Weapons and the Problem of State Accountability," *Chi. J. Int'l L., 15*, no. 652, 2014.

challenges they are facing. A lot of literature is available on the efforts of international organizations to establish rules and laws for AWS. Nevertheless, another angle is necessary to study what are the existing gaps in the existing legal structure, or what are the challenges that arise in terms of accountability of individuals or states using these weapons unethically or against IHL law.

10. Hypothesis

This is the following hypothesis of this study.

1. It is hypothesized that the usage of autonomous weapons offers effective military necessity while presenting ethical and legal implications in an armed conflict.

Chapter 1

THEORETICAL UNDERPINNINGS

This chapter provides the theoretical framework along with its application for the study.

1.1 Theoretical Framework

Two theories are considered for this study – RMA and Kant Ethics, the former is used to explain the dependent variable 'military necessity' and the latter for 'ethical/legal implications' of AWS. The explanation of these theories is given in this chapter, along with their application to the study:

1.2 Development of Military Revolutionary Affairs Theory

Military Revolutionary Affairs (RMA) is a theory that has been discussed in the domain of academics and military strategy. Basically, RMA is often considered both a concept and a theory. However, this theory has not a single source or origin, it emerged in the late 20th century in the realm of military strategical thought shaped by many military scholars, theorists, and strategists. The term first appeared after WWII mostly in Soviet writings but in other words. The Soviet writers at the time used the term "Military Technical-Revolution" (MTR) in order to describe discontinuities in warfare as a result of the development of mechanized forces and the integration of nuclear warheads into the military in the 1920s.[54] Mostly during the 1970s, Soviet military strategists hyped that MTR was emerging in the shape of high-tech precision weapons and communication systems that were widely used in warfare and would revolutionize the concept of war by surging the operational depth.

One of the most vocal proponents of this theory was Marshal Nikolai Orgarkov – Chief of the Soviet General Staff who had the view that maintaining high-tech weapons and organizational adaptability could constitute discontinuity in war.[55] The Soviet MTR had a low influence on the US till the late 1980s. The hype of this Soviet doctrine increased among US

[54] Dima P. Adamsky, "American Strategic Culture and the US Revolution in Military Affairs," Farsverat, 2008.

[55] Carlo Alberto Cuoco, "The Revolution in Military Affairs: Theoretical Utility and Historical Evidence." *Research Institute for European and American Studies 142,* April 2010.

scholars when a prominent figure, Albert Wohlstetter in military establishment claimed that the strategic importance of precision-guided munitions has still been ignored by US military officials.[56] This becomes the turning point for the formulation of RMA theory. Similarly, the way was paved for the RMA to emerge as a theory when Andrew Marshall and Andrew Krepinevich published a classified report in 1992 named "The Military Technological Revolution".[57] Then other military officials tend to start using this term as RMA when the combination of technological advancement with new emerging innovative operational and organizational concepts revolutionizes the nature of war. Even Stephen Briddle further argued that Operation Desert Storm provided an example to proponents of the RMA as a way to pursue military primacy in the security environment.[58]

1.2.1 Theoretical Explanation

In terms of theoretical explanation, RMA gives a framework through which one can analyze and understand the transformation in military affairs.[59] This theory explains the potential impact of the integration of technology, changes in organizational structures, and transformation of operational concepts in the military. Andrew Marshall defines RMA as fundamental, far-reaching changes in how advanced militaries either plan to conduct or prosecute, military operations, he later added the term revolutionize does not incorporate rapid or sudden change but the change that must be profound and gives way to new methods of the warfare that would be more powerful.[60] Similarly, in the past, it is clearly evident that innovation in military technology has revolutionized the concept of war but this revolution is taking place only when new innovative technologies emerge, new methods of operations or warfare develop, and when there is a creation of new military organizations.[61]

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[56] Stephen Biddle, Zirkle Robert, "Technology, Civil- military Relations, and Warfare in the Developing World." *Journal of Strategic Studies* 19, no. 2, (1996): 171–212.

[57] Stephen Biddle, Zirkle Robert, "Technology, Civil- military Relations, and Warfare in the Developing World." *Journal of Strategic Studies* 19, no. 2, (1996): 171–212.

[58] Stephen Biddle, "*Military Power: Explaining Victory and Defeat in Modern Battle*," Princeton University Press, 2004.

[59] Steven Metz, James Kievit "Strategy and the Revolution in Military Affairs: From Theory To Policy*," JSTOR*, 1995.

[60] Ian Roxborough, "From Revolution to Transformation the State of the Field," Review of From Revolution to Transformation the State of the Field." *Joint Force Quarterly*, (2002): 68–75.

[61] Mie Augier, "Thinking About War and Peace: Andrew Marshall and The Early Development of The Intellectual Foundations for Net Assessment," *Comparative Strategy, 32, no.* 1, (2013): 1–17.

Likewise, Andrew F. Krepinevich also gave an explanation of this theory, but his explanation is more influential. Interestingly, he says RMA occurs when the integration or use of emerging technologies are seen in a significant number of military systems along with new innovative operational and organizational concepts and adaptation respectively change the nature of the conduct of war.[62] He further says there are four factors that do not necessarily but somehow still play significant roles in military revolution: technological advancement, system development, operational innovation, and organizational adaptation.[63] Later on, he added two more elements: the degree of state competition in the international realm and strategies that the opponents opt to pursue the exploitation of the hidden potential of military revolution.[64]

Another scholar named Richard O Hundley provided the explanation of RMA. He says an RMA is a paradigm shift for the conduct of military operations and war.[65] Similarly, Theodor Galdi maintains another explanation of the RMA theory which needed to be fully quoted.

> "A revolution in military affairs takes place when one of the participants in a conflict incorporates new technology, organization, and doctrine to the extent that victory is attained in the immediate instance, but more importantly, that any other actor who might wish to deal with that participant or that activity must match, or counter the new combination of technology, organization, and doctrine in order to prevail. The accomplishments of the victor become the necessary foundation for any future military activities in that area of conflict".[66]

To sum up, the discourse surrounding the theoretical explanation of RMA provides that this theory is all about the advancement of military technology, and alteration in operational and organizational concepts and structures of the military to ensure decisive victory in the war.

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62 Andrew F. Krepinevich, "Cavalry to Computer: The Pattern of Military Revolutions," *The National Interest*, no. 37 (1994): 30–42.

63 Andrew F. Krepinevich, "Cavalry to Computer: The Pattern of Military Revolutions," *The National Interest*, no. 37 (1994): 30–42.

64 Andrew F. Krepinevich, "Cavalry to Computer: The Pattern of Military Revolutions," *The National Interest*, no. 37 (1994): 30–42.

65 Richard. Hundley, "Past Revolutions, Future Transformations: What Can the History of Revolutions in Military Affairs Tell Us About Transforming the U.S. Military?," Santa Monica, CA: *RAND*, (1999): 9.

66 Theodor Galdi, "Revolution in Military Affairs: Competing Concepts, Organizational Responses, Outstanding Issues," *Library of Congress Congressional Research Services*, 1995.

1.2.2 Application to Study

In the context of this study, RMA provides valuable knowledge for the potential implication of the integration of these advanced technological weapons at the operational and strategic level for the military in terms of military necessity. This theory emphasizes the transformative effect of innovative technology on military capabilities. AWS is a form of advanced-innovative technology that represents a great advancement for increasing military effectiveness by ensuring rapid decision-making, precision, and fewer human casualties in the war zone.[67] Therefore, this theoretical framework aims to check how the usage of AWS brings technological revolution in the military and increases the effectiveness of operations.

1.3 Development of Kant's Deontological Ethics Theory

The Kantian Ethics Theory was developed during the late 18th century by a well-known German philosopher Immanuel Kant. This theory represented a major shift at the foundational level of moral philosophy. The theory emerged as one of the most dominant theories in response to Utilitarianism. Various philosophers put their best to present theories on ethics such as Aristotle's virtue ethic, Bentham's Utilitarianism, and various forms of hedonism.[68] Previously the theories represented morality as the achievement of happiness and avoidance of pain. On the other hand, Kant tried to establish his arguments for the ethics theory based on reason and rationality irrespective of one's emotional inclination.[69]

1.3.1 Theoretical Explanation

Kant's Ethics – also known as deontological ethics. It is a moral theory that states morality is a result of one's actions if he adheres to rules or regulations rather than by its consequences.[70] According to Kant, Morality is defined by one's duties and actions. The duties are basic guidelines that tell people how to perform their actions. Likewise, duties are imperative as they explain what to do and what not to do. Also, the guiding principles of duty and actions

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67 Maxim Worcester, "ISPSW Strategy Series: Focus on Defense and International Security Autonomous Warfare -A Revolution in Military Affairs Autonomous Warfare -A Revolution in Military Affairs," *Institute for Strategic, Political, Security and Economic Consultancy* 340, (2015).

68 Terence Irwin, *The Development of Ethics: A Historical and Critical Study: From Socrates to the Reformation* (Oxford University Press, 2007).

69 Michael Cholbi, *Understanding Kant's Ethics,* (Cambridge University Press, 2016).

70 Md Lovelu Hasan, "Immanuel Kant: Ethics," *The Review of Contemporary Sciences and Academic Studies 2*, no. 1, (2022).

must be applied universally.[71] The categorical imperative is a central idea of the Kantian ethics. This holds that a person should act in a way, he wants others to be acted. Moreover, these categorical imperatives are not derived from desires or needs but act as an essential way to determine moral duties.[72] Heather Wilburn says Kantian Ethics has four main principles to check the moral dilemmas of a person whether he is acting well or not.[73] First, Universalizability, means that moral actions should be guided by one's maxims so that the act can be universally applied. For instance, if someone wants to steal, he must realize that if other people around the world start stealing it would be ethically wrong and it applies to me as well. Second, Humanity or respect for all incorporates treating everyone as an end in themselves rather than merely as a means to an end. As humans have the capacity for rationality, they must be respected and treated with dignity not for fulfilling personal needs. Third, duty and goodwill, which means one should act morally for the abiding moral law out of inner respect for it. Last is rationality and autonomy, Kant claims that morality comes from the rationality and autonomy of other moral agents. In this regard, people must act based on moral laws taken from reason.[74]

To sum up, this theory says morality is guided by rationality and any kind of ethical principles must be followed by individuals universally without any question. The proponent of the theory – Kant paid attention to elaborate rationality and autonomy of individuals is required to make moral laws, and individuals must act ethically without thinking of their desires or personal gains.

1.3.2 Application to Study

Kantian Ethics Theory is applied as a theoretical framework for investigating the dependent variable (ethical/legal implications). The theory attempts to examine whether the actions taken by the AWS can be considered moral law. Also, the deployment of the AWS in an armed conflict is justifiable as universalizability without any contradictions or violations. Moreover, the theory is applied to evaluate whether the AWS respects human dignity. In this

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71 Udayakumar, Sunder Singh Babu, "Immanuel Kant's Deontological Theory," *IJRAR 8,* no. 2, (2021): 234-243.

72 Udayakumar, Sunder Singh Babu, "Immanuel Kant's Deontological Theory," *IJRAR 8,* no. 2, (2021): 234-243.

73 Heather Wilburn, "An Introduction to Kant's Moral Theory," Philosophical Thought, Library, https://open.library.okstate.edu/introphilosophy/chapter/a-brief-overview-of-kants-moral-theory/.

74 Heather Wilburn, "An Introduction to Kant's Moral Theory," Philosophical Thought, Library, https://open.library.okstate.edu/introphilosophy/chapter/a-brief-overview-of-kants-moral-theory/.

regard, the study first analyzes that AWS makes decisions that do not violate human dignity. In addition to this, this framework also aims to analyze in the context of the AWS - the concept of duty as described by Kant as a guiding principle to perform actions. The theory also assesses one of the most critical concepts, responsibility and accountability assigned with the use of AWS.

Chapter 2

RESEARCH METHODOLOGY

This chapter provides valuable insights regarding the techniques utilized for carrying out this research study.

2.1 Research Methodology

Methodology is a set of practices, layouts, criteria, ideas, and choices on how and what type of data is needed for the thorough study of scientific ways.[75] In other words, it is a method that is used to chalk out research design and problem, data collection, and analysis.[76] It is one of the necessary parts of the research study or any scientific inquiry. In order to answer the given research questions for this study, this chapter discusses the following methods and procedures used in this endeavor.

2.1.1 Research Design

Research design is a method to elaborate the overall structure of a scientific study. It assists in obtaining significant data required on the given topic on which research is being carried out.[77] It provides a proper framework that guides the researcher in terms of data collection and analysis, in other words, a blueprint for a study. It leads the researchers to study in a specific way suitable for it.[78] For this study, a qualitative research design has been adopted for understanding complex topics like AWS usage in armed conflict. It has been adopted to provide valuable insights into the advantages and ethical/legal implications of AWS utilization in armed conflict. Qualitative study helps individuals to get an in-depth

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75 Prabhat Pandey, Meenu Pandey, "Research Methodology Tools and Techniques," *Bridge Center*, 2021.

76 William Wiersma, Stephen G. Jurs, "Research methods in education: An introduction. Montreal," 2009.

77 Kathuri, Pals, "*Introduction to research*. Kenya: Educational Material Center," Egerton University. 1993.

78 Michael Crotty, "The foundations of social research: Meaning and perspective in the research process," *Sage Publication.* 1998.

understanding of the selected issue.[79] Likewise, it assists in understanding the different characteristics of the given topic.

