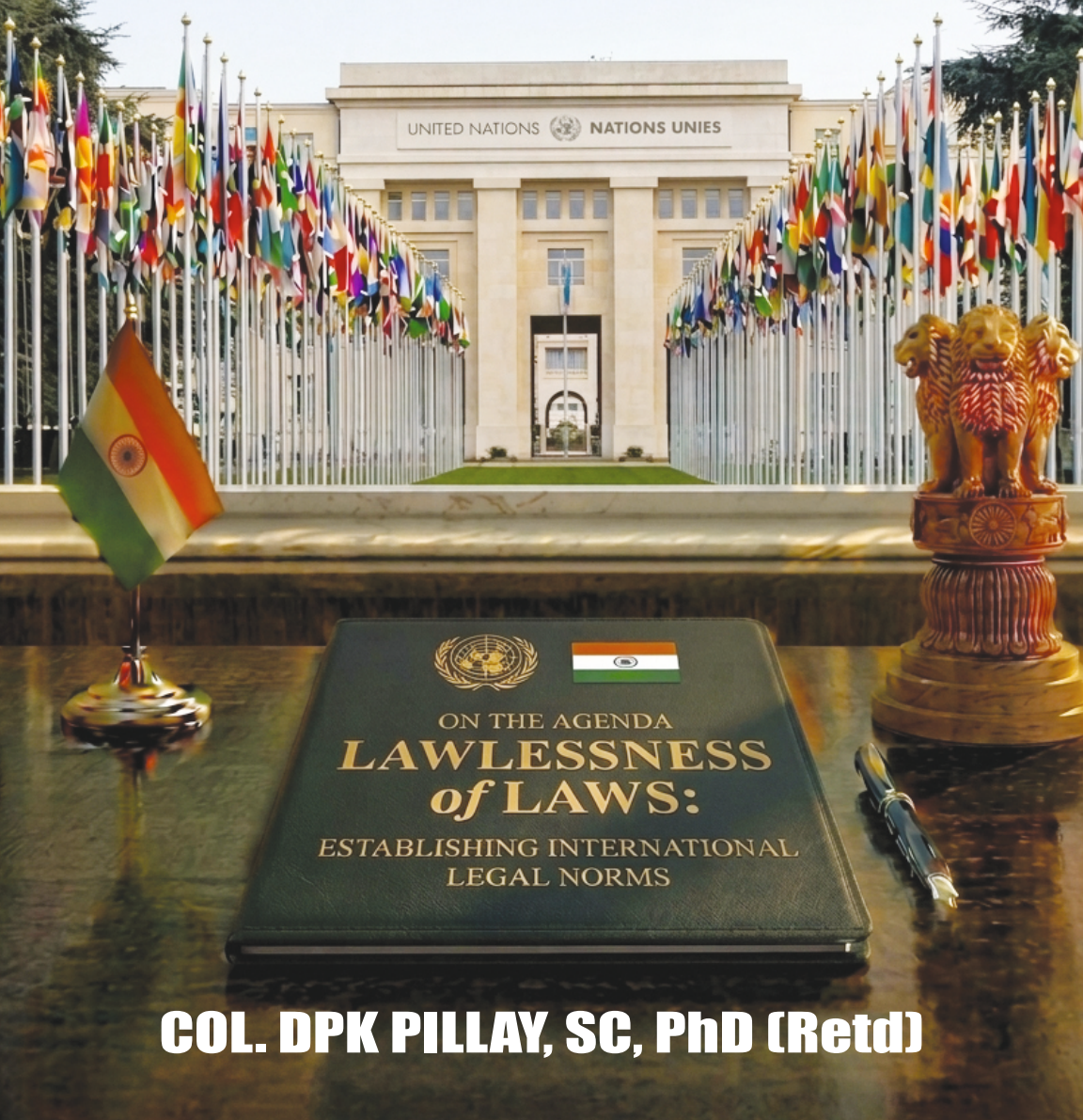


Lethal Autonomy in the Age of AI

Intersection of History, Technology and International Law



COL. DPK PILLAY, SC, PhD (Retd)

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LETHAL AUTONOMY IN THE AGE OF AI

INTERSECTION OF HISTORY,
TECHNOLOGY AND
INTERNATIONAL LAW

DPK PILLAY



MANOHAR PARRIKAR INSTITUTE FOR
DEFENCE STUDIES AND ANALYSES

मनोहर पर्रिकर रक्षा अध्ययन एवं विश्लेषण संस्थान

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PREFACE

The question of how to control extraordinary military power and who should bear responsibility for its use is an eternal civilisational dilemma. Today, the digital battlefield has compressed sensor-to-shooter timelines and increasingly delegated elements of decision-making to weapon systems operating at machine speed. We are therefore confronted with this enduring dilemma from an unprecedented perspective. As combat operations become more automated and the tempo of warfare increasingly outpaces human cognition, the space for meaningful human judgement and moral restraint may narrow to a dangerous degree.

As this monograph goes to press, the international discourse on Lethal Autonomous Weapon Systems has reached a critical juncture. Following the concluding session of the Group of Governmental Experts (GGE) in Geneva in September 2026 and the Preparatory Committee meetings for the Seventh Review Conference, attention now turns to the Seventh Review Conference of the Convention on Certain Conventional Weapons (CCW) in November 2026. The discussions of 2026 have further developed areas of convergence concerning human involvement and judgement, accountability, legal review, testing and evaluation, reliability and predictability, human-machine interaction, training and lifecycle considerations. The Review Conference will now determine the way forward for the international process. This makes the preparation of national positions, negotiating teams and institutional expertise particularly important.

My interest in this arena was ignited years earlier when I played a modest role representing the Ministry of Defence and the Indian delegation at the United Nations Office at Geneva for CCW meetings and the Third Review Conference of the CCW. Building our strategy from the ground up for these high-stakes diplomatic engagements was a formidable task, especially since participation in a Review Conference requires formal Plenipotentiary Powers to negotiate, review and adopt legal instruments on behalf of the Republic. The role also required extensive

task, especially since participation in a Review Conference requires formal Plenipotentiary Powers to negotiate, review and adopt legal instruments on behalf of the Republic. The role also required extensive inter-ministerial coordination and a detailed understanding of the issues involved, as national obligations and legal ramifications extended well beyond the conference room. This experience came in handy during my subsequent tenure at the National Security Council Secretariat (NSCS). In 2017, when India assumed the chairmanship of the newly established CCW Group of Governmental Experts on LAWS, I was tasked by Dr. Arvind Gupta, the then Deputy National Security Advisor, to coordinate and compile our national position paper. This required building consensus through inter-ministerial consultations and engaging with leading experts. We also consulted the Indian private sector engaged in cutting-edge research in this field. India stood in a crucial and delicate position: seeking to prevent an unregulated military landscape while balancing legitimate defence requirements with an unwavering commitment to International Humanitarian Law.

Later, I had the distinct privilege of serving as the first Indian Armed Forces delegate and Military Adviser to the After Action Reviews for humanitarian action in Iraq, Syria and Yemen. This role afforded me considerable exposure to the work of the International Committee of the Red Cross and its critical advocacy for International Humanitarian Law. That experience further strengthened my conviction that the future of warfare must remain firmly connected to humanitarian principles.

What I witnessed firsthand was the meticulous preparation undertaken by other nations across deeply divided geopolitical blocs, as well as the role played by the ICRC and international non-governmental organisations in shaping the emerging normative debate. Delegations from states possessing advanced technologies were concerned with preserving their technological and strategic advantages, while non-possessor states, states seeking to shape emerging norms, and advocacy organisations pursued differing approaches, including proposals for prohibition. Countries taking the lead in weapon-ban initiatives, often supported by well-resourced civil society organisations, arrived with teams of legal advisers, technical specialists and policy experts. They participated extensively in informal consultations and parallel meetings.

Operating with a comparatively lean footprint, our delegation carried a substantial analytical burden. This experience made me realise that India needed greater institutional preparedness for the rapid pace and specialised nature of negotiations concerning emerging military technologies. It also highlighted the importance of institutional memory and continuity of expertise.

I realised, moreover, that there was no comprehensive handbook available to orient a newcomer to this highly specialised field. Confronted by specialists applying different technical, legal, diplomatic and doctrinal methodologies, it takes considerable time to master the complex lexicon, procedural architecture and rigorous preparation required for negotiations concerning emerging military technologies. I therefore wrote this monograph not only to examine LAWS as a subject of technological, operational, legal and strategic importance, but also to help bridge this institutional and knowledge gap.

The monograph brings together the technological, operational, legal, diplomatic and strategic dimensions of autonomous weapon systems. It examines the evolution of military autonomy, the development and application of International Humanitarian Law, the international debate within the CCW, the work of the ICRC, contemporary state practice and operational experience. It also examines the changing nature of human judgement when military decisions are increasingly mediated by algorithms and machine-generated information.

This monograph has improved considerably from its original shape, and I owe this to the rigorous review process undertaken by those who examined its various stages. I owe a special debt of gratitude to my reviewers. My sincere thanks go to Ambassador Debnath Shaw, under whom I served when initially tasked with representing the Ministry of Defence at the CCW, as well as Dr. Anupam Ray, who served as India's Ambassador and Permanent Representative to the UN Conference on Disarmament in Geneva and steered India's engagement at the CCW until very recently. Their guidance has been indispensable.

I also extend my deepest appreciation to Major General Manoj AR, Additional Judge Advocate General of the Indian Army; the officers of the Directorate General of Military Operations, particularly MO4; and Ms. Garima Singh of the National Security Council Secretariat;

whose invaluable remarks have greatly shaped the operational and legal precision of this book.

I am deeply grateful to the Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA) for providing the opportunity, institutional resources, and vibrant intellectual ecosystem that made this study possible. My sincere gratitude goes to the Director General and the Deputy Director General of the Institute for their steadfast encouragement, institutional support, and guidance throughout the preparation and production of this work.

I owe a special debt of gratitude to Dr. Uttam Sinha for his enduring support and intellectual camaraderie. I am immensely thankful to Dr. Samuel Cherian and Dr. Rajeesh Kumar for painstakingly reading every page of the manuscript and offering incisive critiques and valuable suggestions. I also extend my heartfelt appreciation to all my colleagues and peers who patiently engaged with multiple drafts and enriched this study with their insights.

My sincere thanks to Ms. Geeta, Mr. Virender Singh Negi, and the publication/DTP section for their meticulous work on the layout and production. I am equally grateful to Mr. Pitambar, along with Mr. Mukesh and Ms. Hitakshi and, the entire Library staff for their dedicated assistance with archival and research resources.

If I have inadvertently left out anyone who contributed along the way, it is purely an inadvertent omission and entirely unintentional. This work stands as a testament to the collective support of the MP-IDSA community, providing the foundation to continue building critical scholarship on the future of warfare and international law.

LIST OF ABBREVIATIONS

ACTUV	Anti-Submarine Warfare Continuous Trail Unmanned Vessel
AI	Artificial Intelligence
APT	Advanced Persistent Threat
ARPA	Advanced Research Projects Agency
ARPANET	Advanced Research Projects Agency Network
ASPI	Australian Strategic Policy Institute
AWS	Autonomous Weapon Systems
BWC	Biological Weapons Convention
C4I	Command, Control, Communications, Computers and Intelligence
CCW	Convention on Certain Conventional Weapons
CIWS	Close-In Weapon System
CSET	Center for Security and Emerging Technology
CWC	Chemical Weapons Convention
DARPA	Defense Advanced Research Projects Agency
DoD	Department of Defense (US)
DoDD	Department of Defense Directive (US)
DSS	Decision Support Systems
GGE	Group of Governmental Experts
GPS	Global Positioning System
ICRC	International Committee of the Red Cross
IDF	Israel Defence Forces
IHL	International Humanitarian Law
IP	Intellectual Property

ISR	Intelligence, Surveillance, and Reconnaissance
LAWS	Lethal Autonomous Weapon Systems
Lt Col	Lieutenant Colonel
MIT	Massachusetts Institute of Technology
NATO	North Atlantic Treaty Organization
NORAD	North American Aerospace Defense Command
NPT	Non-Proliferation Treaty
OODA	Observe-Orient-Decide-Act
PLA	People's Liberation Army
PRC	People's Republic of China
TTP	Thousand Talents Plan
UAV	Unmanned Aerial Vehicle
UCAV	Unmanned Combat Aerial Vehicle
UGV	Unmanned Ground Vehicle
UK	United Kingdom
UN	United Nations
UNGA	United Nations General Assembly
UNODA	United Nations Office for Disarmament Affairs
US	United States
USV	Unmanned Surface Vehicle
UXO	Unexploded Ordnance

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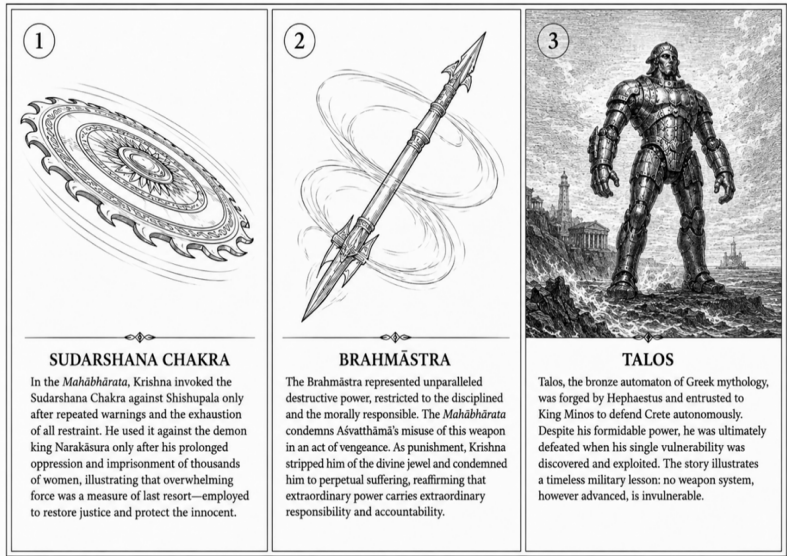
INTRODUCTION

AN ENDURING CIVILISATIONAL DILEMMA: HUMAN ETHICS AND JUDGEMENT IN WARFARE

The question of how extraordinary military power should be controlled and who should bear responsibility for its use is one of humanity's oldest civilisational dilemmas. Long before the emergence of International Humanitarian Law (IHL) or Artificial Intelligence (AI), societies grappled with the challenge of reconciling military necessity with ethical restraint and human responsibility. India's epic traditions recognised that the legitimacy of overwhelming force depended not merely upon the power of a weapon but upon the wisdom, character, and responsibility of the individual authorised to employ it. The Sudarshana Chakra, the divine discus wielded by Lord Vishnu had an extraordinary ability to track and to unfailingly strike its intended target. Similarly, the Brahmastra,¹ represented a weapon of immense destructive power, capable of causing devastation far beyond conventional warfare. It could be invoked only by a select few who had undergone rigorous discipline and possessed the requisite spiritual knowledge, and its use was reserved for the gravest of circumstances. The Mahabharata reinforces these ethical constraints through Aswathama's misuse of the Brahmastra in an act of vengeance following the Kurukshetra War. For this grave transgression, Krishna stripped him of the divine jewel, depriving him of his higher status and divine protection, and condemned him to wander the earth in perpetual suffering. The punishment underscored that extraordinary military power carried equally extraordinary moral responsibility and that its misuse attracted severe personal accountability. In modern terms, the emphasis lay not merely on possession of the weapon but on the ethical judgement, responsibility, and accountability of the individual authorised to employ it.²

The idea of autonomous guardians has existed in human imagination for millennia. Greek mythology describes Talos, a bronze automaton forged by Hephaestus and entrusted to King Minos to defend the island of Crete. Although ultimately defeated when his single vulnerability was discovered and exploited, Talos illustrates a timeless military reality: no weapon system, however advanced, is invulnerable, and every technological advantage invites countermeasures from determined adversaries. Separated by geography, culture, and millennia, both Indian epic tradition and Greek mythology recognised enduring truths that remain relevant today: extraordinary military capability demands responsible human judgement, and no technological superiority remains unchallenged for long. Contemporary debates on AI-enabled and autonomous weapon systems therefore represent the latest expression of these enduring civilisational challenges rather than an entirely new ethical dilemma.

Figure 1.1: Human Judgement and Extraordinary Military Power Across Civilisations



Source: Prepared by the author using OpenAI’s generative AI tools. This conceptual illustration is a creative rendering and does not claim historical authenticity or exact representation.

WHEN MACHINES WERE WRONG AND HUMANS WERE RIGHT: THE ENDURING VALUE OF HUMAN JUDGEMENT

In 1983, Lieutenant Colonel (Lt Col) Stanislav Petrov of the Soviet Air Defence Forces stood at the threshold between catastrophe and restraint. Inside the Serpukhov-15 bunker, the Soviet early warning system reported what appeared to be an incoming United States (US) nuclear strike. Protocol demanded immediate escalation, but Petrov judged the warning to be a false alarm. He was right. Often described as the Petrov Precedent,³ the incident remains one of the clearest demonstrations of the importance of human judgement in decisions involving the use of force. Similar failures occurred elsewhere. In 1980, a faulty electronic chip in the North American Aerospace Defense Command (NORAD) early warning system falsely indicated a large-scale Soviet missile attack, triggering strategic alerts across the United States.⁴ Likewise, during the 1995 Norwegian rocket incident, a scientific research launch was misinterpreted by Russian early warning systems as a possible nuclear strike, prompting activation of the Cheget⁵ nuclear briefcase before the threat was correctly identified.⁶

These episodes reveal a common lesson. Catastrophe was avoided not because the systems were infallible, but because human decision makers questioned, delayed, and ultimately restrained automated warnings. Collectively, they demonstrate that as military decision making becomes increasingly automated, the margin for error narrows. In that narrowing space, human judgement, characterised by contextual reasoning, doubt, and restraint, remains the final safeguard against irreversible catastrophe.