2.1.2 Population

The population of the study comprises the group of individuals that the researcher needs to study. This is a group of individuals whom the researcher can reach easily.[80] In order to determine the target population one must be familiar with the qualities and attributes of certain groups being studied based on various factors so the output can represent or apply to a larger group of interest.[81] When these characteristics are understandable, it assists in determining a suitable person for the study. Therefore, the target population for this study is comprised of individuals integral to the discourse on AWS. This includes military experts who have hands-on experience dealing with AWS and legal scholars who have insights into humanitarian law especially associated with AWS.

2.1.3 Sampling

In research studies, sampling is an essential technique or a prerequisite for collecting data.[82] The sampling size is just not a number, but it is a number of cases or persons chosen from the target population to carry out data collection.[83] However, for the qualitative research approach, the sample size should be considerably smaller. It is said that a sample size between 20-30 is enough for qualitative research.[84] Moreover, the interviews must be continued till the point of saturation or till the researcher gets repetition in data or when no new concepts emerge.[85]

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79 John Creswell, Cheryl Poth, "Qualitative inquiry and research design: Choosing among five approaches," *Sage Publications,* 2016.

80 Michael Mncedisi Willie, "Differentiating Between Population and Target Population in Research Studies," *International Journal of Medical Science and Clinical Research Studies 2*, no. 6, (2022): 521–523.

81 Benjamin Ackerman, Schmid Ian Kara, Rudolph E, Seamans J Marissa, Ryoko Susukida, Mojtabai Ramin, Stuart A. Elizabeth, "Implementing statistical methods for generalizing randomized trial findings to a target population," *Addictive Behaviors* 94, (2019): 124-132.

82 Noriah Ishak, Abu Bakar Yazid, "Developing Sampling Frame for Case Study: Challenges and Conditions," *World Journal of Education 4*, no. 3, (2014): 29-35.

83 Mumtaz Ali. Memon, Hiram Ting, Junhawa Thurasamy Cheah, Chuah Ramayah, Cham Francis, Hue Tat, "Sample Size for Survey Research: Review and Recommendations," *Journal of Applied Structural Equation Modeling 4*, no. 2, (2020): 1-20.

84 John Creswell, Cheryl Poth, "Qualitative inquiry and research design: Choosing among five approaches," *Sage Publications,* 2016.

85 Janice Morse, "Determining Sample Size," 2000.

Basically, saturation is a stage, where there are no new codes are identified while collecting data.[86] Keeping in view this study, the researcher aims to adopt the purposive sampling technique, the selection of expertise on the given subject matter from the target population.[87] This approach guarantees that members have the essential information and encounters related to autonomous weapons systems. The sample size is 11-13 for this study and also decided based on data saturation, with data collection proceeding until no new trends, experiences, and knowledge arise from the interviews or data sources or till the point of repetition.

2.1.2 Data Collection

Qualitative research is a wide-range approach consisting of numerous methods to examine phenomena within a real social setting. It is a collection of subjective and explanatory understanding of phenomena, and the data comes from different means, primary and secondary sources, which are based on narrations from the individual or group and are composed of in-depth knowledge regarding the phenomena.[88] The data collection involves both primary and secondary sources.

2.1.2.1 Primary Data

There are several methods used for data collection, structured interviews are commonly used for the primary data collection.[89] Interviews are a reliable qualitative research technique for obtaining participants' rich, contextualized narratives and points of view. Structured interviews allow for picking up rich, in-depth knowledge from key sources and specialists. Content investigation and documented inquiries are utilized to analyze official archives, approach papers, and pertinent reports to complement the interview data.

In qualitative research, structured interviews follow a logical human interaction: there are conversations, they are talking with each other, and questions and answers among them. Further, there is a specific kind of interaction: a researcher asks questions from the participant

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[86] Devajit Mohajan, Haradhan Mohajan, "Exploration of Coding in Qualitative Data Analysis: Grounded Theory Perspective," 2022.

[87] Jacqueline Guarte, Erniel Barrios, "Estimation under Purposive Sampling," *Communications in Statistics-Simulation and Computation 35*, no. 2, (2006): 277-284.

[88] Omolola Adeoye- Olatunde, Nicole Olenik, "Research and scholarly methods: Semi- structured Interviews," *Journal of the American College of Clinical Pharmacy 4*, no. 10, (2021): 1358-1367.

[89] Albine Moser, Irene Korstjens, "Series: Practical Guidance to Qualitative Research," Part 1: Introduction, *European Journal of General Practice 23*, no. 1, (2017): 271-273.

and the participant shares his or her views, experiences, and understanding of the under-research phenomena.[90] For these types of interviews, the researcher first prepares a list of questions that will be asked during the interview. [91] In this regard, the interviewer not deviate from the original questions and keep on track or avoid asking for unnecessary information from participants.[92] Therefore, in this research study, structured interviews are used for primary data collection. This method assists in collecting data based on direct exploration of the opinions of key stakeholders including military and legal experts.

2.1.2.2 Secondary Data

This type of data is collected by the researcher for the primary aim. The use of existing – Secondary data - provides a feasible possibility for researchers who have limited resources and periods for the study. The same basic research principles are applied to secondary data as follows to primary data.[93] Secondary data is a large-scale survey or data collected as part of personal research, and it may consist of previously gathered data and can be reconsidered for answering new research questions, that are not originally intended for it.[94]

In the research study, the secondary data for this study provides the foundation for this study. It is based on government reports, international treaties (on which IHL is based), and other relevant documents that provide valuable information on the current status of autonomous weapons in armed conflict, military necessity, and legal/ethical implications. This type of data assists in understanding the historical debates and legal frameworks for AWS.

2.1.3 Data Analysis

One of the few general abilities that apply to all qualitative analysis is "thematizing meanings".[95] For this reason, it is a tool that may be used in various ways rather than as a

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90 S Brinkmann, S Kvale "Doing Interviews," *Sage Journals*, 2018.

91 Howard Lune, Bruce Berg, "Qualitative Research Methods for The Social Sciences," England: Pearson Education Limited. 2017.

92 Barbara DiCicco- Bloom, Banjamin Crabtree, "The Qualitative Research Interview," *Medical Education 40*, no. 4, (2006): 314-321.

93 Melissa Johnston, "Secondary data analysis: A method of which the time has come," *Qualitative and Quantitative Methods in Libraries 3*, no. 3, (2014): 619-626.

94 Jaya Prasad Tripathy, "Secondary Data Analysis: Ethical Issues and Challenges," *Iranian Journal of Public Health 42*, no. 12, (2013): 1478.

95 Immy Holloway, Les Todres, "The Status of Method: Flexibility, Consistency, And Coherence," *Qualitative research 3*, no. 3, (2003): 345-357.

specific approach. For understanding thematic analysis "Theme" and "code" are phrases that are used interchangeably. A theme is a particular pattern that can be identified in the data that draws one's interest.[96] For this study, the data collected from the primary source is analyzed based on thematic analysis, which includes distinguishing, analyzing, and announcing designs (topics) inside the data. The method incorporates data familiarization, coding, theme development or improvement, and result interpretation. Data analysis is an iterative process. The discoveries are triangulated to upgrade the validity and unwavering quality of the study. The investigation centers on recognizing the current status of AWS, military necessity, and legal implications.

[96] Ricard Boyatzis, "Transforming Qualitative Information: Thematic Analysis and Code Development," *Sage Journals*, 1998.

Chapter 3

CURRENT STATUS OF AUTONOMOUS WEAPON SYSTEM (AWS)

The recent advancement in technology has seen debates over the operational capabilities and legal/ethical implications of the Autonomous Weapon System (AWS). This chapter provides a significant understanding of the current status of AWS. The chapter consists of two parts: the first part explains the AWS based on the degree of human involvement and different types of AWS being deployed by states in the armed conflict such as defense systems, UAVs, etc. The second part explains the existing legal frameworks regulating the AWS. This part provides an analysis of the international agreements, treaties, and policies regarding AWS. Moreover, this part also gives keen insights into the global ongoing debate for the development of AWS in order to highlight their evolving role in warfare. In this chapter, the analysis is presented based on secondary data sources including official reports, documents, and scholarly literature. This approach ensures a balanced explanation of the current status of the AWS in today's armed conflict.

3.1 General Understanding of Autonomous Weapon System (AWS)

Accurate and comprehensive understanding is crucial when it comes to defining complex topics. A clear statement regarding any concept provides certainty and the ability to understand it well. Before giving military necessity and ethical/legal implications of the AWS, it is essential to establish a clear definition of the given technology for clearly manifesting arguments. However, 'automation' and 'autonomous' – the two terms have been used interchangeably but have different meanings in actual. Marra and Macneil say the more the system works without human involvement the greater the autonomy.[97] Currently, technologies have been deployed in armed conflicts with a certain level of autonomy to track, identify, decide, and target, these systems fall under the spectrum of autonomous, on the other hand, autonomy in weapons is only active when human response is limited or there are

[97] Marra & McNeil, supra note 39, at 1150; SINGER, supra note 4, at 74.

circumstances where human time of engagement is narrow.[98] From this definition, it can be said autonomy is not only best characterized by the discrete property of any system but it's an association between a system and its operator. This can vary across weapon systems based on the degree of the system's autonomy.[99] For a broader understanding, the definitions of ICRC and DOD are considered for a better explanation of the concept.

According to the DOD:

> "An AWS is a weapon system that once activated can select and engage targets without further human intervention. These systems are human-supervised autonomous systems, designed and require human operators (operators)[100] to override operation of the weapon systems, but not require any human operator for further selection and engaging the target."[101]

On the other hand, ICRC says:

> "Any weapon system with autonomy as a key function, that can select, detect, identify, track or select, and attack, neutralize, damage, or destroy a target without any human intervention."

However, when an element of lethality is added to these systems they become Lethal Autonomous Weapon Systems.[102] Therefore, based on these two statements, this study defines AWS as "a system that can accomplish its mission with limited or without human intervention." Hence, AWS is a system whose selecting and targeting functions are autonomous but directed by other agents for all its purposes of operability and mobility. Further explanation of the AWS is given in the sub-sections of this chapter.

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98 Sophie Quince, "*The Laws Surrounding Responsibility and Accountability of Individuals are Insufficient: An Analysis of Legal and Ethical Implications of Autonomous Weapon System*," (LLM Diss., Northumbria University Newcastle), May 11, 2020.

99 Jeffrey L. Caton, "*Autonomous Weapon Systems: A Brief Survey of Developmental, Operational, Legal, and Ethical Issues,"* (US Army War College Press, 2015).

100 In 2023, the US DOD reviewed the directive on AWS, and substituted the word 'Human Operator' with only 'Operator'.

101 US Army/US Marine Corps, "FM 3-24 Insurgencies and Countering Insurgencies." Technical Report. United States Army, 2014.

102 Ajey Lele, "Debating Lethal Autonomous Weapon Systems." *Journal of Defence Studies* 13, no. 1 (2019): 51-70.

3.2 Types of Autonomous Weapon Systems

There is no internationally agreed definition of AWS, but the US Department of Defense divides AWS into three main categories (Semi-Autonomous weapon, human-supervised weapon, autonomous weapon) based on its level of autonomy.[103] Furthermore, Human Rights Watch used the loop theory to apply it to these categories with the addition of a degree of control and defines AWS as follows human-in-the-loop, human-on-the-loop, human-out-of-the-loop.[104] Based on this categorization, the study illustrates types of AWS in Table 3.1 below, and the explanation of each type is given in the succeeding paragraphs.

Table 3.1: Types of Autonomous Weapons based on Level of Autonomy and Degree of Control

Type of AWS	**Loop**	**Definition**	**Example**
Semi-autonomous Weapon	In	Systems capable of operating with limited human intervention for selection of the target.	Reaper and Predator Drones
Human-supervised Weapon	On	Systems capable of operating with human intervention, especially in case of termination or to avoid excessive damage.	Global Hawk Surveillance drone
Lethal Autonomous Weapon	Out	Systems capable of operating (once activated selects and targets on their own) without any human intervention.	Kamikaze Drones, Taranis Drones, SGR A1 Sentry Robots, Aegis Combat System

Source: Author, Based on Information Available on Secondary Source of Data

3.2.1 Semi-Autonomous Weapon

This type of AWS is also referred to as a human-in-the-loop weapon system. It is a weapon system that once activated requires limited human intervention. In other words, A type of autonomous weapon that is only intended to engage targets (individuals or groups) pre-programmed by the human operator. Paul Scharre rightfully says that in a weapon system if a human remains, when the system (observes, orients, decides, and acts) to target the object or individual – this system is considered an autonomous weapon system.[105] In this situation, the

[103] US Department of Defense, "DoD Directive 3000.09," Technical Report, United States Department of Defense, 2017.

[104] Human Rights Watch, "Losing Humanity: The Case Against Killer Robots," 2012

[105] Paul Scharre, Michael C. Horowitz, *"An Introduction to Autonomy in Weapon Systems,"* Technical report. 2015.

search and target of the object or individual may be autonomous but only the human operator decides to engage or target. Drones' technology in modern warfare falls under this type of AWS category.

3.2.2 Human-Supervised Weapon

Human-supervised AWS is also known as a human-on-the-loops weapon. A type of autonomous weapon that requires full human intervention from activation to termination. The human operator in this weapon system acts as a supervisor to intervene and terminate the target even in case of system failure or when there are chances of unacceptable destruction.[106] These weapons autonomously select and attack the individual or object based on a pre-programming nature but retain continuous human supervision for their operability, and if necessary, override the system within a narrow time frame. An example of this weapon system includes the missile defense system of the contemporary world.

3.2.3 Lethal Autonomous Weapons (LAWS)

The type of AWS also referred to human-out-of-the-loop weapon. This one is the most typical type of AWS and is yet to be developed in full swing. It is a weapon that once activated selects or engages an individual or object without any human intervention by any human agent. In broader means, this type of AWS works fully autonomously without further human involvement, they have an element of autonomous decision-making regarding selecting a target or using force against it. Robert Sparrow claims that fully autonomous weapons or lethal autonomous become self-aware and may choose to act rouge because of the level of autonomy they have without any human intervention.[107] Due to the self-awareness capability these weapon systems are equipped with the decision-making ability. Moreover, a truly lethal autonomous system is one that has the ability to learn and adapt its functioning to the change of circumstances or according to the evolving battlefield conditions.[108] Based on this, they are

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106 William Marra, Sonia McNeil, "Understanding 'The Loop': Regulating the Next Generation of War Machines," *Harvard Journal of Law and Public Policy 36*, (2013): 1139–85.

107 Robert Sparrow, Killer Robots, 24 J. APPLIED PHIL. 62, 70 (2007).

108 ICRC, Autonomous weapons: States must Address Major Humanitarian, Ethical Challenges, FAQ (9 February 2013), http://www.icrc.org/eng/resources/documents/faq/q-and-a-autonomous-weapons.htm.

often called ‘killer robots’ or ‘robotic weapons.’[109] Examples of this type of weapon include loitering munitions.

3.3 Classification of Autonomous Weapon System (AWS)

Autonomous Weapon Systems emerged as a significant advancement in the field of military technology and revolutionized the concept of warfare. These weapons are characterized by their capability to operate with limited or without any human intervention. Based on their operational environment, these weapons are classified into fixed positions, ground, air, and maritime, and also have loitering capabilities. Furthermore, this classification has diverse transformative impact in contemporary warfare. Understanding this classification is important for analyzing their military necessity and ethical/legal implications. Therefore, this section aims to examine the classification of AWS already being used in armed conflict as well as some under-development.

3.3.1 Fixed Position Weapon System

The current AWS that has the highest level of autonomy is a fixed-position weapon system. As opposed to remote unmanned systems, these weapons perform their operations in stationary positions. These systems include land and sea-based defensive systems and fixed gun systems or sentry guns having different levels of human intervention. Many countries around the globe are currently using fixed-position AWS for defense purposes against rockets, missiles, drones, aircraft, and high-speed boats.[110] These weapons are mostly semi-autonomous and human-supervised and require human supervision. But a few of these weapons are apparently being developed, they have the capability to perform their operations without human intervention. Table 3.2 illustrated below gives names of a few weapons that fall under this category.

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[109] Gulshan Bibi, *“Lethal Autonomous Weapon System (LAWS): Options for Pakistan,” Islamabad Policy Research Institution 2,* no. 2, 2018.

[110] ICRC, “Autonomous Weapon System: Technical, Military, Legal and Humanitarian Aspects,” *Expert Meeting*, Geneva, Switzerland, (26-28 March 2016).

Table 3.2: Fixed Position Autonomous Weapon System with Brief Description

	Name	Usage	Autonomy	Country	Year
Classification: Fixed Position AWS	Patriot (PAC-3) MSE	Hit-to-kill technology with improved range and accuracy	Semi-autonomous	USA, Germany, Israel, UAE	2015
	Phalanx (CIWS) SeaRAM	Hybrid missile system for greater capability	Semi-autonomous	USA, Germany, Japan, South Korea	2008
	Iron Dome	Air defense for intercepting missiles	Semi-Autonomous	Israel	2011
	NBS MANTIS	Air defense system	Semi-autonomous	Germany	2011
	Samsung SGR A-1	Sentry Robot system, deployed along borders and mil. installations	Semi-autonomous	South Korea	2007
	C-RAM	An Air defense system that detects and tracks incoming missiles.	Semi-autonomous	USA, Germany, UK, Israel. Netherlands, Australia	2004

Source: Author, Based on Information Available on Secondary Source of Data

3.3.2 Ground Weapon System

Unmanned ground AWS has been developed with fitted weapons to perform remote operations and have the potential to perform autonomously. According to the Department of Defense (DOD), these weapons are developed with the aim of two potential uses: reaching out to inaccessible or dangerous areas for humans and for use as a weapon system.[111] This type of weapon provides force multiplication benefits to the troops. Also, these weapons are used for bomb disposal purposes. Even the US is testing and developing ground combat systems to fight with enemy combat systems instead of human soldiers.[112] Still, these systems are not developed yet but have the potential to be realized in the near future. Based

[111] US DOD, "Role of Autonomy in DOD System," Defense Science Board, Task Force Report, *Supra Note 4*, (2012): 92.

[112] Ben Farmer, "US Army Considers Replacing Thousands of Robots with Troops," The Telegraph, (January 2016).

on the currently developed ground weapons, Table 3.3 illustrates some of their examples below.

Table 3.3: Ground-Based Autonomous Weapon System with Brief Description

	Name	Usage	Autonomy	Country	Year
Classification: Ground-based AWS	THeMIS	For the role of transport, logistics, and support.	Semi-autonomous	Estonia	2015
	DOGO	For close-quarter combat, and IRS	Semi-autonomous	Israel	2016
	Uran-9	For reconnaissance and fir support	Semi-autonomous	Russia	2016
	Milrem Robotics type-X	For support, IRS, and direct engagement.	Semi-autonomous	Estonia	2020

Source: Author, Based on Information Available on Secondary Source of Data

3.3.3 Maritime Weapon System

Maritime autonomous weapon systems have also been developed with various sizes and functions. These weapons are further categorized based on their operations into two types: anti-submarine warfare or surface warfare, and underwater vehicles for the use of lying mines and underwater attack.[113] These weapons have revolutionized the concept of maritime warfare, they have abilities to deal underwater, especially in case of communication difficulties. Furthermore, they can perform several operations with a level of autonomy underwater for days without human intervention. Table 3.4 gives names of developed maritime autonomous weapons.

[113] Antoine Martin, "U.S. Expands Use of Underwater Unmanned Vehicles," *National Defense* 96, no. 701, (2012): 34–36.

Table 3.4: Maritime Autonomous Weapon System with Brief Description

	Name	Usage	Autonomy	Country	Year
Classification: Ground Based AWS	Sea Hunter	Anti-submarine warfare and surveillance system.	Autonomous	US Navy	2016
	ACTUV	For warfare and surveillance	Autonomous	US Navy	2016
	Black Fish UUV	Under water UV for ISR	Autonomous	China	2015

Source: Author, Based on Information Available on Secondary Source of Data

3.3.4 Air Weapon System

The air autonomous weapon systems among all AWS stand out. These weapons have the most advanced technology and strategic importance in contemporary warfare in terms of speed, precision, accuracy, and operational efficiency. Air AWS encompasses a broad range of systems from aircraft to loitering munitions that require varying degrees of human involvement. These weapons are further categorized into various types:

3.3.4.1 Aircraft

Autonomous fighter jets are yet to be developed with a high level of autonomy. Older fighter jets require full human supervision for carrying out operations such as pinpoint accuracy to shoot down enemy jets, but modern fighter jets include advanced technology tools to assist in combat operations based on inbuilt sensors, radar, and guided missiles. However, various semi-autonomous jets have been developed that laid the foundation for future autonomous combat air jets. Northrop Grumman with the successful test flight of X-47B, demonstrated that the stage is set for the development of a more permanent fleet of unmanned aircraft in the future.[114] A detailed description of two main semi-autonomous aircraft is given in Table 3.5 below.

[114] Northrop Grumman, "X-47B UCAS," April 15, https://www.northropgrumman.com/what-we-do/air/x-47b-ucas.

3.3.4.2 Unmanned Aerial Vehicles (UAVs)

Unmanned Aerial Vehicles (UAVs) are one of the most significant revolutionary inventions in the military field. They are also known as drones commonly. These systems can be operated remotely or autonomously without any human pilot onboard. UAVs, since the beginning of the 21st century have been extensively used in military operations.[115] UAVs are used for ISR, precision strikes, situational awareness, and logistic support. They come in various sizes and shapes based on their functioning and operability. Tactical UAVs are used for gathering intelligence at intermediate range, on the other hand, strategic UAVs are large-fixed-wing resembles conventional airplanes, used to perform long-range, high altitude, and high-speed missions.[116] The advanced models of UAVs have decision-making capabilities for target identification and engagement with limited human intervention.

3.3.4.2.1 Loitering Munitions

Loitering munitions are a new generation of UAVs that aim to provide next-level value precision and flexibility in contemporary warfare. Unlike UAVs, they are designed to be operated in warfare for direct targeting as they have fire capability due to built-in warheads. It loiters in the air for extended periods to carry out their autonomous missions. This munition is becoming a critical tool for modern militaries as it has been extensively used in the Russia-Ukraine war.[117] Examples of such munitions are a kamikaze drone or a suicide drone.

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115 Shaaban Ali, Osama Hassan, Anand Gopalakrishnan, Aboobacker Muriyan, Sobers Francis, "Unmanned Aerial Vehicle: A Literature Review," *Journal of Hunan University Natural Science 49,* no. 7, (2022): 196-115.

116 Faiyaz Ahmed, Anupam Keshari. Pankaj Singh Yadav, "Recent Advances in Unmanned Aerial Vehicles: A Review," *Arabian Journal for Sciences and Engineering 47,* (2022): 1963-1984.

117 Stacie Pettyjohn, "Drones are Transforming Battlefield in Ukraine but in an Evolutionary Fashion," War on the Rocks, March 2024.

Table 3.5: Air Autonomous Weapon System with Brief Description

		Name	Usage	Autonomy	Country	Year
Classification: Air AWS	**Aircraft**	X-47B	Combat aircraft	Autonomous	US	2011
		Taranis	For IRS and direct engagement	Semi-autonomous	UK	2013
	UAVs	Kamikaze Drones	For precision strikes and tactical operations	Semi-autonomous and Autonomous	USA, Russia	Multiple Years
		Heron TP	For IRS and strike operations	Semi-autonomous	Israel	2010
		Harpy	Targeting enemy radar system	Semi-autonomous	Israel	1990
	Loitering Munitions	KUB-BLA	Suicide drones for precision strikes	Autonomous	Russia	2019

Source: Author, Based on Information Available on Secondary Source of Data

3.4 Existing Legal Framework for AWS

Autonomous Weapon Systems are becoming a crucial focal point in modern warfare. These systems are being operated with minimal or no human intervention raising concern for their regulation. This section looks at whether there are any existing legal frameworks for regulating AWS. Further, it provides current debate by international organizations and states for governing and banning these weapons.

3.4.1 Is AWS Regulated by any Legal System?

To begin with, basically, International Humanitarian Law (IHL) is considered a law of armed conflict to regulate the conduct of the war. Customary IHL regulates the two types of

weapons being deployed in any armed conflict.[118] First, it deals with the weapons that can cause superfluous injury or unnecessary suffering,[119] second, it operates with weapons that are inherently indiscriminate.[120] The first category does not prohibit the usage of weapons that cause tremendous injuries or suffering when these injuries are essential to achieving military objectives. The war itself is a dirty business, its main purpose is to cause harm or injury to the enemy, hence weapons are used to achieve military purposes even the use of the incendiary device is considered lawful when the target is a combatant or military objective.[121] Also, this rule does not prohibit the use of weapons that cause unnecessary injuries. This rule focuses only on the weapons that are designed to cause excessive pain and harm to the combatant. An example is the use of a laser weapon to cause permanent blindness, this can cause lifelong harm and does not serve the military purpose. Similarly, the second category prohibits only those weapons that cannot be directed with point-point precision to the military and have effects that cannot be contained. Here again, the main concern is the design of the weapon such as unguided missiles that are not directed at the specific target and can cause excessive damage does not result in achieving military objective. This rule covers weapons that are not directed at a specific target such as biological weapons, poisonous gases (phosphorous gas), ballon bombs, etc.[122]

Moreover, some other treaties can prohibit or ban the usage of certain weapons. The Hague Conventions prohibited the use of expanding bullets or poisoned gas.[123] Later in 1980, the Convention on Certain Conventional Weapons (CCW) added Protocols (I, II, III, IV) on non-detectable fragments, landmines and booby traps, incendiary weapons, and blinding laser weapons respectively.[124] The Ottawa Convention Prohibits the states or contracting parties

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118 ICRC, "Weapons of a Nature to Cause Superfluous Injury or Unnecessary Suffering," International Committee of the Red Cross, Rule 70.

119 Convention Respecting the Laws and Customs of War on Land, Article 23(e), Oct. 18, 1907, 36 Stat. 2277, T.S. No. 539.

120 ICRC, Rule 71, Supra Note 154.

121 Michael W. Meier, "Lethal Autonomous Weapon System (LAWS): Considering a Comprehensive Weapon Review," *Temple International and Comparative Law Journal 119*, no. 128, (2016).

122 ICRC, Rule 71.

123 ICRC, "Treaties and States Parties to Such Treaties: Methods and Means of Warfare," International Committee of the Red Cross, accessed July 2024.