THE CHANGING CHARACTER OF WARFARE: TECHNOLOGICAL INNOVATION AND MEANINGFUL HUMAN JUDGEMENT

Understanding why meaningful human judgement remains central to the contemporary debate on autonomous weapon systems requires an appreciation of how military technology has evolved. Artificial intelligence did not emerge in isolation; it represents the latest stage in a long process through which technological innovation has progressively transformed the character of warfare.

Every major technological innovation has not merely introduced new weapons but has altered the tempo, scale, and character of warfare. From the rifled musket and machine gun to radar, precision-guided munitions, and network-centric operations, successive military revolutions have rewarded those who adapted most rapidly while rendering established doctrines obsolete. Many technologies that later became indispensable to civilian life including the Global Positioning Systems (GPS), the Internet, and intelligent digital assistants originated in military research. Artificial intelligence⁷ represents the latest stage in this long trajectory of technological transformation. Unlike earlier innovations, however, AI promises not simply to improve the performance of weapons or platforms but to augment decision-making itself by enabling machines to perceive, learn, analyse, and recommend courses of action at speeds beyond unaided human cognition.

The attraction of autonomy follows directly from these developments. Modern warfare increasingly unfolds at speeds and scales that challenge human cognition. Vast streams of sensor data, compressed decision timelines, hypersonic threats, and contested battlespaces create pressure for faster and more efficient decision-making. Military planners therefore view artificial intelligence as a means of processing information, identifying patterns, and supporting operational responses at a pace beyond unaided human capability. The pursuit of autonomy is consequently not merely a technological ambition but a strategic response to the accelerating tempo of contemporary warfare.

Although AI is often presented as a revolutionary development, the pursuit of autonomous military capability is not new. Its lineage can be traced to early automated systems such as naval mines and torpedoes. Once deployed, these systems operated without further human intervention, responding to predefined physical triggers or guidance mechanisms rather than exercising any independent judgement. Although autonomous in a limited functional sense, they remained bounded by simplicity, executing predetermined responses within tightly constrained environments. For decades, such technologies were largely confined to what military doctrine termed the “dull, dirty, and dangerous” spectrum tasks unsuitable for human endurance or safety.⁸ Unmanned aerial vehicles (UAVs), exemplified by the MQ-1 Predator

and MQ-9 Reaper, initially functioned as surveillance platforms and remotely piloted strike systems, retaining a human firmly “in the loop”.

Artificial intelligence represents a fundamental departure from these earlier forms of automation. Whereas traditional automated systems execute pre-programmed responses, AI-enabled systems can analyse data, recognise patterns, learn from experience, and support increasingly complex decisions under changing operational conditions. However, it cannot exercise moral judgement, understand context in the human sense, or assume legal responsibility for the consequences of its decisions. Nor is it influenced by human emotions, whether constructive, such as compassion and empathy, or destructive, such as fear, anger, hatred, and revenge. The challenge, therefore, is not to develop machines that replicate human judgement, but to ensure that increasingly autonomous systems remain subject to responsible human judgement, discretion, and accountability in decisions involving the use of force.

A BROAD EVOLUTION OF MILITARY AUTOMATION AND ARTIFICIAL INTELLIGENCE IN WEAPONS

The enduring principle that responsibility for the use of force rests with human judgement has remained constant even as military technology has evolved. Understanding how contemporary autonomous weapon systems emerged therefore requires an appreciation of the gradual evolution from simple automation to increasingly sophisticated AI-enabled autonomy. Automation executes pre-programmed responses, whereas AI-enabled systems can analyse data, recognise patterns, learn from experience, and support increasingly complex decisions. Autonomy, in turn, refers not to intelligence itself but to the degree of independence with which a system performs its assigned functions. Distinguishing these concepts is essential because many automated or autonomous systems are not intelligent, just as many AI-enabled systems continue to operate under meaningful human judgement and control. Table 1.1 summarises this technological evolution, tracing the progression from early rule-based automation to contemporary AI-enabled military systems and illustrating how the role of human judgement has evolved alongside advances in autonomy. The representative systems included are illustrative rather than exhaustive and are intended to introduce the broad technological concepts that underpin the discussion.

Table 1.1: Evolution of Military Automation and Autonomy in Weapon Systems

Period	Representative System	Degree of Autonomy	Human Role	Operational Characteristics
Late 19th–Early 20th Century	Naval and Land mines	Fixed-rule automation	Human deploys; no further control	Activated automatically by contact, pressure, magnetic influence, or proximity after deployment.
Early–Mid 20th Century	Homing torpedoes	Limited autonomous guidance	Human launches weapon	Followed acoustic, wake, or other signatures using predefined guidance logic.
Second World War	Proximity-fuzed munitions	Automatic detonation	Human selects target and fires	Sensors triggered detonation when within lethal range of a target.
Cold War	- Phalanx CIWS ⁹	- Tactical automation	- Human activates and supervises defensive systems;	- Automatically detected, tracked, and engaged incoming threats within predefined parameters.
	- Patriot Air Defence System ¹⁰	- automated engagement with human oversight.	- Human authorisation normally retained for engagement decisions;	- Radar-guided detection, tracking, and interception of aircraft and missile threats.
	- Oko ¹¹	- automated early warning system requiring human assessment and judgement.	- Human assessment required before escalation	- Automated missile detection and warning

1990s–Present	MQ-1 Predator ⁹ and MQ-9 Reaper ¹⁰ UAVs	Remotely operated	Human in the loop	Human operators controlled navigation, target selection, and weapons release, supported by automated flight functions.
2000s–Present	Unmanned Ground and Maritime Systems like Sea Hunter	Semi-autonomous navigation	Human supervision	Autonomous mobility and obstacle avoidance with human control over mission objectives.
Current era	AI-enabled ISR (e.g., Project Maven ¹¹) Collaborative Autonomous Systems (e.g., Skyborg ¹² , drone swarms ¹³ , Semi-autonomous sentry systems (e.g., South Korean SGR-AI) ¹⁴ , Loitering munitions (e.g., Harop, ¹⁵ Switchblade, ¹⁶ Lancet ¹⁷)	AI-assisted decision support, semi-autonomous navigation, collaborative autonomy, and autonomous target engagement	Human supervision, mission planning, authorisation, and varying degrees of operational oversight depending on system design and doctrine	AI increasingly supports target detection, sensor fusion, threat prioritisation, navigation, intelligence analysis, collaborative operations, and, in some emerging systems, autonomous target selection and engagement with limited or no further human intervention after activation.
	Note: The representative systems included in this table are illustrative examples selected to demonstrate the broad technological evolution from rule-based automation to AI-enabled autonomy. They are neither exhaustive nor intended to imply that all systems within a particular period exhibit identical levels of autonomy or human control.			

Source: Prepared by author using OpenAI's generative AI tools

As Table 1.1 illustrates, the evolution of military technology has been characterised by a gradual progression from rule-based automation to increasingly autonomous and AI-enabled systems. While earlier generations of military technology primarily assisted human operators, advances in machine learning,²¹ sensor fusion,²² and real-time data processing²³ have enabled systems capable not merely of assistance, but of independent target identification, selection and engagement. This represents a qualitatively different stage in the evolution of military technology, where AI can support not only perception and analysis but, in some cases, independent target identification, selection, and engagement with limited or no further human intervention once activated. These developments have given rise to an emerging class of Lethal Autonomous Weapon Systems (LAWS) capable of compressing the observe–orient–decide–act (OODA) loop²⁴ into algorithmic cycles measured in milliseconds. As autonomy increases, the role of the human operator progressively shifts from that of an active decision maker to a supervisor or, in some configurations, merely an observer of machine-generated decisions.

Thus, this transformation is no longer theoretical. Military establishments across the world have already integrated artificial intelligence into a growing range of operational systems. For instance, Project Maven, listed in the preceding table, employs machine learning algorithms to analyse intelligence, surveillance, and reconnaissance (ISR) data. Other programmes, such as Skyborg, autonomous naval vessels such as Sea Hunter, and emerging drone swarm concepts illustrate the growing military reliance on algorithmic decision support and autonomous capabilities. China has invested extensively in AI-enabled military intelligence, surveillance, and command-support systems, while Israel has operationally integrated AI-assisted systems for intelligence analysis, target generation, and operational planning. Some of these systems, including The Gospel and Lavender, have generated significant legal and ethical debate and are examined in detail in a later chapter. The ongoing Russia–Ukraine conflict has further demonstrated the operational significance of these technologies through the extensive employment of unmanned aerial systems, AI-assisted intelligence, electronic warfare, autonomous navigation, loitering munitions, and increasingly sophisticated drone swarms. Thus, the debate surrounding

LAWS is not about a distant future, but about technologies that are already reshaping contemporary warfare.

Against this backdrop, the monograph examines whether existing legal and ethical frameworks are capable of regulating weapon systems that can identify, select, and engage targets with decreasing levels of human intervention. It explores the historical relationship between technological innovation and evolution of International Humanitarian Law (IHL); analyses contemporary state approaches to autonomous weapons; and evaluates whether meaningful human control can remain a viable safeguard in an era of increasingly intelligent machines. At its core, the study asks whether the delegation of lethal decision making to algorithms represents merely another stage in the evolution of warfare, or a fundamental challenge to the legal and moral foundations upon which the laws of war have been constructed.

The chapters that follow develop this enquiry through a sequential examination of the historical, ethical, technological, legal, humanitarian, diplomatic, and policy dimensions of autonomous weapon systems. Chapter 1 introduces the enduring civilisational dilemma of human ethics and judgement, establishing the central question of how humanity should retain responsibility for decisions involving the use of force as technology increasingly transforms warfare. Chapter 2 traces the historical evolution of International Humanitarian Law (IHL), demonstrating how the law of armed conflict has repeatedly adapted to changes in the character and technology of warfare. Chapter 3 examines the delegation of lethal decision making to artificial intelligence, exploring the emergence of autonomy, the technological foundations of military AI, and the challenge of maintaining meaningful human control. Chapter 4 analyses the application of IHL to autonomous weapon systems, examining how the principles and rules of IHL apply when increasingly complex systems are involved in the selection and engagement of targets. Chapter 5 examines the evolution of international negotiations within the framework of the Convention on Certain Conventional Weapons (CCW) and its role in the wider debate on autonomous weapon systems. Chapter 6 examines the humanitarian framework advanced by the International Committee of the Red Cross (ICRC) and its emphasis on human responsibility, control, and the protection of civilians. Chapter 7 broadens the discussion to international

processes and emerging governance frameworks for artificial intelligence and autonomous weapon systems. Chapter 8 examines India's position on artificial intelligence in warfare and autonomous weapon systems, including its strategic, legal, technological, and diplomatic considerations. Chapter 9 undertakes a comparative assessment of the approaches adopted by major military powers and examines the wider implications for the future governance of autonomous weapon systems. Chapter 10, the Conclusion, synthesises the principal findings of the study, assesses the adequacy of the existing legal and governance framework in addressing increasingly autonomous weapon systems, and sets out recommendations for strengthening human control, accountability, and the protection of humanitarian principles in the age of artificial intelligence.

Notes:

- ¹ The *Brahmāstra* was not an ordinary weapon but a *divyāstra* (divine weapon), whose acquisition required prolonged instruction under a qualified guru, rigorous martial training, spiritual discipline (*tapas*), mastery of sacred mantras, and demonstrated moral character. The wielder was expected not only to learn the mantra for invoking the weapon but also the equally important knowledge of withdrawing or neutralising it, thereby preventing indiscriminate destruction. The epic repeatedly emphasises that the *Brahmāstra* was to be employed only under the gravest circumstances against an adversary of comparable capability and never for personal vengeance or disproportionate use of force.
- ² Aúvatthâmâ, driven by anger and vengeance, invoked the *Brahmāstra* against Arjuna. To neutralise the threat, Arjuna invoked the same weapon. As the impending collision threatened catastrophic destruction of the world, the sages Vyâsa and Nârada intervened and instructed both warriors to withdraw their weapons. Arjuna immediately complied and successfully recalled his *Brahmāstra*, demonstrating the discipline and mastery expected of one entrusted with such extraordinary power. Aúvatthâmâ lacked the knowledge to withdraw the weapon. The episode reinforces an enduring principle: the true qualification to wield extraordinary military capability lies not merely in the ability to employ it, but equally in the judgement, restraint, and knowledge required to terminate its effects.
- ³ At the height of the Cold War, the Soviets designed an early warning radar system meant to track fast-moving threats to increase the chance of reprisal. On September 26, 1983, however, the system, code-named *Oko*, malfunctioned. At around midnight, *Oko*'s alarms rang out, alerting the base of one incoming nuclear missile. The screen read, "LAUNCH", which

was not a warning but an automatic order to prepare for retaliation. Lt Col Stanislav Petrov, recognising the limited number of missiles detected and the lack of corroborating evidence, correctly identified the alert as a system malfunction. His decision to not report the incident to his superiors averted a potential retaliatory nuclear strike and likely prevented a full-scale nuclear war. See Jeffrey Lewis, “The Soviet False Alarm Incident and Able Archer 83”, Center for Arms Control and Non-Proliferation, August 21, 2023, available at <https://armscontrolcenter.org/the-soviet-false-alarm-incident-and-able-archer-83/>, accessed on 05 July 2026. It may also be noted that contemporary scholarship adopts a more cautious assessment, arguing that the available evidence does not conclusively establish that the Soviet Union was on the verge of launching a retaliatory nuclear strike.

- ⁴ “False Warnings of Soviet Missile Attacks during 1979–1980 Led to Alert Actions for U.S. Strategic Forces”, National Security Archive, George Washington University, March 16, 2020, available at <https://nsarchive.gwu.edu/briefing-book/nuclear-vault/2020-03-16/false-warnings-soviet-missile-attacks-during-1979-80-led-alert-actions-us-strategic-forces>, accessed on 05 July 2026.
- ⁵ The Cheget is Russia’s secure nuclear command-and-control briefcase, carried by the President and senior military leadership. It provides secure access to Russia’s strategic nuclear command-and-control network, commonly known as Kazbek, enabling the leadership to receive warning information, communicate with military commanders, and, if required, authenticate and transmit nuclear launch authorisations.
- ⁶ “9 Times the World was at the Brink of Nuclear War—And Pulled Back”, Coalition for Nuclear Disarmament and Peace, September 24, 2018, available at <https://www.cndpindia.org/?s=9+time+world+was+brink>, accessed on May 8, 2026.
- ⁷ The intellectual origins of artificial intelligence are commonly traced to Alan M. Turing, “Computing Machinery and Intelligence,” *Mind* 59, no. 236 (1950): 433–460. The term “artificial intelligence” was introduced at the Dartmouth Summer Research Project on Artificial Intelligence in 1956, organised by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon. Their exact formulation is “*We propose that a 2 month, 10 man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer.*”
- ⁸ The “dull, dirty, and dangerous” framework is a standard heuristic in military technology studies, denoting tasks that are repetitive, hazardous, or environmentally extreme, and therefore suitable for automation. See the US

Department of Defense (DoD), *Unmanned Systems Integrated Roadmap 2013–2038*, 2013, p. 20, and subsequent doctrinal discussions on unmanned and autonomous systems.

- ⁹ A radar-guided naval point-defence system designed to detect, track, and automatically engage incoming anti-ship missiles and aircraft within predefined engagement parameters. Although capable of highly automated operation, it functions under rules of engagement established by human operators.
- ¹⁰ A long-range, surface-to-air missile defence system designed to intercept tactical ballistic missiles, cruise missiles, and advanced aircraft. While equipped with automated radar tracking and semi-autonomous engagement capabilities to manage high-saturation threat environments, it operates under human supervision and pre-configured rules of engagement, requiring human command authority to initiate or abort defensive fires.
- ¹¹ The Oko (*Eye*) system was the Soviet Union's space-based early-warning network, designed to provide strategic warning of ballistic missile launches through infrared satellite detection integrated with ground-based radar. Although highly automated in its detection functions, the system relied on human operators to assess and verify alerts before any military response.
- ¹² Developed by General Atomics, the MQ-1 Predator was a remotely piloted unmanned aerial vehicle (UAV) initially designed for intelligence, surveillance, and reconnaissance (ISR) missions. It was later equipped with AGM-114 Hellfire missiles, becoming one of the first UAVs capable of conducting precision strikes. Despite its advanced automation in flight and navigation, target selection and weapons release remained under the control of human operators, making it a human-in-the-loop system rather than an autonomous weapon.
- ¹³ The MQ-9 Reaper is the successor to the MQ-1 Predator, designed with greater payload, endurance, and speed. Like the Predator, it combines automated flight and sensor-management functions with human control over target identification, engagement decisions, and weapons release.
- ¹⁴ Also known as the Algorithmic Warfare Cross-Functional Team, Project Maven was established by the U.S. Department of Defense in 2017 to accelerate the integration of artificial intelligence and machine learning into military intelligence, surveillance, and reconnaissance (ISR). It employs AI algorithms to analyse imagery and sensor data, detect and classify objects, and support human analysts in identifying potential targets. While Project Maven significantly enhances the speed and accuracy of intelligence processing, decisions concerning target identification, engagement, and the use of lethal force remain under human control.
- ¹⁵ A U.S. Air Force programme initiated in 2019 to develop AI-enabled autonomous control systems for unmanned combat aircraft operating alongside crewed fighters. Designed to support human-machine teaming,

Skyborg enables autonomous navigation and mission execution while maintaining human oversight of operational decisions.