124 ICRC, "Treaties and States Parties to Such Treaties: Methods and Means of Warfare," International Committee of the Red Cross, accessed July 2024.

into armed conflict from developing, acquiring, retaining, or deploying anti-personnel mines.[125] Likewise, the Oslo Convention prohibits states from using cluster munitions.[126]

As far as autonomous weapons are concerned, to date, no treaty or customary law prohibits or bans the usage of AWS in armed conflict or combat missions. Also, the term autonomy does not have any specific regulation or prohibition in IHL. Autonomous Weapon System fails legal review only if it is prohibited based on the reason of causing unnecessary harm or injury. Here again, the point comes that they are designed to engage the specific target rather than using force. Schmitt says the features of the AWS indicate them to make decisions for when and where force needs to be deployed instead of the nature of forces to be deployed.[127] However, there is no legal framework exists in IHL to claim that AWS is unlawful to use in an armed conflict. Nonetheless, the fact that IHL does not prohibit the use of Autonomous Weapons is not putting a full stop to the debate to consider the ethical implications of these weapons for regularizing them in the future with their advancement. The next section discusses the ongoing debate for regulating and putting a ban on these weapons.

3.4.2 AWS Lawful or Unlawful: A Debate

The debate on the AWS was started in April 2013 with the publication of the UNHRC report. In this report, a Special Rapporteur of UNHCR discussed the development of AWS and posited that these weapons raised serious ethical concerns as robots can make decisions on life and death on behalf of humans.[128] Then, about ten NGOs led a campaign to stop the advancement of killer robots under the banner of Human Rights Watch, they demanded a comprehensive pre-emptive ban on the development, production, and deployment of these weapons.[129] In 2014, the first multilateral international discussion was carried out on LAWs, in this discussion, the member states of CCW decided to begin yearly debates on LAWs. The

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125 ICRC, "Treaties and States Parties to Such Treaties: Methods and Means of Warfare," International Committee of the Red Cross, accessed July 2024, https://ihl-databases.icrc.org/en/ihl-treaties/treaties-and-states-parties.

126 ICRC, "Treaties and States Parties to Such Treaties: Methods and Means of Warfare," International Committee of the Red Cross, accessed July 2024, https://ihl-databases.icrc.org/en/ihl-treaties/treaties-and-states-parties.

127 Michael Schmitt, JS Thurnher, "Out of the Loop: Autonomous Weapon System and the Law of Armed Conflict," *Harvard National Security Journal 4*, no. 2, (2013): 231-281.

128 Christopher Hynes, "Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions," UN Doc. A/HRC/23/47, 17, (9 April 2013).

129 Human Rights Watch, "Losing Humanity: The Case against Killer Robots," 2012.

aim of this discussion is to prohibit or restrict the use of specific types of weapons that can cause unnecessary or unjustifiable harm to combatants or civilians.

Later, in 2016, it was decided to establish a group of governmental experts to address the question associated with emerging technologies, especially in terms of LAWs. There comes a point of divergence of opinion some states advocated for a full ban, some for negotiating a treaty, and totally opposed these two opinions. Likewise, states that have advanced weapons and invest in an arms race to get military superiority such as the US, UK, Australia, South Korea, Russia, India, Türkiye, and Israel, staunch rejection manifested by these states for negotiating a new CCW protocol or any treaty or a pre-emptive ban, they advocated for research and development.[130] On the other hand, thirty states have agreed to ban these weapons while Austria, Brazil, and Chillie recommended establishing new regulations and a certain degree of control while deploying these types of weapons.[131] China only advocated for the treaty and not a full ban while it is spending heavily to acquire this advanced technology in its military arsenal.[132]

In 2018, Antonio Guterres – Secretary General of the UN urged to put a ban on AWS as "these machines with the power and the decision to take the lives of people without human intervention is unacceptable and morally repugnant."[133] The European Parliament also passed a resolution to ban LAWS that was agreed by 82% of member states.[134] Another opinion merged, with the passage of time, to enhance human control over machines or balance between both. In 2019, the member states of CCW agreed to reflect their consensus to have human-machine interaction.[135] Human control is one of the main elements where states showed their interests and agreed to focus their collective work on it. Moreover, ICRC recommends the states adopt new legally binding rules or treaties to ensure that human

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130 Brian Stauffer, "Stopping Killer Robots: Country Positions on Banning Fully Autonomous Weapons and Reataining Human Control," Human Rights Watch (2020).

131 Brian Stauffer, "Stopping Killer Robots: Country Positions on Banning Fully Autonomous Weapons and Reataining Human Control," Human Rights Watch (2020).

132 Brian Stauffer, "Stopping Killer Robots: Country Positions on Banning Fully Autonomous Weapons and Reataining Human Control," Human Rights Watch (2020).

133 UN Secretary-General, "Autonomous Weapons that Kill must be Banned," insists UN chief (2019). https://news.un.org/en/story/2019/ 03/1035381.

134 European Parliament, *European Parliament Resolution of 12 September 2018 on Autonomous Weapon Systems,"* (2018), 2752(RSP). https://www.europarl.europa.eu/doceo/document/TA-8-2018-0341_EN.html.

135 CCW Report, "Group of Conventional Experts on Emerging Technologies in the Area of Lethal Autonomous Weapon System," *Report of the 2019 Sessions* (Geneva: UNODA, 2019), 25-29 March and 20-21 August 2019, CCW/GGE.1/2019/3.

control and judgment are sufficiently required, and active human supervision for timely intervention and deactivation.[136] It also urges putting limits on the types of targets (only military targets), and situations of use (where civilian objects or civilians are not present) while deploying these weapons.[137]

Again in 2023, the UN Secretary-General pleaded to member states to negotiate a legally binding treaty to ban the AWS that functions without human intervention, and is not in compliance with the IHL, and also to regulate other types of AWS. He claims that the design, development, and production of these weapons raise various concerns and threaten human rights and fundamental freedom.[138] Despite all these debates for the ban or regulation of AWS, the US Department of Defense reviewed its report on AWS and maintains its former position with a slight change from a human operator to an only operator.[139] This reviewed directive further entails that the DOD is putting emphasis on distancing humans from these weapons against the IHL, ICRC, Human Rights Watch, and states that are advocating for 'meaningful human control'. Valadares and Barbosa say the new directive substitutes human operators with only operators and maintains a lower level of human-machine interaction as opposed to other states.[140] All these events raised regulating AWS as an important issue at the international level. Still, there is no consensus found yet to establish new laws or treaties to regulate these weapons.

The next chapters highlight the significance of AWS in an armed conflict, along with their ethical/legal implications.

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136 ICRC, "ICRC Position on Autonomous Weapons," International Committee of the Red Cross, (May 2021).

137 ICRC, "ICRC Position on Autonomous Weapons," International Committee of the Red Cross, (May 2021).

138 UN, "Lethal Autonomous Weapons," Statement of SG of UN, Office of Disarmament Affairs, (2023).

139 US, Department of Defense, "*Directive 3000.09, Autonomy in Weapon System,"* (Washington, DC: DOD 2012).

140 Lutiana Valadares, Fernandes Barbosa, "Exploring the US 2023 directive On Autonomy in Weapon System: Key Advancements and Potential Implications for International Discussions," *CEBRI Journal 2,* no. 9, (2024): 117-136.

Chapter 4

MILITARY NECESSITY OF AWS

This chapter provides a complete analysis and findings of the first dependent variable (military Necessity). The analysis presented in this chapter is based on the themes extracted from the data collected from structured interviews. The detailed structured interviews of respondents from the selected sample size provided a significant understanding of the military necessity or advantages of the utilization of autonomous weapons in armed conflict. The research incorporates thematic analysis with an aim to elaborate the perspectives of the military and legal experts on the given topic focusing on the theme of military necessity. The sub-themes of the main variable are elaborated below in Figure 4.1.

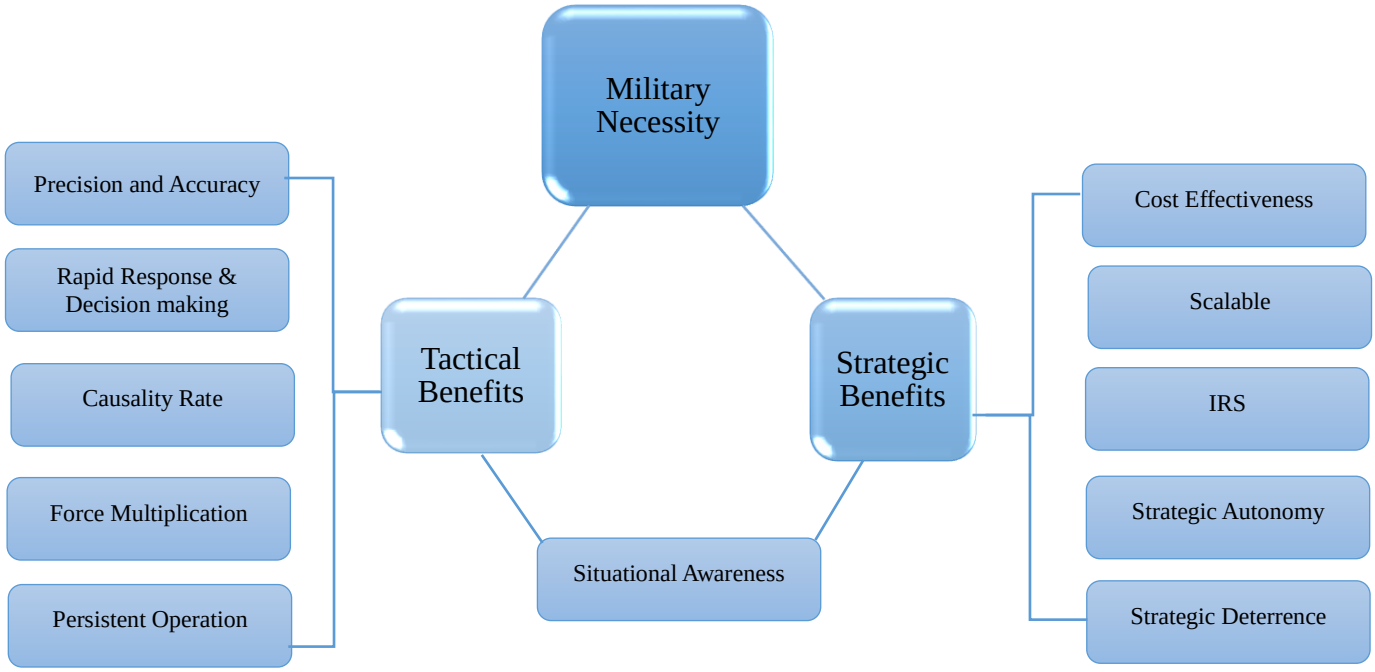

Figure 4.1: Identified Sub-themes of Military Necessity

4.1 Military Necessity

Military Necessity is the fundamental principle in the justification of any warfare. It is a principle of the law of armed conflict that justifies the use of force during any armed conflict

only to achieve the military objective. The indispensable measures for securing the goals/ends of wars are known as military necessity.[141] Similarly, Michael N. Schmitt argues that military necessity ensures the complete submission of the enemy with the least resources i,e. time, life, and cost.[142] However, the recent revolution in military affairs has advanced the conduct of war. In the past, the states used various tactics of war to achieve their military objectives. To date, these military objectives are achieved by the introduction of gun powders, firearms, mechanization, railroads, aircraft, etc. The development of nuclear weapons and advancement in computing and information technology, in actual, revolutionized the concept of war. Nevertheless, in the contemporary warfare era, the RMAs are driven by artificial intelligence and autonomous systems to achieve military necessity. The AWS is transforming changes in the conduct of warfare with key significance in enhancing efficiency, precision, accuracy, and strategic capabilities.[143] This section aims to explain the deployment of the AWS in any armed conflict meets the criteria of military necessity by analyzing the operational effectiveness of the AWS incorporating both tactical and strategic benefits to bring advancement into the conduct of war.

4.1.1 Operational Effectiveness

Operational effectiveness in any armed conflict is an essential component for the military forces to achieve their tactical and strategic goals while reducing the threats and risks with evolving situations of the battlefield and manifesting the desired impact. Similarly, the operational effectiveness of the AWS is deeply rooted in their capability of deployment in armed conflict with greater precision, persistency, and efficiency as compared to conventional weapons. In this regard, the advancement of the AWS proved to be revolutionary in military affairs. As Ajey Lele says, AWS offers ample advantages for the militaries, these weapon systems have the potential of being 'faster, better, cheaper.'[144] The tactical and strategic benefits of the AWS for any armed conflict are discussed in the succeeding paragraphs.

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141 L. Bakaki, "The Scope of Military Necessity, "*War Crimes Memoranda,* no. 124 (2007).

142 Michael Schmitt, "Military Necessity and Humanity in International Humanitarian Law: Preserving the Delicate Balance." (2021).

143 Ahmad Khan, "Artificial Intelligence and Challenging Nature of Warfare." *Strategam* 1, no. 2 (2018): 57-71.

144 Ajey Lele, "Debating Lethal Autonomous Weapon Systems." *Journal of Defence Studies* 13, no. 1 (2019): 51-70.

4.1.1.1 Tactical Benefits

Autonomous Weapons System (AWS) has the ability to provide significant tactical benefits to the military forces by enhancing operational effectiveness in armed conflict. These systems provide precision with persistence on the battlefield. The AWS can be operated fully autonomously or with little human intervention to enable soldiers to have rapid response time with effective decision-making. Furthermore, the integration of advanced sensors and pre-programming allows AWS to perform tasks in complex missions. As, it is said that robots are intelligent like humans and have the ability to operate in all domains whether it is trained for it or not.[145] This uniqueness of AWS has enabled the forces to engage with the adversary forces in a more strategic way, meanwhile; maintaining superiority in an evolving battlefield environment. AWS provides several tactical advantages to the military in an armed conflict.

To begin with, AWS significantly enhances the precision and accuracy of targeting enemy positions or objects in combat operations. With the utilization of advanced integrated sensors, AWS can easily identify, locate, and engage enemy targets with accurate precision. This thing further ensures minimum collateral damage and exacerbates the rate of success of the mission in an armed conflict. Andrew Salerno says there is one area that can provide benefit to military goals with the usage of AWS is precision targeting with minimum collateral damage.[146] These weapon systems use huge amounts of data in real-time for rapid response to target position that surpasses human capabilities. Also, the high degree of accuracy provided by the process of data analysis in real-time ensures that the weapon delivers munitions with pinpoint precision, with a reduction of the threat of unintended damage leading to achieving the military objective. One of the respondents reported that "AWS can increase accuracy and precision in any armed conflict with minimum loss of life and collateral damage due to its ability to pinpoint targeting."[147] This cutting-edge technology not only provides efficiency in the mission but also allows strategic maneuvers within the changing conditions of the battlefield. Another respondent says AWS allows strategic maneuvers in evolving battlefield conditions with continuous operation in terms of speed, accuracy, and precision.[148]

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145 Marco Kovic, "The strategic paradox of Autonomous Weapons." *Zurich Institute of Public Affairs Research*, Policy Brief, February 2018.

146 Andrew S. Garthwaite, "Precision Weapons and Preventing Collateral damage," Global Defense Technology, April 2023.

147 Interview with Respondent 1, Military officer, 28 April 24.

148 Interview with Respondent 4, Military officer, 29 April 24.

In addition to this, AWS also offers rapid response and decision-making capabilities to the military forces in an armed conflict. The battlefield environment in any armed conflict is supposed to be complex and requires swift reaction in minimum time, especially, when there is a high-stake operational situation and time is considered crucial to determine the impact of the outcome of the target. AWS has the capability to analyze huge amounts of data to further assess the threats in the given environment and make rapid- precise decisions by data processing ability. Marko Kovic acknowledges the positive outcomes of autonomous weapons on the battlefield, in essence, these weapons have the capabilities to make complex decisions like humans either soldiers on the grounds or commanders-in-chief in the decision-making chain of the military.[149] AWS can provide a comparative advantage over the adversary in this case by utilizing a rapid decision-making process enabling forces to neutralize the emerging threats effectively and further adapt to the evolving circumstances of the battlefield.

One of the respondents stated:[150]

> AWS has exceptional decision-making abilities, these weapons can identify, track, and pinpoint targets by not only showing the exact image of the target but also suggesting the type of weapon to be used. Apart from that, AWS assists commanders on the ground in making decisions by showing COP (Common Operating Picture).

Thereby, AWS enhances the success of the combat mission in an armed conflict with a decisive edge. Also, in situations where there are communication gaps or disruptions with the command center. These weapons ensure continuity in the mission and maintain operational momentum even when there is a communication breakdown, or in the case of electronic warfare being employed by the forces of the enemy. Another respondent argues, "I believe that even in times of communication breakdown, AWS can make faster decisions with a complete evaluation of risks and opportunities to gain comparative advantage on the battlefield."[151]

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149 Marco Kovic, "The strategic paradox of Autonomous Weapons." *Zurich Institute of Public Affairs Research,* Policy Brief, February 2018.

150 Interview with, Respondent 3, Military officer, 29 April 24.

151 Interview with, Respondent 6, Military officer, 1 May 24.

Another important tactical benefit that the AWS provides in the armed conflict is the reduction of the causality rate of the soldiers. AWS can perform high-risk missions in the most dangerous environments where deploying humans is risky due to threatening conditions. Marchant posits that AWS can reduce the causality rate by reducing the involvement of soldiers in threatening environments.[152] As already discussed, AWS provides high-precision and rapid response even in the absence of soldiers ensuring the safety of human lives. AWS can replace human soldiers in dull and dangerous environments, especially in missions/areas of long sorties, bomb disposal, high radioactive materials, and operating in nuclear clouds. The reduction of the involvement of humans directly in the mission not only lowers the rate of casualties but also enables the strategic deployment of soldiers to achieve military advantage in an armed conflict.

A respondent provides several ways how AWS can reduce the loss of human soldiers in any armed conflict:[153]

> The AWS has the ability to reduce the causality rate of soldiers in several ways; first, these weapons can provide troops convoy protection during their mobility from one place to another by avoiding surprise attacks. Second, AWS has now provided us an opportunity to strike the enemy hideouts without deployment of the troops on the ground. Third, these weapons loiter over a target area for long durations for surveillance and assist in identifying potential threats before they become menaces for the soldiers. Fourth, it provides direct force protection meanwhile operating in environments where there is a requirement for soldiers to be deployed and conduct patrols, especially in troubled areas. Last, AWS now can help us identify potential Improvised Explosive Devices (IEDs) in operational areas resulting in significantly reducing the causalities of soldiers in any conflict.

However, as far as the lives of human resources of adversary forces are concerned, the engagement of the AWS increases the casualties. It can inflict harm to the forces of foes at an exceptional level to have a comparative advantage over them. In this regard, another respondent states that "AWS can maximize the causality rate of enemy forces, if it's a

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152 G.E Marchant, Allenby B, Arkin R, Barrett E.T., Borenstein J, Gaudet L.M, "International Governance of Autonomous Military Robots," *Columbia Science & Technology Law Review 12*, (2011): 272-315.

153 Interview with, Respondent 9, Military officer, 5 May 24.

counterattack target, the attack would be directly on the military installations or objects – where there is the possibility of availability of enemy forces. In this case, direct harm can be inflicted which increases the human loss of adversary forces."[154]

Similarly, one of the most important advantages of AWS in tactical operations is enabling itself to act as a force multiplication. These weapon systems have the ability to perform their role traditionally with double impactive power. AWS as a force multiplier amplifies the effectiveness of the small forces.[155] These weapon systems cover more areas to execute complex operations simultaneously while allowing soldiers to be strategically deployed to more critical areas on the battlefield. This capability of the AWS allows military forces to get a higher operational impact with the involvement of fewer human resources. One of the respondents suggests that "AWS allows military units to achieve greater operational impact with fewer personnel, increasing overall combat efficiency and enabling more strategic allocation of human resources to critical areas, ultimately enhancing the military's operational reach and effectiveness."[156]

Moreover, AWS can be operated continuously in armed conflict because of zero fatigue ability as compared to humans leading towards persistent missions. AWS does not require sleep and rest as compared to human soldiers. Michal Klincewicz claims AWS cannot feel stress, fatigue, or pain; they also do not disobey orders; and come back home from war with Post Traumatic Stress Disorder (PTSD).[157] These weapons can also be operated over extended periods to support the mission. Michael Byrnes – US Air Force Captain demonstrates that a single UAV with complete autonomy and accuracy can perform a few hundred rounds of ammunition with sufficient fuel reserves as compared to human pilots who cannot perform long-duration operations.[158] This continuity of their operation further allows them to monitor vast areas in order to assess the threats, gathering of intelligence, and surveillance without any disruption. A respondent asserts that "the continuous operational

154 Interview with, Respondent 11, Legal Expert, 14 May 24.

155 Amitai Etzioni, "Pros and Cons of Autonomous Weapon Systems," *Military Review,* (2017): 72-80.

156 Interview with, Respondent 01, Military Officer, 28 April 24.

157 Michał Klincewicz, "Autonomous Weapon Systems, Asymmetrical Warfare, and Myths," *Civitas. Studia z Filozofii i Polityki* 23, (2018): 179-195.

158 Michael Byrnes, "Nightfall: Machine Autonomy in Air-to-Air Combat," *Air and Space Power Journal 28*, no. 3, (2014): 48-75.

capability of AWS increases situational awareness and rapid response capability which enable commanders to utilize the real-time data for effective decision making."[159]

4.1.1.2 Strategic Benefits

An autonomous weapon system (AWS) allows forces to achieve military objectives by providing strategic advantages with the ability to transform complex operations through advanced autonomation in any armed conflict. The integration of cutting-edge technology in the AWS increases the agility and response capabilities resulting in operational effectiveness on the battlefield. According to Christian Trotti - Assistant Director of Forward Defense at the Atlantic Council, AWS integrated with AI has implications for the conduct of war and deterrence in future conflicts, these weapons can bring revolution in military affairs with the potential to shape future warfare.[160] AWS assists militaries to carry out operations with less reliance on human intervention and more focus on providing situational awareness optimizing the military utility in armed conflict. These weapon systems strategically provide an adaptable military posture that is crucial for engaging in the dynamic security environment.

AWS is cheaper as compared to conventional weapons. The cost-effectiveness element of the AWS allows the military to get a strategic advantage in armed conflict. Nowadays cheaper UAVs and swarms are being manufactured that provide the power of force multiplication during any operation as compared to conventional weapons. Masood and Baid say AWS is cost-effective and can be produced in a shorter period of time as compared to conventional weapons.[161] Similarly, a respondent for this study "illustrates an example of a single Kamikaze drone that is cheaper to acquire but has the capability to destroy expensive tanks or radar systems."[162] In addition to manufacturing costs, AWS requires less manpower for its deployment further reducing the logistic burdens. This capability of AWS results in lower operational costs, enabling the defense budget to be used on other critical areas more strategically. Likewise, another respondent asserts that "if we do a cost-benefit analysis of both conventional weapons and AWS (drones), the latter is cheaper to acquire as compared to

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159 Interview with, Respondent 07, Military Officer, 28 April 24.

160 Christian Trotti, "What Does the Future of Autonomous Warfare Look like? Four Critical Questions, Answered.," Atlantic Council, May 13, 2022.

161 Maryyum Masood and Muhammad Ali Baig, "Potential Impact of Lethal Autonomous Weapon Systems on Strategic Stability and Nuclear Deterrence in South Asia," *Margalla Papers* 27, no. 2 (December 31, 2023): 27–43.

162 Interview with, Respondent 05, Military Officer, 30 April 24.

the F-16 (a conventional weapon)."[163] He further added that "the operational and maintenance cost of AWS is less than half of the cost used to maintain conventional fighter jets and helicopters like Cobras."[164] Additionally, AWS provides high precision and accuracy with doubled impact reducing the number of weapons to be deployed as a single weapon fulfills the demand.

One of the Respondents briefly provides an overview of the cost-effectiveness of AWS:[165]

> Indeed they are more cost-effective than conventional weapons, first and foremost AWS has reduced personnel costs, with minimal human supervision, reducing the need for large numbers of personnel to operate and maintain them, also, using AWS can reduce overall operational costs as well and they have long service life hence saving the national exchequer, moreover, they have reduced maintenance cost as well, apart from all these they also reduce the battle damage including the personnel casualties which in turn is saving cost for medical care, rehabilitation, and replacement of personnel and assets.

Moreover, AWS has the ability of Intelligence, Reconnaissance, and Surveillance (IRS) that streamlines the operation in any armed conflict. These weapon systems are equipped with advanced sensors that enable them to conduct persistent IRS in vast areas where there is no or limited human intervention. Major Andrew William Sanders says swarming drone units that disperse and then vigilantly concentrate critical moments, provide IRS, and have the ability to destroy the target, - these sorts of systems can transform tactical benefits into strategic advantage for the longer run.[166] The AWS can be operated in hazardous or remote environments where it is challenging to deploy human soldiers or involvement of human resources is impractical. These systems especially in those environments can identify, track, and assess activities rapidly target them with high precision and reliability, and provide continuous situational awareness to the commanders. A respondent states that "AWS with its ease and speed of operation, stealth, and robustness, would increase freedom of action in acquiring intelligence pre- and post-action (battle damage assessment), reinforce the protection of the group, and enhance the effect of deception maneuvers against enemy

163 Interview with, Respondent 09, Military Officer, 5 May 24.

164 Interview with, Respondent 09, Military Officer, 5 May 24.

165 Interview with, Respondent 06, Military Officer, 1 May 24.

166 Andrew William Sanders, Drones Swarms, Fort Leavenworth, Kansas, School of Advanced Military Studies, United States Army Command General Staff College, (2017).

forces."[167] The militaries can further monitor the movements of the enemies by utilizing these weapons and increase their decision-making approach more swiftly, resulting in the ultimate success of the mission.

Another respondent says:[168]

> AWS integrated with AI algorithms can process and analyze vast amounts of data from various sources, including sensors, satellites, drones, and reconnaissance platforms. By fusing information from multiple sources, can generate a comprehensive picture of the battlefield, including enemy positions, terrain features, and potential threats. Pattern Recognition (PR) and Anomaly Detection (AD) capability of the AWS enables early detection of potential threats, such as enemy movements or suspicious activities, allowing commanders to take proactive measures to mitigate risks.

Furthermore, AWS - due to their capability to adapt to dynamic operational requirements and needs enables them to provide scalable benefits to the military. The pre-programmed nature of the AWS allows them to be deployed in diverse environments to perform varying tasks from surveillance to direct combat operation and logistical support as compared to conventional weapons. This scalability means that AWS allows itself to be redeployed quickly in order to deal with emerging threats or to adjust to the various varying strategic priorities. Scholars argue that AWS exhibits advanced features of autonomy, scalability, coordination, and redundancy.[169] This capability ensures that the military operation must be responsive and effective. A respondent claims that "AWS can scale operations efficiently as needed."[170] Also, these weapon systems are manufactured to be deployed in layered missions or across multi-domain operations (MDOs) where there is an element of integrated forces or capabilities. The AWS multi-domain operability allows forces to leverage the power of each domain (land, air, sea), to get operational outcomes with coordination and comprehensive strategies. AWS can help in creating data fusion, data coming from different sides (land, air, sea), and ensures data mining techniques. For instance, one of the respondents said "AWS can

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167 Interview with, Respondent 07, Military Officer, 2 May 24.