- ¹⁶ Drone swarms are AI-enabled groups of interconnected unmanned aerial systems that coordinate their actions through distributed algorithms and real-time communication. By enabling collaborative sensing, adaptive navigation, target allocation, and mission execution with limited human intervention, swarm technology represents a significant step towards increasingly autonomous military operations and forms an important area of debate in discussions on lethal autonomous weapons systems (LAWS).
- ¹⁷ South Korean SGR-A1 is autonomous sentry system deployed in the Demilitarized Zone (DMZ), which uses electro-optical and infrared sensors to detect, track, and challenge intruders. Although capable of autonomous target tracking, human authorisation is generally retained before lethal force is employed, illustrating the continued importance of meaningful human judgement.
- ¹⁸ Long-range loitering munition capable of autonomous target search and attack, originally designed to engage radar and air-defence systems.
- ¹⁹ Portable loitering munition used primarily against personnel and armoured vehicles; widely employed in Ukraine.
- ²⁰ Loitering munition extensively used in the Russia–Ukraine conflict against artillery, air-defence systems, and armoured vehicles.
- ²¹ At its core, machine learning is a subset of AI that allows systems to learn patterns from data rather than follow fixed, pre-programmed rules.
- ²² Sensor fusion refers to the integration of data from multiple sensors to create a single, coherent operational picture.
- ²³ Real-time data processing refers to the ability of systems to process vast amounts of incoming data instantly and act upon it without delay
- ²⁴ John Boyd, a US Air Force fighter pilot and later, a highly influential defence theorist, formulated the OODA loop in the context of air combat and decision making under uncertainty, particularly during the Cold War. His insight was that victory does not necessarily go to the stronger force, but to the one that can cycle through decisions faster and more effectively than its adversary thereby “getting inside” the opponent’s decision loop and disorienting them.

THE HISTORICAL EVOLUTION OF IHL

Understanding how IHL evolved in response to earlier technological disruptions provides essential context for evaluating contemporary debates surrounding autonomy in warfare. Daniel Palmieri, historian at the International Committee of the Red Cross (ICRC), observes that the evolution of warfare has consistently outpaced legal regulation, compelling humanitarian law to adapt to successive technological and operational transformations.¹ Legal norms have rarely emerged before new technologies are introduced. Instead, they have evolved only after the humanitarian consequences of those technologies become apparent on the battlefield. The regulation of autonomous weapons must, therefore, be understood within this broader historical tradition of legal adaptation to technological change. Thus, the history of IHL is not one of uninterrupted progress but of continual adaptation. Throughout history, societies have sought to regulate warfare through ethical principles, customary practices, and legal rules. Yet military necessity and technological innovation have repeatedly exposed the limitations of these restraints, prompting the development of new legal norms in response to the humanitarian consequences of war. This pattern has been particularly evident in the regulation of weapons, where each major technological advance has tested the adequacy of the existing legal framework and compelled its further evolution. From its origins in ancient customs and traditions, it was only in the mid-nineteenth century that IHL assumed a more formal and codified character. The increasing scale and destructiveness of warfare, driven by factors such as mass conscription and advances in weapons technology, created a growing need for internationally accepted rules to limit suffering and protect those not, or no longer, participating in hostilities.

HISTORICAL AND CIVILISATIONAL FOUNDATIONS OF HUMANITARIAN RESTRAINT

Long before the formal codification of International Humanitarian Law, many civilisations had developed ethical norms intended to regulate

the conduct of warfare. Ancient Indian political and military thought, reflected in the Mahabharata, the Manusmriti, and the Arthashastra, recognised that even warfare was subject to moral restraint. The concept of dharma-yuddha (righteous warfare) emphasised honourable conduct, including restrictions on attacking the unarmed, the wounded, prisoners, and those who had surrendered, while advocating proportionality, necessity in the use of force, and fairness in combat. The Mahabharata illustrates that these norms were not always observed. The killing of Abhimanyu, who was surrounded and attacked simultaneously by multiple warriors after being isolated, deprived of his chariot, and ultimately rendered defenceless, was portrayed as a grave violation of the accepted rules of dharma-yuddha, demonstrating that in ancient Indian thought, breaches of the recognised codes governing warfare were condemned. Comparable traditions also emerged in other civilisations. Medieval European chivalry, influenced by Christian ethics, emphasised honour in battle and the protection of prisoners, pilgrims, clergy, women, and other vulnerable persons. Classical Islamic traditions similarly articulated ethical restraints on warfare; for example, the instructions traditionally attributed to the first Caliph, Abu Bakr, prohibited the killing of women, children, and the elderly, forbade the destruction of crops and fruit-bearing trees, the poisoning of wells, and the unnecessary devastation of property. In medieval Japan, the Bushido code emphasised honour, loyalty, courage, discipline, and restraint in the conduct of the samurai. Although these traditions differed in their philosophical foundations, scope, and legal character from contemporary International Humanitarian Law, they collectively demonstrate that the idea of limiting violence during armed conflict has deep historical and civilisational roots. Modern International Humanitarian Law did not emerge in an ethical vacuum; rather, it codified and universalised many longstanding humanitarian principles.

THE BIRTH OF MODERN INTERNATIONAL HUMANITARIAN LAW

A key turning point in the codification of the laws of war was the establishment of the Red Cross Movement, inspired by Henry Dunant's experience of the suffering of wounded soldiers at the 1859 Battle of Solferino in Italy.² This led to the First Geneva Convention in 1864,³ which focused on the humane treatment of sick and wounded soldiers

in the field. The Red Cross Movement's emphasis on alleviating suffering and protecting the victims of war laid the foundation for the subsequent development of IHL. Another milestone was the 1868 St Petersburg Declaration, which marked the first international agreement to ban a specific weapon, that is, exploding projectiles designed to inflict unnecessary suffering. This declaration established the crucial principles of military necessity and prohibition of superfluous injury or unnecessary suffering principles that would continue to guide the development of IHL.

The Brussels Declaration of 1874 further reinforced the principle that belligerents do not possess an unlimited right to choose the means and methods of warfare. Although never formally ratified, it prohibited poison and poisoned weapons, reaffirmed the prohibition on weapons causing unnecessary suffering, and articulated many of the principles that would later shape customary international law and the Hague Conventions. The Hague Peace Conferences of 1899 and 1907 marked the next major stage in the codification of the laws of war. They adopted conventions and declarations governing the conduct of hostilities, restricting specific methods and means of warfare, including the prohibition of projectiles intended to disperse asphyxiating gases and the launching of projectiles from balloons for limited periods, while reaffirming the fundamental principles of military necessity, humanity, and the prohibition of unnecessary suffering. The unprecedented devastation of the First World War, particularly the large-scale use of chemical weapons, further exposed the inadequacy of existing legal restraints. This culminated in the 1925 Geneva Protocol, which prohibited the use of asphyxiating, poisonous, and other gases, as well as bacteriological methods of warfare. Although initially limited to regulating the use rather than the possession of such weapons, the Protocol represented a decisive step in the progressive development of International Humanitarian Law and laid the foundation for the more comprehensive regimes governing chemical and biological weapons that emerged later in the twentieth century. The evolution of these regimes is examined in greater detail later.

HUMANITARIAN IDEALISM AND IMPERIAL CONTRADICTIONS

During its formative half-century, the International Committee of the Red Cross (ICRC) operated within a conceptual framework. According

to Daniel Palmieri, the ICRC's early perception of armed conflict was characterised by an "Age of Illusions", reflecting the belief that war could be progressively humanised through law and shared norms among "civilised" states.⁴ This period was characterised by a belief that warfare was a legitimate, albeit tragic, exception to peace, a chivalrous endeavour between "civilised" states that could be humanised through legal and social progress. This was a profound normative shift: an attempt to humanise war through codified restraint. Reciprocity, honour, and restraint were presumed to be shared values; and this was a deeply Western-centric vision.

Colonial wars, however, rarely conformed to this humanitarian ideal. Conflicts in India,⁵ Africa, Asia, and elsewhere frequently fell outside the legal and moral framework being developed for wars between European sovereign states. Colonial campaigns were often justified as part of a "civilising mission", resulting in the selective application of humanitarian norms. The suppression of the Indian Uprising of 1857 illustrates this contradiction. British reprisals included summary executions, mass hangings, village destruction, and the notorious practice of "blowing from guns", in which prisoners were executed by being tied to the mouths of cannons and blown apart. The contradiction became particularly evident in colonial policing and counter-insurgency operations. The Jallianwala Bagh massacre of 1919, in which British troops under the command of Reginald Dyer opened fire without warning on a large, unarmed gathering in Amritsar, killing hundreds of civilians, starkly demonstrated the selective application of humanitarian principles within the British Empire. The result was a profound contradiction at the heart of nineteenth- and early twentieth-century humanitarianism⁶: legal restraints were increasingly codified and applied to interstate wars in Europe even as colonial violence frequently remained beyond the effective reach of those same humanitarian standards.

THE COLLAPSE OF THE EUROPEAN IDEAL OF CIVILISED WARFARE: TESTING THE LIMITS OF HUMANITARIAN LAW

Despite the prevailing optimism of nineteenth century Western European political and intellectual elites, the expectation that war between the so-called "civilised" powers of Europe would remain limited and

restrained proved tragically misplaced. Within little more than half a century of the First Geneva Convention, Europe descended into the unprecedented devastation of the First World War. The conflict shattered the prevailing belief that legal codification, shared norms of honour, and reciprocal restraint would progressively humanise warfare. Instead, industrialisation transformed war from relatively bounded engagements into mechanised annihilation. Machine guns devastated infantry formations, long-range artillery redefined lethality, and aerial bombardment introduced new dimensions of violence. Most shockingly, chemical weapons including chlorine, phosgene, and mustard gas⁷ turned the very environment into a weapon, inflicting indiscriminate and prolonged suffering on an unprecedented scale. The horrors of chemical warfare demonstrated with painful clarity that technological innovation had once again outpaced existing legal restraints, prompting the adoption of the 1925 Geneva Protocol⁸ prohibiting the use of asphyxiating, poisonous, and other gases, as well as bacteriological methods of warfare.

Despite the adoption of the 1925 Geneva Protocol, major powers continued to research, develop, produce, and stockpile chemical and biological weapons. Although chemical agents had been employed on an unprecedented industrial scale during the First World War, military planners continued to regard them as weapons capable of conferring strategic advantage. The British Empire, for example, maintained significant chemical warfare infrastructure in India, including facilities at Cannanore (present-day Kannur)⁹ and Rawalpindi, illustrating that legal restrictions on the use of chemical weapons did not prevent continued preparation for chemical warfare. The experiences of the Second World War, particularly Japanese biological warfare programmes and other wartime research efforts, exposed the limitations of legal regimes that prohibited use while permitting continued development and stockpiling. Like contemporary debates surrounding autonomous weapons, chemical weapons were initially defended by some military planners as innovations capable of delivering strategic advantage and even shortening conflicts. Their catastrophic humanitarian consequences, however, ultimately generated demands for stronger legal regulation, culminating in the Biological Weapons Convention (1972) and the Chemical Weapons Convention (1993). Table 2.1 summarises the principal chemical warfare programmes during the First World War.

Table 2.1 : Major Chemical Warfare Programmes during the First World War

State	Principal Chemical Agents	Distinctive Features
Germany	Chlorine, Phosgene, Diphosgene, Mustard Gas, Chloropicrin	Conducted the first large-scale lethal gas attack at Ypres (1915); pioneered gas-cloud warfare and developed mustard gas.
France	Tear Gas, Phosgene, Cyanide-based Agents	First to employ chemical irritants in 1914; later expanded the production and use of phosgene artillery shells.
British Empire*	Chlorine, Phosgene, Mustard Gas	Developed an extensive chemical warfare programme, supported by research, testing, production, and storage facilities across the Empire.
United States	Phosgene, Mustard Gas, Adamsite	Established the Chemical Warfare Service after entering the war in 1917 and rapidly expanded chemical weapons production.
Austria-Hungary	Chlorine, Phosgene	Conducted extensive chemical attacks against Italian and Russian forces.
Russia	Chlorine, Phosgene	Limited domestic capability; relied substantially on Allied assistance for chemical munitions.
Italy	Phosgene, Mustard Gas	Initially suffered extensive gas attacks before developing retaliatory chemical capabilities.
Note: The table summarises the principal chemical warfare programmes of the First World War. During the Second World War, the major powers retained extensive chemical weapon stockpiles but generally refrained from using them on the European battlefield, largely because of mutual deterrence and the fear of retaliation. Japan, however, employed chemical weapons extensively in China and conducted biological warfare through Unit 731. * Colonial subjects, including British Indian soldiers, were exposed to chemical agents during experiments such as the Rawalpindi mustard gas trials, while major testing and storage facilities were established across the Empire.		

Source: Compiled by the author from Leo P. Brophy, Wyndham D. Miles, and Rexmond C. Cochrane, *The Chemical Warfare Service: From Laboratory to Field* (Washington, DC: Office of the Chief of Military History, 1959); Ulf Schmidt, *Secret Science: A Century of Poison Warfare and Human Experiments* (Oxford: Oxford University Press, 2015).

As mentioned, the Geneva Protocol prohibited the use of chemical and biological weapons in war, yet left intact their development, stockpiling, and strategic integration. States thus renounced the method, but retained the capability.¹⁰ It was only decades later that more comprehensive regimes emerged, notably, the Biological Weapons Convention (BWC)¹¹ and the Chemical Weapons Convention (CWC),¹² which sought to eliminate entire categories of weapons. By then, however, the moral and strategic realities of chemical warfare had already been fully revealed.

LESSONS FROM CHEMICAL AND BIOLOGICAL WARFARE: THE REACTIVE NATURE OF ARMS CONTROL

The phased evolution from the 1925 Geneva Protocol to the 1972 BWC and the 1993 CWC illustrates the incremental and reactive nature of arms control, where prohibition follows technological use and strategic entrenchment rather than preceding it. The history of chemical and biological weapons, therefore, provides an important precedent for contemporary debates surrounding autonomous weapons. In both the cases, technological capability emerged before effective legal regulation, compelling the international community to confront the humanitarian consequences only after the technology had already entered military planning and practice.

Despite the trajectory just described, it is critical to recognise that efforts to prohibit chemical weapons did not begin after their use, but well before it. The Hague Conventions of 1899 and 1907 had already sought to restrict the use of poison and poisoned weapons, reflecting an early awareness of their potential for indiscriminate harm. Yet, these normative constraints proved insufficient when confronted with the strategic imperatives of industrial war. The lesson, therefore, is not merely that arms control is reactive, but that even when anticipatory norms exist, they often fail in the absence of enforcement, verification, and political will. The tragedy of chemical warfare lies not in the absence of foresight, but in the failure to translate that foresight into binding and effective restraint. As a result, prohibition followed use, rather than preventing it.

Table 2.2 illustrates that efforts to prohibit chemical weapons predated their large-scale use, yet failed to prevent deployment during World

War I, underscoring the gap between normative intent and effective restraint.

Table 2.2: Early Efforts to Prohibit Chemical Weapons and their Limitations

Year	Instrument	Key Provision	Nature of Restraint	Limitation/Outcome
1675	Strasbourg Agreement ¹³	Prohibited use of poisoned bullets between France and the Holy Roman Empire.	Bilateral, normative.	Limited scope; no broader adoption.
1874	Brussels Declaration ¹⁴	Proposed ban on poison and poisoned weapons.	Multilateral (non-binding).	Never ratified; no legal force.
1899	Hague Convention II (1899) ¹⁵	Prohibited use of poison and poisoned weapons.	Binding norm (limited scope).	Ambiguity in interpretation; weak enforcement.
1907	Hague Convention IV (1907) ¹⁶	Reaffirmed prohibition on poison weapons.	Binding norm.	No verification or enforcement mechanisms.
1915–1918	World War I	Large-scale deployment of chlorine, phosgene, and mustard gas.	None but military advantage.	Norms collapse under industrial warfare.
1925	Geneva Protocol ¹⁷	Prohibited use of chemical and biological weapons.	Partial prohibition.	Allowed development, stockpiling, and retaliation clauses.

Source: Compiled by the author.

As Palmieri notes, humanitarian law has historically evolved in response to suffering already experienced, rather than harms merely anticipated.¹⁸ Legal norms have rarely emerged before new technologies are introduced; instead, they have developed incrementally in response to

the humanitarian consequences revealed on the battlefield. The historical record reveals a recurring pattern. Emerging technologies are often recognised as potentially destabilising long before they are widely deployed. Yet, recognition alone rarely translates into effective restraint. Legal norms, political consensus, verification mechanisms, and enforcement structures frequently lag behind technological innovation. The emergence of military aviation would soon provide one of the earliest and most striking illustrations of this dynamic. Although the Hague Conventions attempted to place limited restrictions on aerial bombardment, rapid advances in air power fundamentally transformed the conduct of warfare, exposing once again the limitations of existing legal frameworks and compelling the further evolution of International Humanitarian Law.

AIR POWER: EXTRAORDINARY MILITARY ADVANTAGE AND THE LIMITS OF INTERNATIONAL HUMANITARIAN LAW

For the ICRC, the outbreak of the Second World War represented a tragic repetition of many of the humanitarian challenges encountered during the First World War, as observed by ICRC historian Daniel Palmieri, although the scale of the new conflict soon surpassed anything previously experienced.

The warning signs had been evident even before the outbreak of the Second World War. Although aerial bombardment of civilian centres had occurred during the First World War, the destruction of Guernica in 1937¹⁹ became the defining symbol of the devastating potential of strategic air power against civilian populations. It demonstrated with chilling clarity that future wars would no longer be confined to the battlefield. At the same time, the doctrine of strategic bombing was gaining currency among the major powers, premised on the belief that civilian morale, in addition to military capability, constituted a legitimate target. Recognising these dangers, President Franklin D. Roosevelt appealed to the major powers on 1 September 1939 to refrain from the aerial bombardment of civilian populations:

The ruthless bombing from the air of civilians in unfortified centers of population during the course of the hostilities which

have raged in various quarters of the earth during the past few years, which has resulted in the maiming and in the death of thousands of Defenceless men, women and children, has sickened the hearts of every civilized man and woman, and has profoundly shocked the conscience of humanity.²⁰

He was urging governments to refrain from aerial attacks on civilian populations. This appeal, issued on the eve of global war, underscores that the humanitarian risks of aerial bombardment were clearly understood, yet remained unenforced once hostilities began.