168 Interview with, Respondent 10, RMA Expert, 10 May 24.

169 Justin Cannon, Jacob Frederick, Jonah Holt, John Pithan, and Matthew Mogensen, "Army Drone Swarms: An Emergent Capability in Multidomain Operations," in *Proceedings of the Annual General Donald R. Keith Memorial Conference*, West Point, New York, USA, May 4, 2023.

170 Interview with, Respondent 13, Weapon Expert, 25 May 24.

support multi-domain operations (MDOs) with surveillance in the air to transfer critical information to the land forces to execute cyber operations by disrupting the communication lines of the enemy simultaneously – providing a unified operational response to the military forces to get a comparative advantage over the adversary."[171]

Strategic autonomy is another significant benefit of AWS. The autonomous nature of the AWS enables military forces to enhance the success rate of the mission by reducing reliance on human operators. Scholars argue that AWS is the best invention as it can limit the involvement of humans in war.[172] Similarly, General Robert Cone suggested that by relying on support robots, the military can reduce the size of a brigade in terms of human resources without compromising the effectiveness of the operation.[173] With AWS, soldiers can only pay attention to take rapid and decisive actions on the battlefield despite fully engaging in the war. A respondent reported "with the usage of AWS strategic autonomy can be achieved in contested environments with a probability of a high success rate, meanwhile, soldiers can be deployed to less dangerous areas."[174]

Another advantageous feature of AWS at the strategic level is to bolster deterrence capabilities. These capabilities can be achieved by strengthening the ability of the military to manifest its power and responsive nature in the theatre to potential threats. AWS offers formidable strategic deterrence because of its rapid deployment, precision, accuracy, and persistence in operations. In addition to this, AWS can be deployed strategically in enforcing the policies of deterrence to be realized by the enemy. This thing further demonstrates a credible response capability against the adversary forces. According to Michael C. Horowitz, AWS increases the stability of deterrence through active signaling.[175] [176] The AWS, due to its independent operability nature, allows swift response against any aggression or coercion; meanwhile, maintaining the deterrence posture by manifesting forces' ability to protect their national interests. One of the respondents states, "that deploying AWS in armed conflict

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171 Interview with, Respondent 06, Military Officer, 1 May 24.

172 S. Umbrello, P. Torres, and A.F. De Bellis, The Future of War: Could Lethal Autonomous Weapons Make Conflict more Ethical?, AI & Society, s. 2, 2019.

173 E Ackerman, U.S Army Considers Replacing Thousands of Soldiers with Robots, *IEEE Spectrum*, (2014).

174 Interview with, Respondent 08, Legal Expert, 4 May 24.

175 The Term **Active Signaling** according to the lens of IR means conveying intentions, capabilities, and resolve to enemy states. This prevents the miscalculations and misunderstandings that can become causes of conflict.

176 Michael C. Horowitz, "When Speed Kills: Lethal Autonomous Weapon System, Deterrence and Stability," *Journal of Strategic Studies* 42, no. 6 (2019): 764-88.

offers strategic benefits such as integrating battlefield information for enhanced Command, Control, Communications, Computers, Intelligence, Surveillance, Target Acquisition, and Reconnaissance (C2ISTAR), based on their active monitoring and predictable response, it further ensures any aggressive response taken by the enemy will be swiftly countered, enhancing deterrence capabilities."[177] Besides this, a credible deterrent posture reduces the likelihood of retaliation by the adversary to escalate the conflict thus ensuring stability in a contested environment.

4.1.1.3 Iran-Israel Missile Exchange: A Case Study

The recent Iran-Israel missile exchange incident involved extensive use of both autonomous and semi-autonomous weapons. This incident highlights the exacerbating significance of AWS in modern armed conflict. The missile exchange was started on April 13, 2024, when Iran launched a layered onslaught attack against Israel with more than 300 drones and 120 missiles including both ballistic and cruise missiles.[178] This attack was a retaliatory strike under "Operation True Promise" for Israel's attack on the Iranian diplomatic Base on April 18, in Damascus killing seven key official personnel of the Islamic Revolutionary Guard Corps (IRGC).[179] In response to this attack, Israel again conducted airstrikes inside Iranian territory targeting several areas including Isfahan and Tabriz. The aim of using this case study is to examine how AWS deployed by both states ensuring military necessity.

Iran used a significant number of drones including Shahed-131, and Shahed-136 variants that have the capability of autonomous flight and precision targeting with built-in warheads – a relatively cheaper to manufacture.[180] [181] Along, with these drones, Iran deployed Paveh cruise missiles with semi-autonomous features for navigating and targeting further allowing them to follow a flight path that assists them in evading the defenses of a hostile state. On the other hand, Israel used its' state-of-the-art Iron Dome, a semi-autonomous defense system. Nimran says Israel's Iron Dome has been operational for more than a decade is now uses significant

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177 Interview with, Respondent 13, Weapon Expert, 25 May 24.

178 Susannah George, Samuel Granados, Laris Karklis, Nilo Tabrizy, "What Iran's Attack on Israel Revealed about its Weapon Arsenal," The Washington Post, April 17, 2024,

179 Alexander Palmer, Daniel Bayman, Seth G. Jones, Joseph, S. Bermudes, "Assessing Israel Strikes on Iran," Center for Strategic and International Studies, May 3, 2024.

180 Shaan Sheikh, "The Iran-Israel Air Conflict, in One Week," Center for Strategic and International Studies, April 19, 2024.

181 Brian Barrett, "How Israel Defended Against Iran's Drone and Missile Attack," Wired, April 13, 24.

AI Algorithms to improve system accuracy."[182] And an Arrow missile defense system to defend against the attack of Iran on its territory.[183] Likewise, the retaliatory strikes conducted by Israel involved precision-guided missiles with the ability to target autonomously with high accuracy.

As far as the strategic benefits are considered, the use of fully autonomous and semi-autonomous systems allowed Tehran to launch a coordinated large-scale attack with precision and accuracy simultaneously ensuring no collateral damage or damage to any civilian object. Furthermore, these weapons provided an opportunity for Iran to execute complex attacks with limited human intervention. This strategy ensures no risk to soldiers, meanwhile, surging the operational flexibility. Also, using a large number of these weapons, demonstrated Iran's credible deterrence capability at the international level with the showcase of advanced military technology. Similarly, Tel Aviv also gained strategic benefits by deploying fully and semi-autonomous weapon systems. These systems enabled Israel to effectively and efficiently defend its territories. Only the Iron Dome system intercepted and neutralized a significant number of Iranian drones and missiles in the air, further protected the civilian objects, and ensured no collateral damage. Nimran states Iron Dome's success rate is more than 90 percent with low operating costs.[184] Giving the upper hand to Israel, as with the usage of these weapons for defense it gained strategic control over conflict to avoid unnecessary escalation.

The usage of AWS in the Iran-Israel missile exchange has broader implications. The deployment of the AWS stabilized deterrence dynamics for both states. Each state's ability to carry out offensive and defensive attacks ensured de-escalation. Also, this missile crisis highlighted the significance of acquiring AWS to maintain a technological edge in case of a conflict. In this regard, both Tehran and Tel Aviv demonstrated to the world that having AWS is crucial for strategic superiority and territorial security. In addition to this, the utilization of AWS in this incident enhanced the operational efficiency with no direct involvement of humans in any combat missions or armed conflicts. However, every invention has pros and

182 Ruth Mark Eglash, "Israel's Advance Military Technology on Full Display During Iran's Attack," Fox News, April 18, 24.

183 Shaan Sheikh, "The Iran-Israel Air Conflict, in One Week," Center for Strategic and International Studies, April 19, 2024.

184 Ruth Mark Eglash, "Israel's Advance Military Technology on Full Display During Iran's Attack," Fox News, April 18, 24.

cons, and AWS is no exception. Therefore, the next chapter discusses the ethical/legal implications of AWS.

Chapter 5

ETHICAL AND LEGAL IMPLICATIONS OF AWS

This chapter provides an in-depth analysis of the second dependent variable of the study (ethical/legal Implications). The analysis presented in this chapter is based on themes taken from the primary data collection. The structured interviews of the military and legal experts provided useful insights on the given variable. This chapter provided a thematic analysis to highlight the most significant ethical and legal implications associated with the usage of AWS in an armed conflict. The identified sub-themes of the main variable (ethical/legal Implications) are illustrated in Fig 5.1 below.

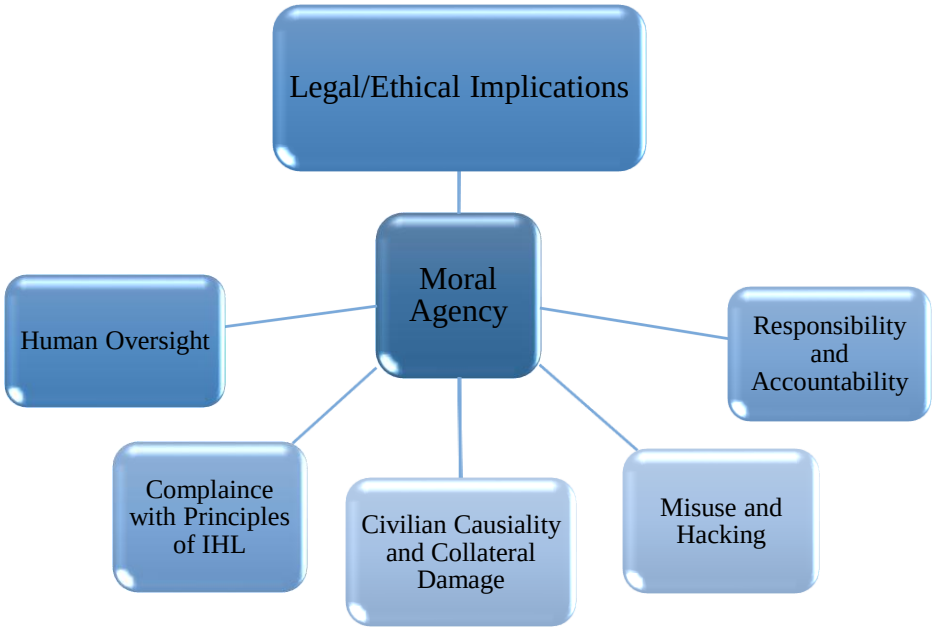

Figure 5.2: Identified Sub-themes of Ethical/Legal Implication

5.1 Ethical/Legal Implications of AWS

Armed conflict is a complex phenomenon with grave implications recognized by the states and international bodies globally. The emergence of Autonomous Weapon Systems (AWS) has revolutionized the concept of armed conflict. The advent of AWS has further raised the questions of morality, and justice, and leaving decisions of life and death to the machines. Moreover, the accountability of the authorities using these weapons and their non-compliance

with the IHL has complicated the ethical and legal concerns of the armed conflict. The ethical aspect of armed conflict delves into the question of morality, justice, and fair conduct of the affairs. On the other hand, legal frameworks include all the laws and regulations imposed by international bodies for the conduct of the war and the protection of the civilian population. This section discusses the ethical and legal implications of the AWS in armed conflict.

5.1.1 Moral Agency

The term moral agency encompasses the ability to make ethically sound decisions and hold responsible and accountable to people for their vicious actions. Initially, moral agency is only attributed to humans who have the ability to comprehend and process complex moral landscapes. According to the Kantian Ethics theory, moral agency is predicted based on rational principles and the ability to perform actions with a complete sense of duty taken from the categorical imperative. The emergence of the AWS has challenged this traditional concept of moral agency, in terms of combat missions, as they are designed to be operated with limited or no human involvement. AWS is not able to make ethically sound decisions due to the absence of rationality. They lack the capability to comprehend and apply moral principles. Taddeo and Blanchard argue meaningful moral responsibility only falls in the jurisdiction of humans willing to take moral gambit and not with the AWS due to their unpredictable nature.[185] However, as already mentioned in the previous section, AWS has the capability of identifying and targeting autonomously based on pre-programmed algorithms and real-time data processing features. No matter if they can engage the target with precision and accuracy, they lack the ability to feel emotions and ethical reasoning prior to targeting as these abilities are only engraved in human beings. Jacky M. Stanhope argues that AWS has no dynamic thinking and emotional intelligence (EQ) in AWS, raising serious concerns regarding their ability to make ethically sound decisions in case of war.[186] Moreover, leaving the death and life decisions solely on AWS in the absence of moral reasoning is a highly contentious issue. This further means that taking the life of any human does not hold them accountable for their actions. Likewise, in case of faulty data or misuse of AWS, the consequences are grave leading to civilian causality and collateral damage. As Paddy Walker suggested AWS

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185 Mariarosaria Taddeo and Alexander Blanchard, "Accepting Moral Responsibility for the Actions of Autonomous Weapon Systems – A Moral Gambit," *Philos Technol 35*, no. 78, 2022.

186 Jacky M. Stanhope, "Opposing Inherent Immorality in Autonomous Weapon System," The Forge, April 6, 2021.

calculates new possibilities with real-time data that can be governed by an error function.[187] Similarly, AWS cannot systematically classify an object into any specific category, its processes review everything as a small number of characteristics. Not only this, but AWS, unlike human soldiers lacks ethical considerations and judgment in the execution of their actions. They cannot weigh moral dilemmas such as distinguishing between combatants and non-combatants. Also, they are not supposed to consider the element of proportionality while carrying out any attack. There is a serious concern that AWS is not in compliance with the principles of the IHL. AWS are not All these limitations of AWS undermine their ability to be deployed in warfare. The succeeding paragraphs give a detailed analysis of each element for better understanding.

5.1.1.1 Accountability and Responsibility

The Autonomous Weapon System (AWS) has a serious concern when it comes to the responsibility and accountability of the individuals directly involved in its functioning. The AWS are programmed to perform their activities with limited or no human intervention. This semi or full autonomy gives rise to questions of who is responsible for the unintended harm or war crimes in any armed conflict. Furthermore, in the case of full autonomy, putting blame on an individual is unjustified for the actions of machines. Nevertheless, the traditional legal framework is absent to deal with such scenarios where there is limited or no human involvement with the dealing of technology in armed conflict. The software running this technology is not developed and operated by one individual to be held responsible. AWS, by design, has a lot of human agents who are responsible for their functioning and operation. Christopher Heyns – UN Special Rapporteur has identified individuals who could be responsible and held accountable for their war crimes such as the software developers, manufacturers, dealers, sellers, military commanders, technicians, operators, and states who authorize them to be used.[188] One of the respondents reported "that with the increase of people developing, operating, and deploying AWS, the process of attribution becomes complex and raises a question of the accountability of their actions."[189] As far as this problem

[187] Paddy Walker, "Leadership Challenges from the Deployment of the Lethal Autonomous Weapons: How Erosion of Human Supervision Over Lethal Engagement Will Impact How Commanders Exercise Leadership." *The RUSI Journal* 166, no. 1, (2021): 10–21.

[188] Christopher Heyns, 'Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions', UN Doc. A/HRC/23/47, 17, 9 April 2013.

[189] Interview with, Respondent 02, Legal Expert, 28 April 24.

of attribution is concerned, then who is responsible for the actions of AWS in case of violations or war crimes? Developer, programmer, state, or command?

Let's start with the developer and operator, the accountability of both of them is a very crucial issue to be discussed. Developers have produced these weapons with the aim of operational effectiveness and bringing advancement in the conduct of war more efficiently. As discussed, AWS provides ample advantages in the combat mission and ensures overall operational success. Developers are creating AWS to work faster than humans with great speed and accuracy to revolutionize warfare. However, it is a logical argument that if someone is holding a developer accountable for the war crimes committed by AWS should equally hold the developer of other conventional weapons. But it has never happened in the past nor is it easy in the future, especially in the absence of any law. Sparrow posits that if one has to hold responsible developer of the AWS for war crimes once it becomes autonomous, it's like holding parents responsible for the actions of their children once they become adults.[190] Similarly, Human Rights Watch stated that one cannot hold a developer responsible for any harm or injury only if, (i) the specifications of the AWS not approved by the state, (ii) the weapon confirmed to those specifications, and (iii) the developer not intentionally fail to address the states acquiring weapon about its expected danger.[191] As one of the respondents reported, "you cannot ask the manufacturers to stop developing AWS because of the consequences we are going to face in the absence of no legal provision enacted especially for them."[192] Keeping all this in view, holding developers or manufacturers responsible for the actions of AWS is challenging. On the other hand, operators are responsible for deploying and overseeing the activity of the AWS. But this responsibility is given to them by the commander or state. They are acting as supervisors to check their operations to some extent. Putting direct responsibility for the ill conduct of AWS on them is not justifiable. Another respondent states that "the operator is compelled to follow the instructions of the commander without any choice left for them, as reported by a respondent."[193]

The other important individual entity that can be held responsible is the commander. The commander or superior of the military has full control over their subordinates. In case, (if) he

190 Robert Sparrow, "Killer Robots," *Journal of Applied Philosophy 24,* no. 1, 2007.

191 Human Rights Watch, "Making the Case: The Danger of Killer Robots and the Need for Pre-emptive Ban," June 16, 2016.

192 Interview with, Respondent 11, Legal Expert, 14 May 24.

193 Interview with, Respondent 1, Military officer, 28 April 24.

found any of them committing wrong – he has a duty to take action against him. According to Article 28 of the Rome Statute regarding the responsibility of commander or superior, the act states: "A military person who is acting as an active commander of the military shall be criminally responsible for the crimes within his jurisdiction of the court committed by the forces under his direct command and control or in case of failure to do so…"[194] Moreover, another situation arises when the commander is not aware or is not in direct command for the execution of the mission, he cannot be held responsible or accountable. Also, in the case of fully autonomous weapons or human-out-of-loop or in case of communication gap the machines make rapid decisions without the need for any approval, if this situation occurs the active control of the commander diminishes as well as the chance of holding him responsible. A respondent stated, "when the weapon is fully autonomous or due to its fast-processing nature, nothing can be done to stop it leading to ineffective control that cannot be questionable."[195]

States are acquiring modern weapons for the purpose of deterrence in this unpredictable world. Many states are developing and using AWS but there are few considerations regarding the ethical and legal implications when it comes to its use. Geiss stated an interesting point that states directly commissioned the AWS into their militaries, human beings are in charge of the deployment of AWS, but accountability can be determined only based on the established rules.[196] In this regard, IHL provides no legal exact rule for the operation of AWS and in case of holding responsible to any entity. Even IHL is insufficient to regulate the AWS, based on two reasons, the permissive nature of IHL due to military necessity, and the structural lack of IHL to deal with the challenges arising from this novel issue and method of armed conflict.

Another respondent illustrates the issue of accountability with the usage of AWS:

> As far as accountability is concerned, none can be blamed for it because there is no legislation enacted. For instance, Israel is targeting the Gaza Strip because according to their intelligence, they think Hamas is hidden in tunnels

194 Rome Statute of the International Criminal Court, Article 28, (Responsibility of Commander and Other Superior), July 17, 1998.

195 Interview with, Respondent 02, Legal Expert, 28 April 24.

196 Robert Geiss, "Autonomous Weapon System: Risk Management and State Responsibility," Third CCW meeting of experts on Lethal Autonomous Weapon System (LAWS), Geneva, April 11-15, 2016.

under the hospitals or public places – this excuse makes them not accountable for their ethical violations."[197]

In view of the above discussion, it can be stated that there exist accountability gaps that lead towards impunity for unlawful acts and disregarding the trust in terms of deploying AWS in armed conflict.

5.1.1.2 Human Oversight

The advent of AWS in warfare is unacceptable as it removes the human sight from killing human beings. Human control is significant for the use of any weapon that is supposed to take human lives. In the presence of human oversight, moral responsibility, accountability and adherence to the principles of the Law of Armed conflict (LOAC) is possible.[198] Meaningful human control assists in maintaining the traditional concept of ethical sound reasoning by humans in terms of making decisions aligned with moral values and standards. According to ICRC, machines cannot feel compassion, but humanity is all about compassion for others and the ability to protect.[199] Not only this, human control for the use of AWS is highly crucial when it comes to the point of attribution liability that is being missed when human-is-out-of-loop. A respondent says "humans have their own value on the battlefield that cannot be neglected."[200] Another troublesome thing associated with AWS is analyzing the consequences in the absence of human oversight. When there is no human operator the impact of the AWS on any target object cannot be visualized. Jack emphasizes the importance of human control by stating that when a missile is fired the operator estimates the impacts it will cause and then makes decisions whether or not to activate it.[201] But without human involvement, those estimations cannot be calculated sensibly. Furthermore, removing human oversight in deploying AWS erodes human dignity. Robotic weapons are not sensible to comprehend the element of respect even in the killing. They cannot distinguish between an object and a human while targeting them. Allowing machines to make decisions about when

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197 Interview with, Respondent 10, RMA Expert, 10 May 24.

198 Human Rights Watch, "Making the Case: The Danger of Killer Robots and the Need for Pre-emptive Ban," June 16, 2016.

199 Larissa Fast, "Unpacking the Principle of Humanity: Tensions and Implications," *International Review of the Red Cross* 97, no. 897/898, (2016): 111–131.

200 Respondent 12, Legal Expert, 18 May 2024.

201 Jacky M. Stanhope, "Opposing Inherent Immorality in Autonomous Weapon System," The Forge, April 6, 2021.

and where to attack humans turned them into mere objects only, they are treated as targets, not humans. One of the respondents claims that "one cannot fully rely on AWS as they are not cognitive – there is a chain of command involved in proper decision-making in any armed conflict but again due to the absence of human oversight, it's hard to blame any one entity."[202] In the absence of robust human oversight, it is not possible to deploy AWS responsibly and lawfully.

5.1.1.3 Misuse and Hacking

Autonomous Weapon Systems are prone to misuse and hacking presents serious ethical concerns for their deployment. AWS are robots or machines integrated with AI, their programable nature poses risks of misuse and hacking. AWS can intentionally be misused by both state and non-state actors for carrying out their vicious activities including targeting civilian populations, committing war crimes, or conducting terrorist attacks. Jonathan Kwik claims malicious actors (state/non-state) taking advantage of AWS, using them for political gains or ethnic killings.[203] Their autonomous uniqueness makes it easier for them to be deployed without human involvement resulting in untraceable attacks. Moreover, AWS is also vulnerable to cyberattacks and hacks that lead to loss of control and uncertain behavior. Brian Hall says AWS are vulnerable to spoofing, hacking, and intrusive deception as they lack mindfulness, sensibility, and exact frame of reference to assess faculty data.[204] A respondent says "reliance on AWS on digital systems or network connectivity causes vulnerabilities of cyberattacks that lead to excessive human causalities."[205] Also, non-state or other malicious actors can take advantage by manipulating these weapons to redirect them to target deliberately places of civilians or cause collateral damage. As Brendan Munro states by exacerbating the levels of electronic and digital components in weaponry, states surge the opportunities for its enemy to hack or takeover them in a manner that is unimaginable.[206] This misuse and hacking of AWS ensures that their deployment or proliferation does not adhere to ethical or legal standards. Furthermore, the proliferation of AWS raised the potential risk that

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202 Interview with, Respondent 10, RMA Expert, 10 May 24.

203 Jonathan Kwik, "Mitigating the Risk of Autonomous Weapon Misuse by Insurgent Groups," *LAWS 12*, no. 1, (2015): 5.

204 Brian K. Hall, "Autonomous Weapon System safety," *Joint Force Quarterly 86,* (3rd Quarter 2017): 86-93.

205 Respondent 09, Military Officer, 5 May 24.

206 Brendan Walker Munro, "Can Autonomous Weapon Systems be Seized? Interactions with the Law of Prize and war Booty, *Journal of Conflict and security Law 29,* no. 1, (Spring 2024): 143-163.

these advanced technologies could fall into the hands of malicious or insurgent groups to use them for destructive purposes. Philip Chertoff posits that non-state actors do not have any need to consider distinction or proportionality in their terrorist attacks, for them, this destructive-indiscriminate violence is an ultimate goal because this act of brutality increases fear and intimidation – their main strategy of the mission.[207] The respondent states that "the fast pace-evolution of AWS at a rapid pace is out-passing the legal frameworks and regulatory mechanisms of war."[208] In this regard, the proliferation of the AWS is legally violating the LOAC standards.

5.1.1.4 Civilian Causality and Collateral Damage

Autonomous Weapon Systems (AWS) pose devastating risks to the civilian population and can cause collateral damage. AWS lacks sensible judgment in order to identify, assess, engage, and differentiate between civilian objects and non-civilian objects. Johnson and Axinn claim that AWS struggles with judgments because they are not human.[209] The target can result in an attack on any civilian object or infrastructure leading to a significant number of causalities. Similarly, AWS is pre-programmed and uses algorithms and sensors to operate. In case of faultiness, they cannot be able to adapt to the complex and evolving combat environment. This situation can result in misinterpretations and unintended consequences. A respondent mentioned that "in case of faultiness, these weapons are not able to differentiate between an actual target, a civilian or a target not supposed to be engaged."[210] For instance, the case, where a civilian holding non-threatening objects during crossfire could be wrongly considered a combatant by the robotic weapon. Josef Ansorge states, that under the challenging conditions of illegibility and disfluency, data can be assessed to an unprecedented degree in order to identify the actual target or predict this person can be one.[211] In addition to this, AWS being a machine does not possess any emotions or feelings. These weapons due to their insensitive nature can cause higher human costs of military operations. Lack of morality

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207 Philip Chertoff, "Peril of Lethal Autonomous Weapon System Proliferation: Preventing Non-State Acquisition," *Geneva Center for Security Policy,* no. 2, (October 2018).

208 Interview with, Respondent 09, Military Officer, 5 May 24.

209 Aaron M. Johnson, Sidney Axinn, "The Morality of Autonomous Robots," *Journal of Military Ethics 12,* no. 2, (2013): 137.

210 Interview with, Respondent 12, Legal Expert, 18 May 2024.

211 Josef T. Ansorge, "*Identify & Sort: How Digital Power Changed World Politics*," (London: C. Hurst & Co., 2016), 523.

leads to potential destruction that outweighs the possible ethical outcomes of AWS.[212] Likewise, in a scenario, where there is a space being occupied by both civilians and combatants, AWS would not be able to differentiate between them and this circumstance leads to collateral damage. Another respondent says "AWS is prone to cause excessive civilian causality due to their lack of sense to avoid incidental harm to the civilians and their infrastructure."[213] This detachment of AWS from human beings exacerbates the risks to the lives of the civilian population and their property.