The historical record reveals a profound tension between humanitarian aspiration and military necessity. Despite early moral appeals to protect civilian populations, the pressures of total war led all major belligerents including Germany, Britain, the United States, and Japan to adopt strategies that increasingly blurred the distinction between military objectives and civilian populations. By the closing stages of the Second World War, strategic aerial bombardment had become one of the principal instruments of warfare. The United States, in particular, employed air power on an unprecedented scale through the systematic firebombing of Japanese cities, culminating in the atomic bombings of Hiroshima and Nagasaki. These campaigns demonstrated both the extraordinary military advantage offered by air power and the profound limitations of the contemporary legal framework in protecting civilian populations. While historians continue to debate whether alternative courses of action might have been possible, the sequence underscores a deeper tension: the same actors who articulated norms against civilian targeting ultimately departed from them under the pressures of total war. Table 2.3 summarises the principal international efforts to regulate aerial warfare before and during the Second World War, together with the reasons why these initiatives ultimately failed to prevent the widespread use of strategic bombing.

Table 2.3: International Efforts to Regulate Aerial Warfare and Their Limitations (1923–1945)

Year	Instrument	Key Provisions on Aerial Warfare	Intended Restraint	Limitation/ Outcome
1923	Hague Rules of Air Warfare ²¹	Prohibited indiscriminate bombing; restricted attacks to military objectives; required distinction between civilians and combatants.	Anticipatory legal framework for air power.	Never ratified; remained non-binding.
1938	League of Nations Resolutions on Aerial Bombardment ²²	Declared bombing of civilian populations illegitimate.	Normative condemnation.	No enforcement; ignored in practice.
1939	Pre-World War II declarations by major powers ²³	Conditional commitments to limit bombing to military targets.	Political restraint.	Collapsed immediately with the onset of war.
1939–1945	World War II	Strategic aerial bombardment (Blitz, Dresden, Tokyo, Hiroshima and Nagasaki)		Widespread targeting of civilian areas; IHL norms ineffective.

Source: Compiled by the author.

The deeper failure lay elsewhere. As historical analysis of the International Committee of the Red Cross (ICRC) demonstrates, even when confronted with the early manifestations of aerial bombardment, the organisation underestimated the transformative implications of air power. It did not fully appreciate that warfare had irreversibly expanded into the skies and, with it, into the everyday lives of civilian populations. By 1940, however, the reality had become undeniable. Air power had collapsed the distinction between battlefield and civilian space. War was no longer geographically confined to the front; it had become total, borderless, and multidimensional.

Recognising these dangers, the ICRC issued a forceful appeal in March 1940 calling for the prohibition of aerial bombardment directed against civilian populations.²⁴ The appeal was both prescient and ultimately unsuccessful. It sought to impose humanitarian restraint on a technology that had already become central to military strategy. Faced with an existential conflict, none of the major belligerents was prepared to accept unilateral limitations on what had become one of the most decisive instruments of warfare. Strategic necessity prevailed over humanitarian restraint. Air power promised overwhelming operational advantage, and once every major power embraced its use, restraint rapidly gave way to military expediency. What had begun as an exceptional capability soon evolved into an accepted method of warfare.

During the Second World War, aerial bombardment reached an unprecedented industrial scale. According to the United States Strategic Bombing Survey (USSBS), Allied air forces dropped approximately 2.7 million tonnes of bombs worldwide, including around 2.35 million tonnes over Europe and approximately 700,000 tonnes in the Pacific theatre.²⁵ These figures should be regarded as approximate, as different official histories and subsequent scholarly studies employ varying methodologies and geographical scope in calculating bomb tonnage. Nevertheless, they illustrate the extraordinary scale on which air power had become an instrument of modern warfare. The United States Army Air Forces accounted for the majority of this tonnage, while the British Royal Air Force conducted extensive area-bombing campaigns against German cities in which Dresden²⁶ stands out. Germany, although an early pioneer of strategic air operations, delivered substantially lower tonnage because of industrial and operational constraints, while Japan's bombing campaign remained comparatively limited. Individual operations demonstrated the extraordinary destructive potential of modern air power. The firebombing of Tokyo in March 1945²⁷ alone employed approximately 1,700 tonnes of incendiary bombs in a single night, producing one of the deadliest conventional air raids in history. The subsequent atomic bombings of Hiroshima and Nagasaki compressed even greater destructive power into a single weapon, fundamentally transforming both the scale and nature of aerial warfare.²⁸

Taken together, these figures reflect a fundamental transformation: warfare had shifted from discrete engagements to sustained, large-scale destruction of urban–industrial systems, with civilian populations increasingly exposed to the effects of strategic bombing. As Michael Walzer observed, “a just war is not necessarily fought justly”.²⁹ This distinction between *jus ad bellum* and *jus in bello* lies at the heart of IHL, and highlights the persistent tension between military necessity and humanitarian restraint. The historical record demonstrates that this balance is precarious: the ICRC’s 1940 appeal to ban aviation as a method of warfare was largely ignored by belligerent states precisely because military utility superseded humanitarian concerns. The experience of aerial warfare reinforced a recurring lesson in the evolution of humanitarian law: the dangers posed by emerging technologies were often recognised well before their widespread employment, yet effective legal restraint consistently lagged behind military adoption.

REBUILDING LAW AFTER THE CATASTROPHE: POST-WORLD WAR II HUMANITARIAN LEGAL ORDER

It was only in the aftermath of this catastrophe that the international community undertook a systematic effort to reconstruct the legal and moral order governing conflict. The scale of destruction witnessed during World War II, which displayed industrialised killing, mass civilian targeting, genocide, and the displacement of entire populations, exposed not only the inadequacy of existing laws of war but also the fragility of the broader framework meant to protect human dignity.

The response was both immediate and far-reaching. The adoption of the four Geneva Conventions³⁰ of 12 August 1949 marked a watershed in the evolution of International Humanitarian Law, establishing the modern legal framework for the protection of victims of armed conflict. Collectively, the Conventions significantly expanded the scope of humanitarian protection, recognising that modern warfare no longer confined suffering to the battlefield but affected combatants, civilians, and occupied populations alike. Their principal focus is summarised below.

Table 2.4: The Four Geneva Conventions of 12 August 1949

Convention	Subject Matter
Geneva Convention I	Protection of wounded and sick members of armed forces in the field.
Geneva Convention II	Protection of wounded, sick, and shipwrecked members of armed forces at sea.
Geneva Convention III	Treatment and protection of prisoners of war.
Geneva Convention IV	Protection of civilian persons in time of war, including civilians in occupied territories.

Source: Compiled by the author from the Geneva Conventions of 12 August 1949.

Yet, this legal reconstruction did not occur in isolation. It formed part of a wider normative transformation that sought to anchor international order in the protection of the individual. The Universal Declaration of Human Rights³¹ articulated, for the first time, a universal standard of human dignity applicable in both peace and war. The Convention Relating to the Status of Refugees³² responded to the mass displacement unleashed by the conflict, establishing protections for those forced across borders. Unlike the nineteenth century humanitarian discourse, which often reflected European notions of racial and civilisational superiority and frequently viewed colonised peoples through a paternalistic lens, the post-1945 legal order was founded upon the principle of universal equality.³³ Alongside these, the development of the United Nations (UN) system³⁴ reflected an effort to prevent future wars through collective security and legal cooperation. Table 2.5 summarises the principal pillars of the post-war international legal order that collectively reshaped the protection of the individual in international law.

Table 2.5: The Post-War International Legal Order (1945–1951)

Year	Instrument	Primary Objective	Long-term Significance
1945	Charter of the United Nations	Maintain international peace and security through collective security and peaceful settlement of disputes.	Established the modern international legal order and prohibited the use of force except in limited circumstances.
1948	Universal Declaration of Human Rights (UDHR)	Recognised universal and inalienable human rights applicable to all persons.	Became the normative foundation of international human rights law.
1949	Four Geneva Conventions	Protect victims of armed conflict, including the wounded, prisoners of war, and civilians.	Established the cornerstone of modern International Humanitarian Law.
1951	Convention Relating to the Status of Refugees	Protect refugees displaced by conflict and persecution.	Created the modern international refugee protection regime.

Source : prepared by Author

Taken together, these instruments signalled a profound shift: from regulating the conduct of war alone to safeguarding the human being as the central subject of international law. Yet, even this moment of legal consolidation reveals a familiar pattern. These frameworks were not anticipatory; they were reactive, constructed in response to devastation already endured. Law, once again, followed destruction, shaped by the moral reckoning that only catastrophe seemed capable of producing. The reconstruction of the post-war legal order did not end with the Geneva Conventions or the broader human rights framework. As new humanitarian challenges emerged, international law continued to evolve through successive treaties addressing both the conduct of hostilities and the regulation of specific weapons. These included the 1954 Hague Convention for the Protection of Cultural Property, the 1972 Biological Weapons Convention, the 1977 Additional Protocols to the Geneva Conventions, the 1980 Convention on Certain Conventional Weapons (CCW), the 1993 Chemical Weapons

Convention, the 1997 Ottawa Convention prohibiting anti-personnel landmines, the 1998 Rome Statute of the International Criminal Court, and the 2008 Convention on Cluster Munitions. Collectively, these instruments illustrate the continuing expansion of humanitarian law in response to the humanitarian consequences of evolving methods and means of warfare.

Of particular relevance to this study are the 1977 Additional Protocols to the Geneva Conventions. They further refined the regulation of the means and methods of warfare. Most notably, Article 36 of Additional Protocol I introduced an obligation on States Parties to determine whether the employment of a new weapon, means, or method of warfare would be prohibited under international law. Although Article 36 has become one of the principal legal mechanisms through which many states assess the legality of emerging military technologies, including autonomous weapons systems, it has not achieved the same level of universal acceptance as the four Geneva Conventions. Several significant military powers, including India, the United States, Israel, Pakistan, Iran, and Türkiye, are not parties to Additional Protocol I and are therefore not legally bound by its Article 36 weapons review obligation, although many nevertheless conduct legal reviews as a matter of national policy. Consequently, Article 36 has become an influential but not universally binding mechanism for reviewing emerging weapons technologies.

The historical evolution of International Humanitarian Law reveals a consistent pattern. From explosive projectiles and poison gas to strategic bombing, nuclear weapons, and emerging autonomous systems, technological innovation has repeatedly outpaced legal regulation. Humanitarian law has seldom anticipated the next revolution in warfare; rather, it has evolved incrementally in response to the suffering that each revolution has produced. Whether autonomous weapons will finally break this historical cycle remains uncertain. If even human decision-makers, guided by law, ethics, training, and experience, have struggled to apply the principles of distinction, proportionality, and precaution during armed conflict, the delegation of lethal decision making to increasingly autonomous systems raises profound legal, ethical, and strategic questions. The challenge is not simply whether machines can comply with International Humanitarian Law, but whether

the normative foundations upon which that law rests can endure when the most consequential decisions in war are increasingly mediated or made by artificial intelligence.

The debate over Lethal Autonomous Weapons Systems is therefore not merely a technological question; it is a legal, ethical, and ultimately civilisational challenge. The question confronting the international community is whether, for the first time in the history of warfare, law can anticipate technological revolution rather than merely respond to its humanitarian consequences.

Notes:

- ¹ Daniel Palmieri, “How Warfare has Evolved—A Humanitarian Organization’s Perception: The Case of the ICRC, 1863–1960”, *International Review of the Red Cross*, Vol. 97, No. 900, 2015, pp. 985–998. available at https://international-review.icrc.org/sites/default/files/irc_97_900-3.pdf?utm_, accessed on 06 July 2026.
- ² Henry Dunant (1828–1910), a Swiss businessman, who witnessed the aftermath of the Battle of Solferino on June 24, 1859, became the catalyst for modern humanitarian law. Seeing thousands of wounded soldiers left to suffer without adequate medical care, Dunant organised local civilians to provide assistance regardless of the soldier’s nationality. Upon returning to Switzerland, he published, *A Memory of Solferino* (1862), in which he proposed the creation of national relief societies to care for the wounded in wartime and a formal international treaty to recognise and protect these volunteers. His ideas led to the formation of the “Committee of Five” in February 1863, which included Dunant, General Guillaume-Henri Dufour, Louis Appia, Gustave Moynier, and Théodore Maunoir. This group founded what would become the ICRC. International Committee of the Red Cross. The Battle of Solferino and the Birth of the Red Cross. Geneva: International Committee of the Red Cross. Available at: <https://www.icrc.org/en/document/battle-solferino-and-birth-red-cross>, accessed on 6 July 2026.
- ³ The committee’s efforts culminated in a diplomatic conference in 1864, where 12 states signed the First Geneva Convention. This landmark treaty established a universal and permanent legal framework that placed limits on the absolute power of states to wage war, specifically mandating humane treatment of wounded soldiers and protection of medical personnel and facilities marked by the Red Cross emblem. For his role in initiating this movement, Dunant was jointly awarded the first Nobel Peace Prize in 1901.
- ⁴ In his analysis of the ICRC’s historical evolution from 1863 to 1960, Palmieri argues that the organisation’s early understanding of warfare was largely

theoretical and shaped by prevailing nineteenth-century assumptions about armed conflict. This “time lag” between humanitarian perception and the changing realities of warfare meant that the ICRC often adapted to new forms of violence such as industrialised warfare, aerial bombardment, and total war only after their humanitarian consequences had become apparent. His analysis provides an important historical context for understanding why both humanitarian institutions and International Humanitarian Law have frequently evolved reactively in response to technological and operational change. For a comprehensive historical analysis of the ICRC’s evolving perception of warfare see the link provided at note 1.

- ⁵ British forces frequently employed scorched-earth tactics and summary executions, which were framed domestically not as war crimes, but as the necessary re-establishment of “order” over “rebellious” subjects. This “latitude for empire” allowed colonial powers to bypass the humanitarian scrutiny that was beginning to govern battlefields like Solferino, as colonised populations were not viewed as legally equal combatants under the nascent IHL.
- ⁶ The organisation’s primary publication, the *Bulletin* (the precursor to the *International Review of the Red Cross*), frequently reflected the racial and colonial attitudes prevalent in nineteenth-century Europe. The *Bulletin* described Japan as a “pagan nation” and initially portrayed the Chinese as “insufficiently civilized” to adhere to the Geneva Convention. During the British reconquest of Sudan, it controversially suggested that “finishing off the wounded was almost necessary during the war against the Dervishes”. Similarly, it characterised the Boer population in southern Africa as “semi barbarians”, a position it later revised during the First Boer War. A further illustration of these colonial attitudes is found in the relationship between ICRC President Gustave Moynier and King Leopold II’s Congo Free State. Despite mounting evidence of widespread exploitation and brutality in the Congo, Moynier, who also served as the Congo Free State’s consul general in Switzerland, remained an ardent supporter. As late as 1903, he argued that Belgian “education” would eventually transform the “savagery” of the Congolese into “civilized” behaviour. These examples demonstrate that the early development of international humanitarian law was shaped by the intellectual and colonial assumptions of its time, often overlooking atrocities committed against non-European peoples while portraying colonial violence as a civilising enterprise rather than a violation of human dignity. May please see Daniel Palmieri, “To Inform or Govern? 150 Years of the *International Review of the Red Cross*, 1869–2019,” *International Review of the Red Cross*, available at <https://international-review.icrc.org/articles/inform-or-govern-150-years-international-review-red-cross-1869-2019>, accessed July 9, 2026.
- ⁷ Early efforts to restrict chemical warfare date back to the 1675 Strasbourg Agreement between France and the Holy Roman Empire prohibiting poison bullets. Subsequent attempts include the 1874 Brussels Declaration (never

ratified) and the Hague Conventions of 1899 and 1907, which prohibited the use of poison and asphyxiating gases. Despite these measures, chemical weapons were employed on an unprecedented scale during World War I, beginning with the German chlorine gas attack at Ypres on April 22, 1915. By the end of the war, approximately 124,000 tonnes of chemical agents had been deployed, causing over 90,000 fatalities and injuring more than 1 million. See Organisation for the Prohibition of Chemical Weapons, “Facts on Chemical Weapons”, available at <https://www.opcw.org/about-us/history>, accessed on 06 July 2026,

- ⁸ The Geneva Protocol of 1925 is an international treaty prohibiting the use of chemical and biological weapons in warfare. Formally titled the “*Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare*”, it marks a major early effort to limit weapons of mass destruction. The protocol bans the use of “asphyxiating, poisonous or other gases” and “bacteriological methods” in war, but it does not prohibit research, production, or stockpiling. Many nations, initially, kept the right to respond with chemical weapons if attacked.
- ⁹ The existence of the Chemical Warfare Experimental Station at Cannanore (present-day Kannur) and mustard gas trials involving Indian troops has been documented in declassified British records and acknowledged in parliamentary proceedings. See Ulf Schmidt, *Secret Science: A Century of Poison Warfare and Human Experiments* (Oxford: Oxford University Press, 2015); UK Parliament (Hansard), Parliamentary Questions concerning Porton Down chemical warfare experiments; and contemporary reporting in *The Guardian*, “Military scientists tested mustard gas on Indians”, 1 September 2007 available at <https://www.theguardian.com/uk/2007/sep/01/india.military>, accessed on 06 July 2026.
- ¹⁰ D.P.K. Pillay, “*Can we Become Wiser from the Havoc of COVID-19?*”, *CBW Magazine*, Vol. 15, No. 2, July–December 2021. Available at: https://idsa.in/publisher/cbw-magazine/can-we-become-wiser-from-the-havoc-of-covid-19?utm_, accessed on 06 July 2026.
- ¹¹ The BWC, formally the “*Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction*”, is a 1972 international treaty that bans biological and toxin weapons. It is the first multilateral disarmament agreement to prohibit an entire class of weapons of mass destruction, establishing a foundational global norm against biological warfare. Post-World War I prohibitions under the Geneva Protocol barred only the use of biological weapons. Renewed disarmament talks in the 1960s, led by the UK and supported by the US–Soviet cooperation, separated biological from chemical weapons issues.
- ¹² The CWC, formally the “*Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction*”, is a 1993 multilateral disarmament treaty. It bans the entire category of chemical weapons and establishes mechanisms to ensure their destruction and prevent

their re-emergence. The convention represents a cornerstone of global non-proliferation and humanitarian law. The CWC is widely regarded as the most successful disarmament treaty, having verifiably eliminated nearly all declared chemical weapons. The Organisation for the Prohibition of Chemical Weapons (OPCW) received the 2013 Nobel Peace Prize for its implementation efforts.

- ¹³ “Agreement between France and the Holy Roman Empire Prohibiting the Use of Poisoned Bullets”, Strasbourg, August 27, 1675, available at https://www.chemurope.com/en/encyclopedia/Strasbourg_Agreement_%281675%29.html, accessed on May 8, 2026.
- ¹⁴ “Project of an International Declaration Concerning the Laws and Customs of War”, Brussels, August 27, 1874, available at <https://ihl-databases.icrc.org/en/ihl-treaties/brussels-decl-1874>, accessed on May 8, 2026.
- ¹⁵ “Convention (II) with Respect to the Laws and Customs of War on Land”, The Hague, July 29, 1899, available at <https://ihl-databases.icrc.org/en/ihl-treaties/hague-conv-ii-1899>, accessed on May 8, 2026.
- ¹⁶ “Convention (IV) Respecting the Laws and Customs of War on Land”, The Hague, October 18, 1907. Available at <https://ihl-databases.icrc.org/en/ihl-treaties/hague-conv-iv-1907?utm>, accessed on 06 July 2026.
- ¹⁷ “Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare,” Geneva, June 17, 1925, available at <https://ihl-databases.icrc.org/en/ihl-treaties/geneva-gas-prot-1925>, accessed on May 8, 2026.
- ¹⁸ Palmieri, “How Warfare has Evolved—A Humanitarian Organization’s Perception”.
- ¹⁹ The bombing of Guernica on 26 April 1937 by the German Condor Legion, acting in support of Nationalist forces during the Spanish Civil War, became an international symbol of the destructive potential of modern air power. It demonstrated the growing vulnerability of civilian populations to aerial bombardment and exposed the inadequacy of existing legal restraints on the conduct of air warfare, foreshadowing the strategic bombing campaigns of the Second World War. See Richard Overy, *The Bombing War: Europe 1939–1945* (London: Allen Lane, 2013).
- ²⁰ Franklin D. Roosevelt, “Appeal to Great Britain, France, Italy, Germany, and Poland to Refrain from Air Bombing of Civilians”, *The American Presidency Project*, September 1, 1939, available at <https://www.presidency.ucsb.edu/documents/appeal-great-britain-france-italy-germany-and-poland-refrain-from-air-bombing-civilians>, accessed on May 8, 2026.
- ²¹ Hague Rules of Air Warfare, “Draft Rules of Aerial Warfare, adopted by a Commission of Jurists at The Hague, December 1922–February 1923 (never ratified)”, available at <https://ihl-databases.icrc.org/en/ihl-treaties/hague-rules-1923>, accessed on May 8, 2026.

- ²² League of Nations, “Resolution on the Protection of Civilian Populations against Bombardment from the Air”, September 30, 1938, available <https://international-review.icrc.org/sites/default/files/S0020860400067358a.pdf>, accessed on May 8, 2026.
- ²³ Foreign Relations of the United States, Diplomatic Papers, 1939, General, Vol. I, “The Chargé in Germany (Kirk) to the Secretary of State,” Telegram No. 1004, 1 September 1939. The document reproduces the diplomatic exchanges following President Franklin D. Roosevelt’s appeal urging belligerents to refrain from bombing civilian populations. German Chancellor Adolf Hitler replied that the German Air Force had been instructed to restrict its operations to military objectives, provided opposing air forces observed the same principle. Available at: <https://history.state.gov/historicaldocuments/frus1939v01/d568>, accessed 8 May 2026.
- ²⁴ Palmieri, “How Warfare Has Evolved,” 995, citing “Appel concernant la protection de la population civile contre les bombardements aériens,” *Bulletin International des Sociétés de la Croix-Rouge (BISCR)*, no. 452 (April 1940): 321–327.
- ²⁵ United States Strategic Bombing Survey (USSBS), *The United States Strategic Bombing Survey: Summary Report (European War)* (Washington, DC: U.S. Government Printing Office, 30 September 1945); *United States Strategic Bombing Survey, Summary Report (Pacific War)* (Washington, DC: U.S. Government Printing Office, 1 July 1946). The aggregate figure of approximately 2.7 million tonnes is derived from the USSBS and subsequent historical compilations. Precise totals vary among official reports and historians depending on the theatres included and the methodology used to calculate bomb tonnage.
- ²⁶ The firebombing of Dresden (February 13–15, 1945) was carried out primarily by the Royal Air Force, with support from the US Army Air Forces, against targets in Nazi Germany during the final months of World War II. The raids caused widespread destruction and significant civilian casualties, commonly estimated at around 25,000 deaths. While the Allied campaign was conducted in the context of a war widely regarded as just in its cause namely, the defeat of Nazi Germany the deliberate use of area bombing against urban centres has remained deeply contested in terms of its compliance with the principles of distinction and proportionality under IHL. See Richard Overy, *The Bombing War: Europe 1939–1945* (London: Allen Lane, 2013), pp. 499–520.
- ²⁷ The firebombing of Tokyo on the night of March 9–10, 1945, carried out by the US Army Air Forces, resulted in approximately 80,000–100,000 deaths and the destruction of large parts of the city. Often regarded as the most devastating conventional air raid in history, it exemplifies the shift towards area bombing strategies that blurred the distinction between military targets and civilian populations. See Max Hastings, *Retribution: The Battle for Japan, 1944–45*. London: HarperPress, 2007.

- ²⁸ The atomic bombings of Hiroshima (August 6, 1945) and Nagasaki (August 9, 1945), conducted by the US Army Air Forces, resulted in immediate and long-term mass civilian casualties, with total deaths estimated at over 200,000. These events marked the advent of nuclear warfare and raised enduring legal and ethical questions regarding distinction, proportionality, and the limits of permissible violence under IHL. See International Court of Justice, *Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons*, 1996.
- ²⁹ Michael Walzer, *Just and Unjust Wars*, Basic Books, New York, 1977. In his seminal work, Walzer argues that the moral standing of a war (its justice) is separate from the conduct of the soldiers within it. Even in a “just” war of self-defence, a state is legally and morally bound to adhere to IHL. The delegation of force to autonomous algorithms risks collapsing this distinction, as machines cannot possess the moral agency required to navigate the “war rights” of non-combatants.
- ³⁰ The Geneva Conventions (adopted on August 12, 1949) consist of four treaties: (I) Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field; (II) Convention for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea; (III) Convention Relative to the Treatment of Prisoners of War; and (IV) Convention Relative to the Protection of Civilian Persons in Time of War. Available at <https://www.icrc.org/en/geneva-conventions-and-law>, accessed on 05 July 2026.
- ³¹ The Universal Declaration of Human Rights, adopted by the United Nations General Assembly (UNGA) on December 10, 1948, articulated a universal standard of human dignity in response to the atrocities of World War II. Though not legally binding, it marked a fundamental shift in international law by placing the individual rather than the state at the centre of legal concern and laid the foundation for the modern human rights regime.
- ³² The Convention Relating to the Status of Refugees, adopted on July 28, 1951, emerged directly from the unprecedented displacement caused by World War II, which left millions stateless, uprooted, and without legal protection. Existing legal frameworks were ill-equipped to address individuals who no longer fell under the protection of any state. The convention sought to fill this gap by establishing an international legal regime for the protection of refugees, most notably through the principle of “*non-refoulement*”, which prohibits the return of individuals to territories where their life or freedom would be threatened. In doing so, it marked a critical shift in international law: from a system centred exclusively on state sovereignty to one that recognised obligations towards individuals displaced by conflict and persecution.
- ³³ Notwithstanding these landmark legal developments, the universal promise of equality remained imperfectly realised. Racial segregation and discrimination persisted in several countries, most notably in the United States, despite the affirmation in the Universal Declaration of Human Rights that all human

beings are born free and equal in dignity and rights. The tension between universal legal principles and domestic practice was brought into sharp relief by *Brown v. Board of Education of Topeka*, 347 U.S. 483 (1954), in which the U.S. Supreme Court declared racial segregation in public schools unconstitutional. The broader struggle to translate legal equality into lived reality was further exemplified by Rosa Parks' refusal to surrender her seat on a segregated bus in Montgomery, Alabama, in 1955, an act that catalysed the modern American civil rights movement and underscored that legal recognition alone was insufficient without effective implementation.

- ³⁴ The UN, established under the “Charter of the United Nations”, was conceived not only in response to the devastation of World War II but also to the failure of earlier international arrangements most notably, the League of Nations to prevent global conflict. The inability of the League of Nations to enforce collective security or deter aggression exposed the limits of a system lacking both institutional authority and political commitment from major powers. Against this backdrop, the UN sought to create a more robust framework, embedding the maintenance of international peace and security within a permanent institutional structure. Signed on June 26, 1945 and entering into force on October 24, 1945, the charter established mechanisms for collective action, while also promoting human rights, international cooperation, and the development of friendly relations among states.

THE DELEGATION OF LETHAL DECISION-MAKING: AI, AUTONOMY, AND HUMAN CONTROL

The central debate is no longer simply how humans employ force, but whether humans will continue to decide when and against whom force is used. Advances in artificial intelligence, robotics, sensor technologies, and machine learning have created the possibility that decisions involving life and death may increasingly be delegated to machines. The reason for this transformation are Lethal Autonomous Weapons Systems popularly, though somewhat imprecisely, referred to as “killer robots”. These systems possess varying degrees of autonomy in selecting and engaging targets, fundamentally challenging long-established assumptions regarding human agency, responsibility, and accountability in the conduct of hostilities.

Although autonomous weapons are often associated with science fiction, the issues they raise are already a practical reality. The possibility of delegating life-and-death decisions to machines is an emerging feature of contemporary warfare. Had the Soviet early warning system, discussed in the Introduction chapter, been permitted to act autonomously, the consequences might have been catastrophic.¹ These episodes are a powerful reminder of the continuing importance of human judgement when decisions must be made under conditions of uncertainty, incomplete information, and potentially irreversible consequences. It illustrates one of the central questions underlying the debate on autonomous weapons: should machine speed ever be permitted to displace human judgement in decisions involving the use of lethal force?

The ethical dimensions of this question have also been explored through popular culture. Films such as *Eye in the Sky*² vividly portray the profound difficulties faced by human operators in applying the principles of distinction and proportionality even when they remain

firmly “in the loop.” Such narratives suggest that removing humans from the decision-making process may not eliminate ethical dilemmas but instead intensify them. The challenge posed by LAWS is therefore not merely technological; it is fundamentally legal, ethical, and deeply human, requiring us to confront a question that is no longer hypothetical: can the delegation of lethal authority to machines be reconciled with the principles of international humanitarian law? Before examining the competing ethical perspectives, it is necessary to distinguish automation, artificial intelligence, autonomy, and LAWS.

UNDERSTANDING AUTOMATION, ARTIFICIAL INTELLIGENCE, AND AUTONOMY

The terms automation, AI, autonomy, and LAWS are frequently used interchangeably in public discourse. They are, however, distinct concepts. Understanding the relationship between them is essential because the legal and ethical challenges posed by autonomous weapon systems arise not from artificial intelligence alone, but from the degree to which machines are permitted to exercise independent control over the use of lethal force.

Automation refers to the execution of predefined tasks according to programmed rules or instructions. Automated systems respond predictably to specific inputs and operate within parameters established by their designers. They do not exercise judgement, adapt independently to changing circumstances, or determine their own objectives. Traditional examples include automatic aircraft flight-control systems, industrial manufacturing robots, and defensive military systems that execute pre-programmed responses under specified conditions.

Artificial intelligence, by contrast, refers to a broad range of computational techniques that enable machines to perform functions normally associated with human cognition, including pattern recognition, data analysis, learning, prediction, and decision support. AI is therefore an enabling technology rather than a weapon or capability in itself. An AI-enabled system may assist human decision-makers by analysing vast quantities of information, identifying patterns, or recommending courses of action without itself exercising autonomous control over the use of force.

Autonomy describes the ability of a system to perform tasks or achieve assigned objectives with limited or no further human intervention once activated. Unlike purely automated systems, autonomous systems are capable of perceiving their operational environment, processing information, adapting to changing circumstances within defined mission parameters, and taking actions necessary to accomplish their assigned tasks. The degree of autonomy may vary considerably, ranging from systems that perform only limited functions independently to those capable of selecting and engaging targets without real-time human direction.

As discussed earlier, LAWS constitute a distinct category of autonomous military systems. They are defined not by the mere incorporation of artificial intelligence but by their ability, once activated, to select and engage targets with varying degrees of human intervention. Although advances in artificial intelligence, particularly machine learning, sensor fusion, computer vision, and real time data processing, have significantly expanded the capabilities of autonomous systems, AI is neither a necessary nor a sufficient condition for classification as a LAWS. Many autonomous weapon systems rely primarily on pre-programmed rules rather than advanced AI, while numerous military applications of AI, such as intelligence analysis, logistics, cyber defence, decision support, and predictive maintenance, involve no autonomous use of lethal force. It should also be noted that there is no internationally agreed definition of LAWS. The absence of a universally accepted definition remains one of the principal obstacles to international consensus, as states differ on the degree of autonomy, the role of human control, and the functions that should determine whether a weapon system falls within the scope of LAWS.

From the perspective of international humanitarian law, the decisive issue is not the sophistication of the underlying technology but the extent to which humans retain control over decisions involving the use of lethal force. It is therefore the degree of autonomy in the selection and engagement of targets, rather than the mere presence of artificial intelligence, that distinguishes Lethal Autonomous Weapon Systems from other military applications of AI. The distinctions are summarised in Table 3.1.

Table 3.1: Distinguishing AI and LAWS

Feature	Artificial Intelligence	Lethal Autonomous Weapon Systems
Nature	An enabling technology that allows machines to perform tasks requiring human-like cognition, such as learning, perception, pattern recognition, and decision support.	A specific category of weapon systems capable of selecting and engaging targets with varying degrees of human intervention once activated.
Scope	Broad technology with both military and civilian applications.	Limited to military systems employing autonomy in the use of lethal force.
Purpose	Enhances analysis, prediction, planning, logistics, intelligence, surveillance, cyber operations, and decision support.	Applies force against military objectives through autonomous target selection and engagement.
Lethality	Not inherently lethal; depends on the application.	Inherently associated with the use of lethal force.
Role of AI	AI may or may not be used depending on the application.	AI may enhance capability but is not essential for a system to qualify as a LAWS.
Autonomy	May enable varying levels of autonomy but does not itself create an autonomous weapon.	Autonomy in selecting and engaging targets is the defining characteristic.
Human Control	Can operate with humans in, on, or out of the loop depending on the application.	Distinguished by reduced or absent human intervention at the point of target selection and engagement, depending on system design.
Legal Significance	Generally regulated according to its function and application. Evolving	Subject to specific legal and ethical scrutiny under international humanitarian law because of the delegation of targeting functions.
These concepts therefore overlap but are not synonymous. Not all automated systems employ artificial intelligence, not every AI-enabled system is autonomous, and not every autonomous system exercises lethal force. Conversely, many military applications of AI involve no autonomous use of force at all		

Source: compiled by Author.

THE DELEGATION OF LETHAL DECISION-MAKING

Thus the battlefield today is no longer solely the domain of human combatants; it is increasingly populated by machine systems that observe, crawl, swim, and fly, undertaking tasks once considered exclusively human but without the consequential human fatigue and costs. This technological transformation has been accompanied by a fundamental change in the conduct of military operations. Traditionally, uncertainty regarding an adversary's location and intentions required commanders to deploy substantial manpower across multiple axes of advance while relying upon a hierarchical intelligence cycle of collection, collation, analysis, interpretation, dissemination, and action. The growing availability of satellites, unmanned platforms, networked sensors, secure communications, and AI has dramatically compressed this process. Information now flows through integrated sensor networks capable of identifying, tracking, processing and relaying targets to weapon systems in near real time, thereby shortening the sensor to shooter cycle and reducing the need to allocate resources against every potential threat. For modern militaries, AI has therefore become not merely a tool for automation but a force multiplier capable of enhancing operational tempo, precision, and decision superiority. Yet the very operational advantages that make autonomy militarily attractive have also generated one of the most significant legal and ethical debates in contemporary warfare. As autonomous systems assume increasingly complex functions, the central challenge is no longer whether AI will be integrated into military operations, but how technological capability can be reconciled with meaningful human control, legal accountability, and the principles of international humanitarian law.

THE ETHICAL FRONTIER: DELEGATING THE POWER TO KILL

At the heart of this transformation lies an ethical question that is as old as warfare, yet newly urgent in its technological context: should machines be granted the authority to take human life? The emergence of LAWS forces a confrontation with the limits of both engineering and ethics. Proponents argue that autonomous systems can enhance precision, reduce collateral damage, and operate without fear, fatigue, or vengeance. Critics counter that such systems lack moral agency and

cannot be held accountable under existing legal frameworks. The spectre invoked is not merely technological but civilisational, a dystopian trajectory in which the decision to kill is delegated entirely to code. In such a paradigm, violence risks becoming depersonalised, frictionless, and scalable beyond human restraint.

One influential response is advanced by Ronald C. Arkin, Professor of Robotics at the Georgia Institute of Technology, in his seminal book *Governing Lethal Behavior in Autonomous Robots*.³ Arkin argues that properly designed autonomous systems could, in certain circumstances, comply with IHL more consistently than human combatants. Because machines are not influenced by fear, anger, fatigue, or revenge, he contends that appropriately constrained autonomous systems may reduce civilian casualties and improve adherence to the principles of distinction and proportionality. To achieve this, he proposes an ethical architecture incorporating an Ethical Governor⁴ to prevent unlawful attacks and a Responsibility Advisor to ensure that human commanders authorise operational constraints and retain legal responsibility for the system's deployment.