5.1.1.5 Compliance with IHL Principles

The deployment of AWS raises serious concerns about compliance with the principles of International Humanitarian Law (IHL). IHL is a branch of international law that deals with the code of conduct of war. IHL sets rules and regulations of war to limit the destruction and suffering during armed conflict.[214] It basically regulates the conduct of parties participating in the war (*Jus in Bello)* and the lawful use of force (*Jus ad Bellum).*[215] Similarly, IHL has formulated some basic principles for the conduct of war that impose limits on the suffering of humanity and destruction. Every conflicting party has to comply with these principles (humanity, distinction, proportionality, military necessity, and precaution). With the development of advanced technologies, AWS, there is an ongoing debate regarding their non-compliance with the IHL. As Article 36 Additional Protocol (I) of the Geneva Convention states "the contracting parties prior to the development or deployment of the advanced technologies or weapons must be in compliance with the IHL.[216] Dieter Flex says, as far as AWS is concerned the problem is twofold: AWS's non-compliance with the principle of distinction and non-compliance with the principle of proportionality.[217] Even the respondent claims the same thing, he stated, that AWS violates every principle of IHL but distinction and

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212 Kari Zaccharias, Ketra Schmitt, "Note for National defense: Ethics of Lethal Autonomous Weapons," *MINDS,* (August 2021).

213 Respondent 08, Legal Expert, 4 May 24.

214 ICRC, "What is International Humanitarian Law?," International Committee of Red Cross, 2022.

215 ICRC, "What is International Humanitarian Law?," International Committee of Red Cross, 2022.

216 United Nations, *Geneva Convention Relative to the Protection of Civilian Persons in Time of War (Fourth Geneva Convention),* 1949, accessed July 2, 2024, https://www.un.org/en/genocideprevention/documents/atrocity-crimes/Doc.33_GC-IV-EN.pdf.

217 Dieter Fleck, "*The Handbook of International Humanitarian Law,"* (Oxford: Oxford University Press, 2010), 30.

proportionality are at the top.[218] Therefore, the study discusses these two principles based on data collection (identified themes/sub-themes).

The principle of distinction allows combatants to distinguish between the combatant and non-combatant in the armed conflict.[219] Based on these principles, the conflicting parties cannot deliberately attack the civilian population or infrastructure. The pre-programmed nature of AWS is not able to distinguish between the combatant and non-combatant. Asif Khan argues that AWS identification and targeting of the object is carried out under the control of machines, this weapon cannot discriminate among civilians and non-civilians or enemy, or fighters that have surrendered (*Hors de Combat),* or wounded.[220] A respondent in this regard, reported "while using AWS it sometimes becomes difficult to distinguish between the local populace from terrorists, especially in remote areas or during counter-insurgency operations."[221]

Similarly, the principle of proportionality has key significance like distinction in the conduct of war. It seeks to limit the incidental damage in the armed conflict caused by the combat mission that outweighs the military advantage.[222] This principle allows the conflicting parties to use force that only results in achieving the necessary military advantage and does not cause excessive destruction. AWS is not able to evaluate the concrete and direct military advantage anticipated at the time of the attack. Another respondent says, "proportionality is one of the most violated principles of IHL in the case of AWS."[223]

The legal and ethical implications highlighted the importance of taking stringent measures, robust legal frameworks, and incorporation of human supervision to ensure the lawful use of AWS for better operational effectiveness.

5.1.1.6 Russia-Ukraine War: A Case Study

The Ukrainian-Russian conflict is one of the most prominent examples of modern warfare displaying the exacerbated utilization of AWS. Both sides have been using AWS extensively

218 Interview with, Respondent 10, RMA Expert, 10 May 24.
219 ICRC, "How Does Law Protect in War?," International Committee of Red Cross, 2022.
220 Asif Khan, "*Autonomous Weapons and Their Compliance with International Humanitarian Law*," (LLM Diss., International Islamic University), 2018.
221 Interview with, Respondent 07, Military Officer, 28 April 24.
222 ICRC, "How Does Law Protect in War?," International Committee of Red Cross, 2022.
223 Interview with, Respondent 12, Legal Expert, 18 May 2024.

to get a comparative advantage over each other.[224] On the Ukrainian side, Bayraktar TB2 drones have been deployed. These drones are manufactured by Turkiye and equipped with laser-guided bombs with the aim of carrying out precision strikes and ISR operations. These drones have been playing a crucial role in shaping the outcome of the confrontation. Ukrainian Ministry of Defense revealed that these drones have destroyed a total of 180 enemy tanks, 670 armored vehicles, and 130 artillery systems.[225]

Russian forces, on the other hand, have been utilizing different types of drones including Orlan-10, Shahed -136, and KUB-BLA loitering munitions. Orlan-10 has been used for gathering intelligence regarding the mobilization and positions of the Ukrainian troops. KUB-BLA are used as engaging targets, they are equipped with warheads, and once detected the target, they do a crash landing on it acting as suicide drones. Also, semi-autonomous missile systems (Kalibr Cruise missiles) are also being used in this conflict by the Russian forces for precision targeting.[226] Russia has been using these AWS to target power stations, urban areas, and other civilian objects especially to deprive Ukraine of electricity and power.

The extensive deployment of AWS in the Russian-Ukraine conflict has raised serious questions of ethical and legal implications. One of the most troublesome issues associated with the usage of these drones is an increased in causality rate. There have been many incidents where these drones stuck un-combatants resulting in a number of deaths. The surging rate of civilian deaths raises questions on the legitimacy of using such technology that is causing unintended civilian harm outweighing military advantages. Furthermore, the usage of AWS results in non-compliance with the IHL. The increased causality rate indicates that these weapons are violating the principle of distinction and proportionality. In this regard, the unintended harm to civilians also raises issues of responsibility and accountability, as actions cannot be attributed to any one individual clearly. The Russia-Ukraine war is a significant example where these weapons are making decisions in the absence of the human element to use lethal force further undermining human dignity raises a concern for establishing international legal frameworks to regulate these weapons.

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224 Tetyana Malyarenko, David Galbreath, "The Ukrainian-Russian War: A Case Study in the Ethics and Law of Autonomous Weapon Systems," *Journal of Military Ethics 20,* no.1, (2021): 54-70.

225 Damian Varela, "The Role of Autonomous Weapon in Ukrainian-Russian Conflict: A Critical Analysis," UOC, June 2023, https://uoc.edu/edcp/es/the-role-of-autonomous-weapons-systems-in-the-ukrainian-russian-conflict/.

226 Russian Defense Ministry, "Report on the Use of Artificial Intelligence in Military Operations," http://mil.ru/files/files/ai_report_2020.pdf.

CONCLUDING DISCUSSIONS

This chapter presents the synthesis of this research by highlighting the main findings of the three research questions. It presents the assessment, in light of the theoretical framework and findings of the three main research questions, with the hypothesis. Based on the assessment of the pre-existing literature available on autonomous weapon systems, this study formulated a hypothesis with the aim of explaining the current status of AWS, along with its advantages and implications. The emergence of autonomous weapons (AW) has revolutionized the concept of contemporary warfare. However, as it said everything has its advantages and disadvantages, and AWS has no exception to it. The advent of the AWS is not only bringing advancement in the conduct of wars but also poses serious ethical/legal implications as well.

The current status of the AWS discussed the comprehensive understanding of the topic with key advancements of the technology in different domains of the military. The study presented two main definitions of the AWS given by the DOD and ICRC. Based on these definitions, the study derived its own definition that is incorporated throughout the study for further explanation of the variables by keeping in view the theoretical framework. Moreover, the study provided three main types of AWS based on the level of autonomy and human control: semi-autonomous weapons, human-supervised weapons, and (lethal) autonomous weapons. In addition to this, the classification of AWS has also been discussed based on its transformative impact on the conduct of warfare. Each type or classification has a unique point in consideration that overall increases the operational effectiveness in combat missions. This advancement supports the hypothesis that AWS offers significant military necessity for contemporary militaries. However, on the other side, the same advancement poses ethical/legal implications in warfare as there are no laws and regulations exist to deal with them.

The main purpose of this study is to explain the military necessity of AWS. As far as it is concerned, primary data collected from military officers and legal experts suggest that AWS enhances operational effectiveness by discussing the key tactical and strategic advantages that enable the system as compared to conventional weapons provide a greater comparative advantage to forces over their adversary. Likewise, the theoretical framework adopted for this variable is ‘Military Revolutionary Affairs’ posits that technological advancement brings

revolution or alteration in military tactics and strategies. In the context of the theoretical framework, it can be said that AWS has the potential to bring a transformative impact on military capability. The strategic importance of the AWS is recognized by data collected from primary sources. These weapons provide significant decision-making and rapid action even in certain operating environments as well as on the battlefield. These weapons give the upper hand in mobilizing assets and dominance in terms of escalation when the opponent is still relying on conventional weapons. Furthermore, a case study (Iran-Israel Missile Exchange) has also been discussed in the context of this variable. This case study also illustrated a crucial role played by the AWS in achieving military advantages. All of this supports the hypothesis of the study that the advent of AWS is, actually, changing the landscape of warfare by conferring notable military advantages.

The secondary purpose of this study is to explain the ethical/legal implications associated with the usage of autonomous weapons in armed conflict. As aforementioned, for the variables primary data is conducted. Based on this data, the study highlighted various ethical/legal challenges. AWS worked on pre-programmed features; it cannot comprehend moral landscapes as humans. Leaving life-and-death decisions on machines leading towards issues of attribution, the decision of responsibility and accountability cannot be associated with the machine. Similarly, AWS is not intelligent like humans to distinguish between the combatant and non-combatant and sense to use the right amount of force, thus violating the IHL principle of distinction and proportionality. In this way, AWS also derogates human dignity which is a serious ethical challenge. Moreover, in terms of theoretical context, Kantian Ethics theory talks about the moral agency that is predicted based on rational principles and the ability to perform actions with a sense of duty taken from the categorical imperative. Kantian standards of ethics say any action must be guided by maxima and that it must be universally applicable, must respect human dignity, and must be able to follow the sense of duty, in terms of AWS, as the adoption of these weapons is resulting in morally unacceptable standards, killing humans without responsibility and accountability, and also violating principles of IHL – their utilization is morally unethical as per the Kantian ethics standards. Also, all these findings underline the notion that AWS has serious ethical/legal implications, thus supporting the hypothesis of the study.

The adoption of the RMA and Kantian Ethics theories for this study provides an in-depth understanding of the dual impacts of autonomous weapon systems in an armed conflict. The

analysis of the primary data ensures that AWS offers substantial military utility or advantages in combat missions while posing profound ethical/legal implications. The key findings of the research ensure their alignment with the hypothesis and theories that the advancement of autonomous weapon technology has strategic advantages for the military, ethical dilemmas for humanity, and legal challenges for the states. Moreover, the analysis reveals that there is a consensus when it comes to the transformative impacts of AWS for combat missions, on the other side, grave concerns regarding the regulations of AWS to ensure ethical usage and in case of war crimes, proper accountability.

The synthesis highlights the importance of the human factor that can strengthen and address the significance of AWS for both military efficacy and ethical concerns. As technological advancement is on surge likely chances of extensive use of lethal autonomous weapons will be increased. In order to create a balance between military necessity and avoiding ethical/legal implications, it is crucial to get humans in the loop. It will further ensure the responsible deployment of AWS in an armed conflict.

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APPENDIX A

PLAGIARISM REPORT

AWS Thesis written by Dua Shahid, Supervised by Dr, Ansar Jamil.docx

ORIGINALITY REPORT

8%	7%	4%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	dokumen.pub Internet Source	<1%
2	slidelegend.com Internet Source	<1%
3	link.springer.com Internet Source	<1%
4	dergipark.org.tr Internet Source	<1%
5	hdl.handle.net Internet Source	<1%
6	law.unimelb.edu.au Internet Source	<1%
7	harvardnsj.org Internet Source	<1%
8	www.cfc.forces.gc.ca Internet Source	<1%
9	Submitted to Middlesex County College Student Paper	<1%

APPENDIX B

INTERVIEW QUESTIONS

Main Questions

Military Necessity

1. In what ways, do you think AWS can increase the effectiveness and efficiency of military operations in armed conflict as compared to conventional weapons?
2. What roles does AI play in providing situational awareness and capabilities of decision-making for the commanders?
3. How does the usage of AWS in armed conflict enhance the military utility to deal with emerging threats and evolving battlefield conditions?
4. What are the key tactical and strategic benefits of deploying AWS in armed conflict?
5. Do you think AWS serves as a force multiplier in armed conflict and reduces the casualty rate of soldiers?
6. What do you think AWS is more cost-effective than conventional weapons? Provide a brief comparison.

Legal/Ethical Implications

1. From your perspective, what are the key legal and ethical challenges associated with the usage of AWS in armed conflict?
2. From an ethical perspective, what are the main considerations and concerns surrounding the use of AWS in armed conflict, particularly regarding the moral agency, accountability, and decision-making capabilities of autonomous systems?
3. Do you think AWS violates legal principles of International Humanitarian Law IHL such as proportionality, distinction, and precaution in the context of military operations?
4. Considering the technological capabilities of AWS and its relevance to International Humanitarian Law (IHL), can you please comment on what are the key challenges and limitations in ensuring compliance with legal norms and principles during armed conflict situations?