Paul Scharre, a former U.S. Army Ranger and defence analyst, adopts a more cautious position in his influential book *Army of None: Autonomous Weapons and the Future of War*.⁵ He argues that the central issue is not whether autonomy should be incorporated into warfare, but how functions should be allocated between humans and machines. While recognising the operational advantages of autonomy, Scharre warns that increasingly autonomous systems remain vulnerable to unexpected failures and therefore require meaningful human supervision and accountability. Drawing on incidents such as the Patriot missile failures at Dhahran in 1991⁶ and the USS Vincennes tragedy,⁷ he demonstrates that sophisticated automated systems do not eliminate human error but can create new forms of operational risk. Together, the contrasting perspectives of Arkin and Scharre frame much of the contemporary debate on LAWS, illustrating the tension between confidence in technological solutions and the continuing necessity of human judgement, supervision, and accountability. Their competing approaches ultimately converge on a common issue: whether increasingly autonomous weapon systems can comply with the fundamental requirements of IHL.

These competing perspectives give rise to fundamental questions concerning the application of IHL. The core principles of distinction, proportionality, military necessity, and accountability all presuppose human judgement, the ability to interpret context, assess intent, and weigh consequences in real time. This gives rise to three central questions:

- Can an autonomous system reliably distinguish between combatants and civilians in complex, fluid environments?
- Can proportionality, which is an inherently subjective assessment, be reduced to quantifiable parameters?
- Most critically, who bears responsibility when an autonomous system commits a violation?

ARGUMENTS FOR AND AGAINST LETHAL AUTONOMOUS WEAPON SYSTEMS

The contemporary debate surrounding LAWS is sharply divided between claims of operational advantage and concerns over ethical and legal rupture. Proponents argue that such systems could reduce casualties by minimising human error, fatigue, and emotional bias. By removing soldiers from immediate danger, LAWS are viewed as a means of achieving military objectives while limiting risk to one's own forces. Advances in precision targeting, sensor fusion, and data processing are further presented as enhancing compliance with the principles of IHL, particularly distinction and proportionality. Supporters, therefore, contend that autonomy may improve both military effectiveness and humanitarian outcomes under certain operational conditions.⁸

These claims, however, are highly contested. Critics caution that the delegation of lethal decision making to machines may generate unintended and destabilising consequences. Autonomous systems operating at machine speed could compress escalation timelines beyond meaningful human control, increasing the risk of rapid and unintended conflict escalation. More fundamentally, they raise profound accountability concerns. When an autonomous system makes a lethal error, responsibility may become diffused across commanders, operators, programmers, manufacturers, and systems that themselves

lack legal or moral agency (Table 3.2). Critics, therefore, question whether existing frameworks of responsibility can adequately address autonomous decision making in warfare.

Additional concerns arise from the practical limitations of machine cognition. Can an autonomous system distinguish not merely objects but also intent, surrender, or changing civilian status in complex and fluid operational environments? The possibility of malfunction, adversarial hacking, spoofing, or proliferation to non-state actors further compounds these risks, reinforcing calls for caution in the development and deployment of LAWS. The arguments are summarised below:-

Table 3.2: Arguments For and Against Lethal Autonomous Weapon Systems

Dimension	Proponents' Claims	Critics' Concerns
Casualties	Reduced through elimination of human error and emotional bias.	Risk of unintended harm due to misclassification and system errors.
Force Protection	Keeps soldiers out of harm's way.	Lowers threshold for use of force, enabling more frequent conflict.
Precision	Enhanced targeting through AI and sensor fusion.	Difficulty in applying contextual judgement required for distinction.
Decision Making	Faster, data driven, and more consistent.	Removes human judgement, empathy, and moral hesitation.
Accountability	Responsibility remains with commanders and operators.	Creates "responsibility gap" across designers, programmers, and users.
Escalation Dynamics	Faster response enhances deterrence.	Machine speed warfare risks uncontrolled escalation.
Security Risks	Technological superiority advantage.	Vulnerable to hacking, spoofing, and proliferation to non-state actors.

Source: Author.

The convergence of technological capability and strategic incentive raises a fundamental question: can IHL, constructed upon assumptions of human judgement, responsibility, and control, adequately regulate systems that may operate with diminishing levels of human involvement? The prospect of autonomous systems exercising lethal force without meaningful human intervention challenges core assumptions underlying the law of armed conflict. It compels a re-examination of whether existing legal frameworks remain sufficient or whether new normative and regulatory approaches are required to preserve human agency, accountability, and legal responsibility in warfare. The answer to this question depends upon whether the existing framework of IHL can effectively govern the development and use of LAWS.⁹

MEANINGFUL HUMAN CONTROL

Having distinguished automation, artificial intelligence, autonomy, and LAWS, the central legal issue is no longer the technology itself but the extent to which humans remain involved in decisions involving the use of lethal force. Contemporary discussions therefore distinguish between three broad models of human control over autonomous weapon systems viz. **human-in-the-loop**, **human-on-the-loop**, and **human-out-of-the-loop** which represent progressively decreasing levels of direct human participation in target selection and engagement.

The distinctions outlined in the Table 3.3 that follows are not merely descriptive; they lie at the heart of contemporary legal and policy debates concerning autonomous weapon systems. As autonomous systems assume increasingly complex targeting functions, the concept of meaningful human control has emerged as one of the principal normative frameworks for assessing their legality, legitimacy, and ethical acceptability. These models are summarised in Table 3.3.

Table 3.3: Models of Human Control in Autonomous Weapon Systems

Model of Human Control	Role of the Human Operator	Role of the Autonomous System	Human Intervention	Level of Human Control
Human-in-the-Loop	Authorises each individual use of force before engagement.	Assists in target detection and engagement but cannot employ force without human approval.	Required before every attack.	High
Human-on-the-Loop	Supervises system operations and may intervene, modify, or abort the attack if necessary.	Selects and engages targets autonomously within predefined operational parameters.	Possible during operation.	Moderate
Human-out-of-the-Loop	Activates the system before the mission but does not participate in targeting decisions thereafter.	Independently identifies, selects, and engages targets without real-time human involvement.	No real-time intervention after activation.	Minimal/None

Source: Adapted by the author from discussions on autonomous weapon systems and meaningful human control in the Convention on Certain Conventional Weapons Group of Governmental Experts and publications of the International Committee of the Red Cross.

It is therefore a growing recognition that the legitimacy of autonomous weapon systems depends not merely on their technological sophistication but on the continued ability of humans to exercise informed judgement, assume legal responsibility, and remain accountable for decisions involving the use of lethal force. Though meaningful human control has emerged as a widely accepted normative

objective, yet it remains neither precisely defined nor legally codified in law. The absence of an agreed international standard has consequently raised a more fundamental question: does the existing framework of international humanitarian law adequately regulate autonomous weapon systems, or do the unique characteristics of LAWS require the development of new legal norms?

The following chapter, therefore, examines how the legal regime applicable has evolved, analysing whether the established principles of distinction, proportionality, military necessity, precautions in attack, and weapons review provide an adequate basis for regulating increasingly autonomous forms of warfare.

Notes:

- ¹ See discussion of the 1983 Stanislav Petrov incident and others in “Introduction”.
- ² *Eye in the Sky* (directed by Gavin Hood, 2015) portrays real-time drone operations and highlights the difficulty human decision makers face in applying proportionality, assessing collateral damage, and exercising moral judgement even when fully “in the loop”. Other films, including *Ex Machina*, *I, Robot*, and *Terminator 2: Judgment Day*, explore broader questions concerning artificial intelligence, machine autonomy, and human control over technology.
- ³ Ronald C. Arkin, *Governing Lethal Behavior in Autonomous Robots*, CRC Press, Boca Raton, FL, 2009.
- ⁴ He proposes achieving this through mathematical formalization, translating the Laws of War into computable logic bounded by an ‘Ethical Governor’ an architectural bottleneck designed to suppress any lethal command that violates international humanitarian law.
- ⁵ Paul Scharre, *Army of None: Autonomous Weapons and the Future of War*, W. W. Norton & Company, New York, 2018.
- ⁶ On 25 February 1991, a Patriot missile battery at Dhahran failed to intercept an Iraqi Scud missile because of a software timing error, resulting in the deaths of 28 U.S. soldiers. The incident is widely cited as illustrating the limitations of automated military systems and the continuing need for effective human oversight. See Scharre, *Army of None*, 129–34.
- ⁷ On 3 July 1988, the USS *Vincennes* mistakenly shot down Iran Air Flight 655 after misidentifying the civilian aircraft as an attacking Iranian F-14, killing all 290 people on board as both took off together from the Bandar Abbas airport.

APPLYING INTERNATIONAL HUMANITARIAN LAW TO AUTONOMOUS WEAPON SYSTEMS

How does international law regulate a weapon that did not exist when most of the law was written? This question lies at the heart of the contemporary legal debate on Autonomous Weapon Systems. Unlike previous advances in military technology, autonomous weapons challenge not merely the means by which force is delivered but the allocation of decision-making authority over the use of lethal force. As weapons increasingly perform functions traditionally reserved for human operators, the issue is no longer whether international law applies, but whether the existing legal framework is capable of regulating the delegation of legally significant decisions to machines. The prevailing view among States, international organisations, and legal scholars is that autonomous weapon systems are not governed by a legal vacuum. Existing IHL, together with other applicable rules of international law, continues to regulate their development and use. The principles governing the conduct of hostilities including distinction, proportionality, military necessity, precautions in attack, and the prohibition of weapons causing unnecessary suffering apply irrespective of the technology employed. Likewise, obligations relating to weapons reviews under Article 36 of Additional Protocol I, State responsibility, and individual criminal responsibility remain fully applicable to autonomous weapon systems.

The applicability of IHL, however, does not resolve the legal challenges posed by autonomous weapons. The existing legal framework was developed on the assumption that legally significant decisions concerning the use of force would be made by human commanders exercising judgement, interpreting context, and accepting responsibility for their actions. Autonomous systems increasingly perform functions that require contextual assessment, discretionary judgement, and legal evaluation. As the degree of autonomy expands, the practical application

of established legal principles becomes progressively more complex, exposing challenges relating to implementation, accountability, predictability, reliability, and the preservation of meaningful human judgement.

This chapter examines these issues by first outlining the existing legal framework applicable to autonomous weapon systems, including the principal sources of IHL and the rules governing the conduct of hostilities. It then analyses the extent to which these established legal principles can be effectively applied to autonomous weapon systems, with particular emphasis on distinction, proportionality, military necessity, precautions in attack, weapons reviews, and legal accountability. The chapter argues that while existing IHL continues to provide the governing legal framework for autonomous weapon systems, the unprecedented delegation of decision-making functions to machines exposes significant practical and normative challenges that the existing legal regime was not originally designed to address. These challenges provide the foundation for the subsequent examination of Meaningful Human Control as an emerging response to preserving legal compliance and human responsibility in the use of force.

Figure 4.1 The AI Arms Race



Source: Prepared by the author using OpenAI's generative AI tools; content reviewed, verified, and finalised by the author.

FUNDAMENTAL PRINCIPLES OF IHL AND THEIR APPLICATION TO AUTONOMOUS WEAPON SYSTEMS

IHL regulates the conduct of hostilities through a body of fundamental principles designed to balance military necessity with humanitarian considerations. As a technology-neutral legal regime, these principles apply equally to autonomous weapon systems, notwithstanding the absence of a treaty specifically governing such weapons. Their continued applicability is widely accepted by States, international organisations, and legal scholars. However, the application of these principles becomes increasingly complex as autonomous systems assume functions traditionally performed by human commanders. While the legal obligations themselves remain unchanged, the delegation of target selection and engagement decisions to machines raises fundamental questions regarding the implementation of IHL. Principles such as distinction, proportionality, military necessity, precautions in attack, weapons review, and legal accountability all presuppose the exercise of informed human judgement. As autonomy increases, the practical application of these rules becomes progressively more challenging, exposing concerns relating to contextual interpretation, predictability, accountability, and the preservation of meaningful human control.¹ It is against this backdrop that the following sections examine the principal rules of IHL governing autonomous weapon systems and the legal challenges that arise in their application. The challenge posed by autonomous weapon systems is not the absence of an applicable legal framework, but the increasing difficulty of applying established legal principles to technologies capable of independently performing functions traditionally exercised by human operators. Accordingly, the following sections analyse the specific legal and operational challenges that autonomous weapon systems present in their implementation. Particular attention is given to the principles of distinction, proportionality, military necessity, precautions in attack, legal accountability, and weapons review, each of which depends, to varying degrees, upon the exercise of informed human judgement.

Principle of Distinction

The principle of distinction forms the cornerstone of IHL. It requires parties to an armed conflict to distinguish at all times between

combatants and civilians and to direct attacks only against lawful military objectives. This obligation is reflected in Articles 48², 51³ and 52⁴ of Additional Protocol I⁵ and is recognised as a rule of customary international law.

For conventional weapons, compliance with distinction depends upon the judgement of commanders who evaluate intelligence, observe behaviour, interpret intent, and continuously assess changing battlefield conditions. Autonomous weapon systems, however, must perform many of these functions through sensors, algorithms, and pre-programmed decision-making processes. Although advances in AI have significantly improved object recognition and target identification, machines continue to face substantial limitations when confronted with contextual situations that require human interpretation.

Modern battlefields rarely present clear distinctions between civilians and combatants. Civilians may directly participate in hostilities, combatants may surrender, wounded personnel become *hors de combat*, and civilians may act under coercion or deliberately conceal hostile intent. Urban warfare further complicates these assessments, where military objectives are frequently located within densely populated civilian areas. Such determinations often depend upon behavioural cues, contextual understanding, cultural awareness, and legal judgement rather than simple object recognition. The central legal question, therefore, is not whether autonomous systems can identify objects, but whether they can reliably interpret the complex and dynamic circumstances that the principle of distinction requires.

Principle of Proportionality

The principle of proportionality prohibits attacks expected to cause incidental civilian harm that would be excessive in relation to the concrete and direct military advantage anticipated. The principle of proportionality in attack is codified in Article 51(5)(b) of Additional Protocol I, and repeated in Article 57.⁶ Unlike distinction, proportionality does not involve a purely factual determination but requires balancing competing military and humanitarian considerations before an attack is authorised. This balancing exercise presents one of the greatest legal challenges for autonomous weapon systems. Assessing military advantage is inherently predictive and context dependent, while

estimating collateral damage requires consideration of uncertain and continuously evolving battlefield conditions. Human commanders routinely incorporate experience, operational judgement, ethical considerations, and incomplete intelligence when making proportionality assessments.

Whether an algorithm can replicate this discretionary balancing process remains highly contested. Although AI may improve the accuracy of collateral damage estimation, it remains unclear whether value-based legal judgements can be reduced to computational calculations without fundamentally altering the nature of proportionality itself.

Principle of Necessity

The principle of “necessity” of Article 57⁷ further complicates the use of LAWS. This principle stipulates that military action, including the deployment of LAWS, must be necessary to achieve a legitimate military objective.⁸ Military necessity recognises that parties to an armed conflict may use force directed towards achieving a legitimate military objective, subject to the limitations imposed by IHL. Military necessity does not provide an independent authority to disregard applicable IHL rules; rather, military action must remain within the limits established by the law of armed conflict.

For autonomous weapon systems, the relevance of military necessity arises at several stages: the decision to employ an autonomous system, the selection of the mission and target, the determination of the operational environment in which the system may be used, and the parameters within which autonomous functions are permitted to operate.

The availability of an autonomous weapon system may create incentives to employ force because the system can reduce risks to one’s own personnel or reduce the resources required for particular operations. The existence of such advantages, however, does not itself establish the necessity of a particular attack.

The relevant question is therefore not whether an autonomous weapon system can perform a military function efficiently, but whether its employment in the circumstances is directed towards a legitimate military objective and remains subject to the other applicable rules of IHL.

Precautions in Attack

The obligation to take precautions in attack is particularly significant for autonomous weapon systems. Article 57 of Additional Protocol I requires those planning or deciding upon an attack to take all feasible precautions to avoid, and in any event to minimise, incidental loss of civilian life, injury to civilians and damage to civilian objects.

Precautions include, among other things, doing everything feasible to verify that targets are military objectives, selecting means and methods of attack with a view to minimising civilian harm, and cancelling or suspending an attack where it becomes apparent that the target is not a military objective or that the expected incidental civilian harm would be excessive in relation to the anticipated military advantage.

For autonomous weapon systems, some precautions must necessarily be incorporated into the system before deployment. These may include restrictions on the geographic area of operation, target classes, operating conditions, engagement parameters, weapons effects, duration of autonomy, communications requirements and mechanisms for human intervention or termination.

This gives precautions in attack a particular significance in the context of autonomy. Human judgement is not confined to the moment immediately before a weapon engages a target. It can also be exercised through the design, testing, programming, mission planning and operational constraints established before deployment.

Principle of Accountability

The principle of accountability underpins the enforcement of IHL. Unlike distinction or proportionality, it does not regulate how force is used but determines who bears legal responsibility when IHL is violated. Under the existing legal framework, responsibility ultimately rests with human actors, including commanders, operators, and States.

Autonomous weapon systems complicate this assumption because decision-making functions are distributed across commanders, operators, software developers, manufacturers, and autonomous algorithms. This diffusion of responsibility has given rise to concerns

regarding an “accountability gap”, raising the question of whether existing frameworks of State responsibility and individual criminal responsibility remain adequate when legally significant decisions are increasingly delegated to machines. Autonomy therefore makes questions of attribution and accountability more important rather than less important.

The development of autonomous systems should be accompanied by mechanisms capable of establishing who authorised their development and deployment, who determined the conditions under which they could be used, what information and safeguards were available, and how decisions were made when the system operated. This is why accountability must be addressed across the entire lifecycle of an autonomous weapon system, rather than only after an incident has occurred.

Principle of Indiscriminate Attacks

IHL prohibits indiscriminate attacks. Article 51(4) of Additional Protocol I identifies, among other things, attacks that are not directed at a specific military objective or that employ a method or means of combat whose effects cannot be limited as required by IHL.

For autonomous weapon systems, the issue is closely connected to the system’s technical characteristics and operational environment. A system may be capable of highly accurate performance under controlled conditions but become unreliable when exposed to conditions outside those for which it was designed, tested or validated.

The legality of an autonomous weapon system therefore cannot be assessed solely on the basis of its performance in ideal testing conditions. Its reliability, predictability and limitations must be considered in relation to the environment and circumstances in which it is intended to operate.

Principle of Humanity and Unnecessary Suffering

The conduct of hostilities is also constrained by the principle of humanity and by the prohibition on employing means and methods of warfare of a nature to cause superfluous injury or unnecessary suffering. These constraints apply irrespective of whether the means or method of warfare incorporates autonomous functions.

For autonomous weapon systems, the principal issue is whether the effects produced by a weapon are consistent with the applicable legal limitations and whether autonomy introduces additional risks that cannot be adequately controlled. The incorporation of autonomy into a weapon does not alter the underlying legal prohibition.

This principle also reinforces the importance of weapons reviews and technical evaluation. The assessment of an autonomous weapon cannot be confined to whether the system can identify and engage a target; its foreseeable effects and manner of operation must also be examined.

WEAPONS REVIEW

Weapons review provides an important mechanism for assessing the legality of new weapons, means and methods of warfare. Article 36 of Additional Protocol I requires a State Party, when studying, developing, acquiring or adopting a new weapon, means or method of warfare, to determine whether its employment would, in some or all circumstances, be prohibited by applicable international law.

For States that are not party to Additional Protocol I, Article 36 does not itself constitute a treaty obligation. Nevertheless, a number of States conduct national legal reviews of weapons and weapons systems as part of their broader processes for ensuring compliance with IHL and other applicable law.

Autonomous weapon systems make such reviews particularly important because legality may depend not only upon the physical characteristics of the weapon but also upon its software, data, algorithms, operating parameters, intended environment and degree of autonomy.

A meaningful review should therefore consider the system throughout its lifecycle and should be revisited where significant modifications to hardware, software, algorithms, mission parameters or intended operating environments alter the system's capabilities or foreseeable effects.

The application of core principles of IHL to LAWS reveals a series of structural challenges, outlined in Table 4.1.

Table 4.1: IHL Principles and Challenges in the Context of LAWS

IHL Principle	Legal Source & Obligation	Application to LAWS	Key Challenge
Distinction	Articles 48, 51 and 52, Additional Protocol I Parties must distinguish between combatants and civilians and target only lawful military objectives.	Autonomous systems must identify and engage only legitimate targets.	The central question for autonomous weapon systems is therefore not merely whether a system can identify an object, but whether the system can perform the legally relevant assessment required to distinguish lawful targets from persons and objects protected by IHL in the particular circumstances of its intended use.
Proportionality	Article 51(5)(b) of Additional Protocol I, repeated in Articles 57(2)(a)(iii) and 57(2)(b) Civilian harm must not be excessive relative to anticipated military advantage.	Systems must assess and balance military gain against potential collateral damage.	Proportionality requires value-based judgement, which cannot be reduced to purely algorithmic calculation. The key question is therefore whether the system, together with the human decision-making architecture within which it operates, can provide a sufficiently reliable basis for the proportionality assessment required by IHL.

IHL Principle	Legal Source & Obligation	Application to LAWS	Key Challenge
Military Necessity	Customary IHL; General Principles of the Law of Armed Conflict Force must be used only to achieve a legitimate military objective.	LAWS must be deployed only when operationally necessary.	The availability of an autonomous system can reduce risks to personnel, but this does not itself establish necessity. The relevant question is whether its employment in the circumstances is directed towards a legitimate military objective and remains subject to the other applicable rules of IHL.
Precaution (Precautions in Attack)	Article 57, Additional Protocol I All feasible precautions must be taken to minimise civilian harm.	Systems must incorporate safeguards to prevent or reduce unintended harm.	Some precautions must be incorporated prior to deployment (geographic area, target classes, duration, fail-safes). Human judgement is exercised through system design, testing, programming, and operational constraints rather than exclusively at the moment of engagement.
Accountability	State Responsibility and Individual Criminal Responsibility Legal responsibility must be attributable.	Responsibility must be assigned for LAWS actions; accountability cannot be transferred to machines.	Diffusion of responsibility across designers, programmers, commanders, and operators. Mechanisms must establish who authorised deployment and how operational decisions were bounded across the entire lifecycle of the system.

IHL Principle	Legal Source & Obligation	Application to LAWS	Key Challenge
Indiscriminate Attacks	Article 51(4), Additional Protocol I Prohibits attacks not directed at a specific military objective or using means whose effects cannot be limited.	Systems must remain predictable, controllable, and contained within their assigned operational envelope.	A system tested successfully in controlled settings may fail in dynamic combat environments. Legality cannot be assessed solely on ideal performance; its predictability and error limits must hold under actual operational conditions.
Humanity and Unnecessary Suffering	Article 35(2), Additional Protocol I; Customary IHL Prohibits weapons and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.	Weapon effects and autonomous mechanisms must conform to fundamental humanitarian limits.	The principal issue is whether autonomy introduces secondary risks or effects that cannot be adequately controlled. Requires rigorous technical evaluation and testing of foreseeable injury and destruction profiles.
Weapons Review	Article 36, Additional Protocol I (for States Parties) / National Policy (for Non-Parties) Obligation to determine whether the employment of a new weapon would be prohibited under international law.	Mandatory legal review of autonomous platforms, software, algorithms, data libraries, and mission envelopes before fielding.	Legality depends on dynamic software, code updates, and algorithms rather than physical hardware alone. Reviews must be iterative throughout the lifecycle whenever modifications alter capabilities.

Source: Author.

Among the challenges summarised in the table, accountability is perhaps the most structurally significant because it lies at the heart of the legal regulation of armed conflict. The IHL presupposes that responsibility for the use of force can ultimately be attributed to human actors, whether commanders, operators, or states. Autonomous systems, however, complicate this assumption by introducing multiple layers of decision making, involving software designers, programmers, manufacturers, military commanders, and operators. The resulting diffusion of responsibility has led many scholars and international organisations to identify a potential “accountability gap” in the regulation of autonomous weapons.⁹

It is precisely to address such challenges that IHL incorporates mechanisms for the review of new means and methods of warfare, particularly through Article 36 of Additional Protocol I. Consequently, Article 36 review process has become one of the central legal tools through which states assess the legality of emerging AWS.

ARTICLES 35 AND 36 OF ADDITIONAL PROTOCOL I AND THE LEGAL REVIEW OF NEW WEAPONS

Adopted in 1977, Additional Protocol I emerged in response to the profound transformations in warfare witnessed in the decades following World War II. The Geneva Conventions of 1949 had established a comprehensive framework for the protection of victims of armed conflict, but they were largely silent on the regulation of rapidly evolving means and methods of warfare. By the 1960s and the 1970s, technological developments, including advanced aerial bombardment, precision-guided munitions, and new forms of conventional and unconventional weaponry, had exposed the limitations of a system that relied primarily on the prohibition of specific weapons rather than the articulation of general principles. At the same time, decolonisation and the rise of non-international conflicts further complicated the legal landscape, demanding a more adaptable and universally applicable framework.

Additional Protocol I represented a decisive step forward. It shifted the focus of IHL from enumerating prohibited weapons to establishing

overarching principles, such as distinction, proportionality, and precaution, that would apply to all weapons systems, including those not yet developed. In doing so, it marked an effort to move from reactive prohibition towards a more anticipatory form of legal regulation. Central among these were the principles of **distinction** and **precaution**: attacks must be directed only at military objectives; and all feasible measures must be taken to minimise civilian harm. This articulation of overarching constraints represented one of the most significant developments in the evolution of IHL.

As Additional Protocol I established principles intended to apply to all means and methods of warfare, including those not yet invented, it sought to provide a more adaptable legal framework capable of responding to future technological change.

This evolution was grounded in a fundamental legal constraint articulated in Article 35 of the protocol, which established the substantive boundary of lawful warfare. It affirmed that not all technological innovations are permissible and that weapons must conform to the principles of humanity and military necessity. As per Article 35:

In any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited. It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.¹⁰

Thus, by establishing the substantive limits of lawful warfare, Article 35 confirms that military necessity does not provide unlimited freedom in the development or use of weapons, and that all means and methods of warfare remain subject to humanitarian constraints. For contemporary debates surrounding LAWS, Article 35 serves as the foundational legal benchmark against which emerging technologies must ultimately be measured.

It is within this normative framework that Article 36 operates. While Article 35 defines the limits, Article 36 provides the mechanism through which states are required to assess whether new weapons, including

emerging technologies such as LAWS, fall within those limits. Article 36 reads as follows:

In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party.¹¹

In this sense, Article 35 answers the question of legality in principle; Article 36 asks whether that legality can be determined in practice. Article 36 transforms the general principles embodied in Article 35 into a practical obligation. States are required to assess the legality of new weapons, means, and methods of warfare before their deployment, examining whether their use would be prohibited under IHL or any other applicable rule of international law. In the context of LAWS, Article 36 has become the principal legal mechanism through which states evaluate the compatibility of autonomous systems with existing humanitarian norms.

Unlike the Geneva Conventions, which enjoy universal ratification, Additional Protocol I has not achieved universal acceptance. While it has been widely ratified, several key military powers, including the US and Israel, and India are not parties. This uneven participation raises important questions regarding the uniform application and enforcement of its provisions in contemporary conflicts.

The 1974 Diplomatic Conference on IHL, in Geneva, which led to Additional Protocol I, also laid the groundwork for a more systematic approach to regulating specific weapons. The conference recognised the need for a dedicated forum to address the challenges posed by evolving technologies and called for a separate conference to consider the regulation of specific conventional weapons.

This call led to the 1980 CCW, a framework convention that has become a cornerstone of international efforts to control the use of weapons that may cause excessive injury or have indiscriminate effects. The CCW

established a process for states to negotiate protocols addressing specific types of weapons, such as incendiary weapons, blinding laser weapons, and explosive remnants of war. The CCW and its relevance to contemporary debates surrounding LAWS is examined in the next chapter.

THE MARTENS CLAUSE AND EMERGING TECHNOLOGIES

The legal assessment of autonomous weapon systems is not confined to Articles 35 and 36 of Additional Protocol I. IHL also incorporates a broader humanitarian safeguard through the Martens Clause¹², which has acquired renewed significance in debates concerning emerging military technologies. Originally proposed by the Russian jurist and diplomat Fyodor Fyodorovich Martens during negotiations at the First Hague Peace Conference in 1899, the Martens Clause emerged as a diplomatic compromise to address situations not expressly regulated by treaty law. It read as follows:

“Until a more complete code of the laws of war is issued, the High Contracting Parties think it right to declare that in cases not included in the Regulations adopted by them, populations and belligerents remain under the protection and empire of the principles of international law, as they result from the usages established between civilized nations, from the laws of humanity and the requirements of the public conscience.”

It has subsequently been incorporated into several IHL instruments, including Article 1(2) of Additional Protocol I, which provides:

”In cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience.”

This provision does not establish a new category of prohibited weapons but confirms that where treaty law is incomplete or silent, the legality of new means and methods of warfare must continue to be assessed

in light of customary international law, the **principles of humanity, and the dictates of public conscience**.

The **principles of humanity** reflect the fundamental humanitarian values that underpin IHL. They reinforce the proposition that military necessity is not unlimited and that the development and employment of weapons must remain consistent with the protection of human dignity and the minimisation of unnecessary suffering.

The **dictates of public conscience**, by contrast, recognise that the legality of emerging technologies cannot be assessed solely through technical compliance with existing treaty provisions. They reflect the evolving moral judgement of the international community, as expressed through state practice, international organisations, judicial decisions, expert opinion, and wider humanitarian concern. Consequently, even where no treaty expressly prohibits a particular weapon, widespread international rejection may influence the interpretation and future development of IHL.

The Martens Clause has therefore assumed particular importance in discussions concerning autonomous weapon systems. Since no treaty specifically regulates the delegation of lethal decision-making to AI, many scholars, the International Committee of the Red Cross, and numerous participants in the Convention on Certain Conventional Weapons process argue that the legality of autonomous weapons must also be evaluated against these broader humanitarian principles. Others maintain that the clause functions primarily as an interpretative principle rather than an independent source of legal obligations. Nevertheless, there is broad agreement that it reinforces the continuing applicability of humanitarian values to technological developments not expressly addressed by existing treaties.

The Martens Clause complements Articles 35 and 36 of Additional Protocol I. Whereas Article 35 establishes the substantive limits governing lawful weapons and Article 36 requires States to review new means and methods of warfare before their adoption, the Martens Clause ensures that technological innovation remains subject to the enduring principles of humanity even where positive treaty law has yet to evolve.

Figure 4.2 Marten Clause in the Age of AI



Source: Prepared by the author using OpenAI’s generative AI tools; content reviewed, verified, and finalised by the author.

PRINCIPAL LEGAL CHALLENGES PRESENTED BY LETHAL AUTONOMOUS WEAPON SYSTEMS UNDER IHL

The foregoing analysis demonstrates that autonomous weapon systems remain subject to the existing framework of IHL. The principal legal issues examined in this chapter are summarised in Table 4. 2. Collectively, they illustrate that the central challenge lies not in the absence of an applicable legal framework, but in the increasingly complex task of applying established IHL principles to weapon systems capable of independently performing functions traditionally exercised by human decision-makers.

CONCLUSION

The foregoing analysis demonstrates that autonomous weapon systems remain governed by the existing framework of IHL. However, the application of that framework to increasingly autonomous technologies exposes practical, legal, and normative challenges that were not

envisaged when many of these rules were developed. While the core principles of IHL remain applicable, their implementation becomes progressively more complex as decision-making functions are delegated to machines.

However, the existence of an applicable legal framework has not resolved the broader international debate. As advances in AI have accelerated, questions concerning the adequacy of existing law, the preservation of meaningful human judgement, and the need for new international regulation have become the subject of increasing scholarly, humanitarian, and diplomatic attention. The next chapter therefore examines how these concerns evolved from academic discussion into one of the most significant contemporary debates in IHL, culminating in sustained deliberations within the framework of the Convention on Certain Conventional Weapons (CCW).

Notes:

- ¹ See Noel Sharkey, “The Evitability of Autonomous Robot Warfare,” *International Review of the Red Cross*, Vol. 94, No. 886 (2012), pp. 787–799; United Nations Institute for Disarmament Research (UNIDIR), *The Interpretation and Application of International Humanitarian Law to Lethal Autonomous Weapon Systems* (Geneva: UNIDIR, 2025); and International Committee of the Red Cross, *Autonomous Weapon Systems: Technical, Military, Legal and Humanitarian Aspects* (Geneva: ICRC, 2014). Collectively, these works identify the principal legal and operational challenges associated with applying the core principles of International Humanitarian Law to autonomous weapon systems, particularly in relation to contextual judgement, distinction, proportionality, predictability, and human control.
- ² Article 48 states “In order to ensure respect for and protection of the civilian population and civilian objects, the Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives.”
- ³ Article 51 of Additional Protocol I protects the civilian population by prohibiting attacks directed against civilians, acts or threats of violence intended to spread terror among civilians, indiscriminate attacks, and attacks expected to cause incidental civilian harm that would be excessive in relation to the concrete and direct military advantage anticipated.
- ⁴ Article 52 provides general protection to civilian objects and defines military objectives as those objects which, by their nature, location, purpose, or use, make an effective contribution to military action and whose destruction, capture, or neutralisation offers a definite military advantage.

- ⁵ Additional Protocol I has been ratified or acceded to by 174 States, reflecting its broad international acceptance, although several militarily significant States including the United States, India, Israel, and Pakistan are not State Parties. Many of its core provisions, particularly those relating to distinction, proportionality, and precautions in attack, are nevertheless widely regarded as reflecting customary international humanitarian law. International Committee of the Red Cross. Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I): States Parties and Signatories. Available at the ICRC treaty database <https://ihl-databases.icrc.org/en/ihl-treaties/api-1977/state-parties?utm>, accessed on 07 July 2026.
- ⁶ ICRC, Customary International Humanitarian Law Database, Rule 14, 'Proportionality in Attack', <https://ihl-databases.icrc.org/en/customary-ihl/v1/rule14>, accessed on 13 July 2026.
- ⁷ Article 57 of the 1977 Additional Protocol I to the Geneva Conventions establishes legally binding "Precautions in attack." It requires military planners to take all feasible measures to verify that targets are military objectives, minimize incidental harm to civilians and civilian objects, and cancel or suspend attacks if the civilian toll becomes disproportionate.
- ⁸ Protocol Additional to the Geneva Conventions of 12 August 1949 (Additional Protocol I), art. 57; see also International Committee of the Red Cross, *Commentary on the Additional Protocols of 8 June 1977* (Geneva: Martinus Nijhoff, 1987).
- ⁹ Philip Alston, "Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions", UNGA Report A/65/321, UN, New York, 2010; Human Rights Watch, "Heed the Call: A Moral and Legal Imperative to Ban Killer Robots", New York, 2018; Sharkey, "The Evitability of Autonomous Robot Warfare"; and United Nations Human Rights Council, "Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, Christof Heyns", UNGA Report A/HRC/23/47, UN, Geneva, 2013.
- ¹⁰ Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), adopted 8 June 1977, entered into force 7 December 1978, 1125 UNTS 3, art. 35.
- ¹¹ Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), adopted 8 June 1977, entered into force 7 December 1978, 1125 UNTS 3, art. 36.
- ¹² Convention (II) with Respect to the Laws and Customs of War on Land, The Hague, 29 July 1899, Preamble; Rupert Ticehurst, "The Martens Clause and the Laws of Armed Conflict," *International Review of the Red Cross*, No. 317, 1997, pp. 125–134.

THE CCW PROCESS: EVOLUTION, NEGOTIATION, AND ITS ROLE IN THE IHL DEBATE ON LAWS

This chapter traces the emergence of LAWS as an international legal issue, examines the institutional evolution of the CCW, analyses the humanitarian lessons of its five Protocols, and explains why the CCW has become the principal multilateral forum for negotiating the governance of autonomous weapons. Although the technological foundations of AWS were laid through decades of advances in robotics, artificial intelligence, sensor technologies, and unmanned platforms, they did not emerge as a distinct subject of international legal and policy concern until the early twenty-first century. By then, rapid advances in machine perception, computational power, and autonomous navigation had fuelled growing military interest in reducing human involvement across an expanding range of battlefield functions, including navigation, surveillance, target detection, and defensive engagements. As increasingly autonomous systems became technologically feasible, legal scholars, ethicists, military practitioners, and roboticists began questioning whether decisions traditionally reserved for humans could legitimately be delegated to machines. At the centre of this debate lay fundamental principles of international humanitarian law, including distinction, proportionality, precaution, accountability, and the continuing role of human judgement in decisions involving the use of lethal force. The central question was no longer whether autonomous technologies could be developed, but whether they could be employed consistently with the requirements of international humanitarian law.

THE EMERGENCE OF THE INTERNATIONAL DEBATE ON LAWS

A decisive turning point occurred in 2010 when Philip Alston, then the United Nations Special Rapporteur on Extrajudicial, Summary or

Arbitrary Executions, became the first United Nations official to draw sustained international attention to the legal and ethical implications of increasingly autonomous weapon systems. In his report to the United Nations General Assembly¹, Alston warned that rapid advances in robotics and autonomous technologies could soon produce weapon systems capable of selecting and engaging targets with minimal or no meaningful human intervention, raising profound questions concerning accountability, civilian protection, and compliance with international law. Rather than advocating an immediate prohibition, he called for sustained international scrutiny and expert assessment to determine whether existing legal frameworks remained adequate to govern these emerging technologies. In doing so, Alston identified many of the issues that would subsequently shape the international debate on LAWS.²

These concerns were reinforced by Christof Heyns, Alston's successor as Special Rapporteur, whose 2013 report argued that decisions involving the use of lethal force must remain subject to meaningful human control and called for greater clarity regarding definitions, responsibility, and legal oversight.³ Together, the Alston and Heyns reports placed autonomous weapons firmly on the international agenda and contributed to the CCW convening informal Meetings of Experts on LAWS from 2014. Building on these discussions, the Fifth Review Conference of the CCW established the Group of Governmental Experts (GGE) on LAWS in December 2016, with its first formal session held in 2017. The GGE remains the principal multilateral forum for international deliberations on autonomous weapons.

CCW: AN EVOLUTIONARY FRAMEWORK FOR REGULATING EMERGING WEAPONS TECHNOLOGIES

Before examining the evolution of the CCW process on LAWS, it is useful to understand how the Convention itself evolved. The CCW did not emerge as a forum for autonomous weapons in isolation. Its authority rests on more than four decades of experience in responding to successive humanitarian challenges posed by new weapons technologies. The evolution of its five protocols demonstrates how the Convention has historically balanced military necessity with humanitarian concerns through incremental, consensus-based regulation. This historical experience provides the institutional and normative

context within which contemporary discussions on LAWS have developed.

The CCW has seen the adoption of successive protocols, each negotiated in response to a distinct humanitarian concern arising from developments in weapons technology. This evolutionary approach reflects the practical realities of arms control, where international consensus is more readily achieved through targeted regulation than comprehensive prohibition. Collectively, the protocols demonstrate how the Convention has sought to reconcile military necessity with humanitarian considerations while progressively shaping state practice, military doctrine, and normative expectations. The following overview is not intended to provide a detailed history of each protocol. Rather, it highlights the principal humanitarian lesson contributed by each and explains how, together, they transformed the CCW into the institutional and normative foundation upon which contemporary international discussions on LAWS have developed.

INSTITUTIONAL FRAMEWORK, PARTICIPATION, AND NEGOTIATING PROCESS OF THE CCW

Although the CCW is an inter governmental treaty, its deliberative process extends beyond the High Contracting Parties. Meetings of the High Contracting Parties, Review Conferences, and the Group of Governmental Experts (GGE) routinely bring together a diverse range of participants, each performing distinct legal, technical, humanitarian, and advisory functions. While formal decision-making remains the exclusive prerogative of the High Contracting Parties acting by consensus, the broader participation of international organisations, civil society, academia, and industry has become an important feature of the contemporary CCW process. Table 5.1 summarises the principal categories of participants and their respective roles:

Table 5.1: Participation in the CCW Process

Category	Current Status	Representative Participants	Role in the CCW Process
High Contracting Parties	128 States Parties	States Parties to the CCW	Negotiate, submit working papers, make statements, establish mandates, and adopt decisions by consensus.
Signatory States	50 Signatories	States that have signed but not ratified the Convention	May participate in certain meetings but do not take part in consensus decision-making until becoming High Contracting Parties.
Observer States	Invited non-party States	States not party to the CCW invited by the Meeting of High Contracting Parties	Attend meetings, deliver statements, and contribute to discussions without participating in formal decisions.
United Nations	Secretariat	UNODA, UN Secretariat	Provides conference services, documentation, treaty support, and administrative assistance.
International Organisations	Observers /Experts	ICRC, UNIDIR, OPCW (where relevant), regional organisations	Provide legal analysis, humanitarian expertise, technical advice, and research.
Civil Society Organisations	Observers	Campaign to Stop Killer Robots, Article 36, Human Rights Watch, PAX and others	Undertake advocacy, submit research, provide legal and technical analysis, and participate in informal consultations.
Academic and Research Institutions	Experts	Universities, think tanks, independent researchers	Provide technical, legal, ethical, military, and policy expertise through presentations and written submissions.

Category	Current Status	Representative Participants	Role in the CCW Process
Industry and Technical Experts	Experts	Defence industry, AI developers, robotics specialists	Explain emerging technologies, operational capabilities, technical limitations, and implementation challenges.
Note : Unlike many multilateral treaties, the CCW permits States to become Parties to the Convention without accepting all of its Protocols. Each Protocol requires separate consent, resulting in different levels of participation. As of June 2026 the status is as under: - Protocol I (Non-Detectable Fragments) has 119 States Parties; - Amended Protocol II (Mines, Booby-Traps and Other Devices) has 106; - Protocol III (Incendiary Weapons) has 115; - Protocol IV (Blinding Laser Weapons) has 109; and - Protocol V (Explosive Remnants of War) has 97 States Parties.			
Verifying State Participation in International Humanitarian Law Treaties The International Committee of the Red Cross (ICRC) maintains the authoritative online database of international humanitarian law treaties and State participation. The database enables users to verify the status of every State with respect to the Geneva Conventions, the Additional Protocols, the Convention on Certain Conventional Weapons (CCW) and its Protocols, the Hague Conventions, the Biological Weapons Convention, the Chemical Weapons Convention, the Convention on Cluster Munitions, the Anti-Personnel Mine Ban Convention, and numerous other IHL instruments. It also categorises treaties by subject area and provides, for each State, information on signatures, ratifications, accessions, reservations, declarations, and the date on which the treaty entered into force. Readers may consult the ICRC Treaties, States Parties and Commentaries Database to verify treaty participation by State or by treaty category, including the Geneva Conventions, the CCW and its Protocols, and other international humanitarian law treaties at https://ihl-databases.icrc.org/en.			

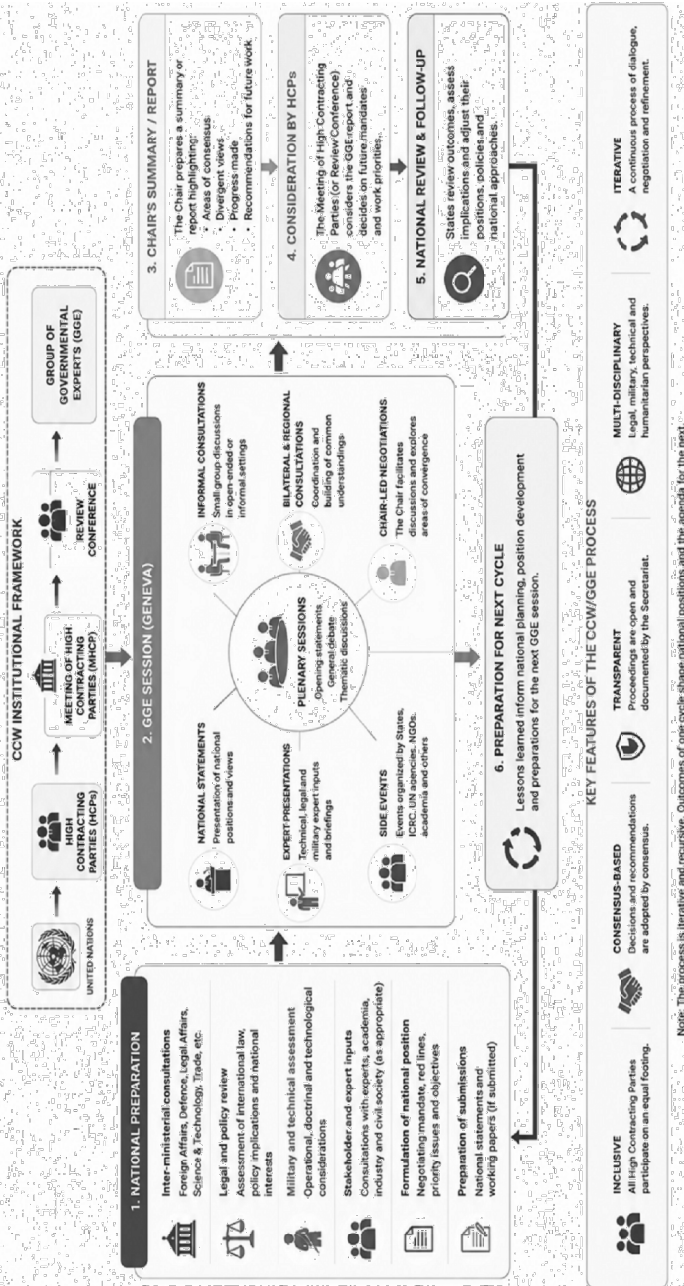
Source: Compiled by Author

The participation of these diverse stakeholders has become particularly significant in discussions on autonomous weapon systems, where legal, ethical, military, technological, and humanitarian considerations intersect. Despite this broad participation, the CCW remains a State-driven process in which only the High Contracting Parties possess decision-making authority, and all substantive outcomes continue to be adopted by consensus.

THE CCW NEGOTIATING PROCESS: FROM NATIONAL PREPARATION TO MULTILATERAL NEGOTIATION

The work of the GGE extends far beyond the formal sessions held in Geneva. The positions presented during negotiations are the product of an extensive preparatory process undertaken by participating States, involving legal, military, technological, diplomatic, and policy assessments, inter-ministerial consultations, and the formulation of national negotiating positions. During the GGE sessions, these national positions are refined through plenary discussions, informal consultations, bilateral engagements, and expert exchanges before contributing to the Chair's report and any emerging areas of consensus. The institutional framework of the CCW and the typical negotiation cycle are illustrated in Figures 5.1 that follows.

Figure 5.1: The CCW/GGE Negotiation Process
THE CCW/GGE NEGOTIATION PROCESS
 From National Preparation to Multilateral Outcomes



Source: Prepared by the author using OpenAI's generative AI tools; content reviewed and verified by the author. An illustrative national preparation process for India is presented at the end of this chapter.

EVOLUTION OF THE FIVE PROTOCOLS: PROGRESSIVE HUMANITARIAN GAINS

The five Protocols were negotiated in response to a specific humanitarian challenge arising from developments in weapons technology. The following discussion highlights the principal contribution of each protocol rather than providing a detailed historical account.

Protocol I: Non-Detectable Fragments

Protocol I prohibits weapons designed to injure through fragments that cannot be detected by X-rays, thereby reinforcing the IHL prohibition against weapons that cause unnecessary suffering or superfluous injury. Its significance lies less in the specific weapon than in the regulatory approach it introduced. Rather than prohibiting an entire category of weapons, the Protocol targeted a particular design feature considered incompatible with humanitarian principles. In doing so, it demonstrated that effective humanitarian regulation can intervene at the design stage of weapon development, eliminating harmful characteristics while preserving legitimate military capabilities. This preventive, design-based approach continues to provide an important precedent for contemporary discussions on the regulation of emerging technologies, including LAWS.

Amended Protocol II: Mines, Booby-Traps, and Other Devices—Regulating Persistence and Indiscriminate Harm

Originally adopted as Protocol II in 1980 and substantially revised through Amended Protocol II in 1996,⁴ the Protocol represents one of the CCW's most significant efforts to regulate weapons whose humanitarian consequences persist long after active hostilities have ceased. Although landmines are not classified as Lethal Autonomous Weapon Systems, they represent an early form of autonomous weapon operation in that, once emplaced and activated, they function without further human intervention. Rather than exercising intelligence or judgement, they respond automatically to predefined triggering conditions. Their humanitarian consequences became starkly apparent during the late twentieth century, particularly in Afghanistan, Cambodia, Angola, and

Mozambique, where millions of mines remained active long after hostilities had ceased, causing civilian casualties, impeding reconstruction, and delaying the return of displaced populations.

Rather than prohibiting mines outright, Amended Protocol II sought to reduce their indiscriminate effects through a combination of technical, operational, and humanitarian safeguards. Among its principal requirements were: detectability requirements for anti-personnel mines;⁵ the recording of minefield locations; the marking, fencing, and monitoring of mined areas; clearance, removal, or destruction of mines after hostilities; self-destruction and self-deactivation mechanisms for remotely delivered mines; restrictions on transfers of non-compliant mines; the extension of the Protocol to non-international armed conflicts; and the obligation to take all feasible precautions to protect civilians from the effects of mines, booby-traps, and other devices.

Amended Protocol II reflected an attempt to reconcile military necessity with humanitarian protection. Many States continued to regard mines as legitimate weapons for area denial, border defence, and force protection, making consensus on a comprehensive prohibition unattainable. The regulatory approach therefore focused on mitigating humanitarian harm rather than eliminating the weapon itself. In practice, however, incomplete recording, unreliable self-destruct mechanisms, and inadequate clearance meant that civilian casualties continued long after conflicts had ended.

The Ottawa Convention: From Regulation to Prohibition

Mines continued to be deployed in ways that failed to meet recording requirements; self-destruct features proved unreliable in practice; and clearance efforts lagged far behind the scale of contamination. As a result, civilian casualties remained high and the long-term humanitarian impact persisted. These shortcomings gave rise to growing dissatisfaction among states, humanitarian organisations, and civil society actors. This culminated in the 1997 Anti-Personnel Mine Ban Convention (more commonly known as the Ottawa Convention), which prohibits the use, production, stockpiling, and transfer of anti-personnel mines. The Convention emerged outside the CCW after consensus on a comprehensive prohibition proved unattainable within its framework.⁶

The relationship between Amended Protocol II and the Ottawa Convention illustrates an enduring feature of the evolution of international humanitarian law. Where consensus within the CCW proved insufficient to support a comprehensive prohibition, humanitarian concerns gave rise to a parallel treaty process. Protocol II established many of the technical and legal foundations upon which the Ottawa Convention subsequently built, demonstrating the CCW's continuing role in the progressive development of humanitarian norms.

This experience offers an important lesson for contemporary debates on autonomous weapon systems. While incremental regulation may reduce humanitarian risks, technologies that fundamentally challenge the principles of international humanitarian law may ultimately generate demands for more comprehensive normative responses beyond the CCW framework.

Protocol III: Incendiary Weapons—Regulating Visibility, Suffering, and the Limits of Restraint

Protocol III regulates the use of incendiary weapons, such as napalm and other weapons primarily designed to set fire to objects or cause burn injuries. Unlike fragmentation or blast weapons, incendiary weapons inflict prolonged suffering through intense heat and fire, while their effects may spread unpredictably, particularly in populated areas. The humanitarian consequences of their widespread use during the Vietnam War generated international concern and contributed to demands for legal regulation.

Rather than prohibiting incendiary weapons outright, Protocol III imposes restrictions on their use. It prohibits attacks using air-delivered incendiary weapons against military objectives located within concentrations of civilians and restricts the use of other incendiary weapons where civilians may be affected. In doing so, the Protocol gives practical effect to the core IHL principles of distinction, proportionality, and precautions in attack.

The Protocol reflects a negotiated compromise. It distinguishes between air-delivered and ground-delivered incendiary weapons, imposing stricter restrictions on the former. This distinction has been criticised

because the humanitarian consequences depend less on the method of delivery than on the effects of the weapon in the circumstances of its use. The Protocol therefore regulates and not prohibits incendiary weapons, preserving military utility while seeking to reduce civilian harm.

Protocol III illustrates an important characteristic of the CCW framework. Rather than eliminating every weapon capable of causing severe humanitarian consequences, the CCW often seeks to regulate the conditions under which such weapons may be employed. This experience offers an important lesson for contemporary debates on autonomous weapon systems: where complete prohibition proves politically unattainable, carefully tailored restrictions may provide an alternative means of balancing military necessity with humanitarian protection.

Protocol IV: Blinding Laser Weapons—A Model of Preventive Regulation

Protocol IV is widely regarded as one of the CCW's most successful achievements. It remains one of the few examples in modern arms control where international law acted before a technology became widely operational or strategically entrenched. Rather than responding to humanitarian harm after the fact, states collectively chose to prevent the emergence of an entire category of weapons considered fundamentally incompatible with humanitarian principles. Adopted in 1995, it pre-emptively prohibited laser weapons specifically designed to cause permanent blindness. What distinguishes this protocol is its anticipatory character as it was negotiated and adopted before such weapons became widely deployed on the battlefield. This preventive approach marked a significant departure from the traditional pattern of arms regulation, which often follows widespread humanitarian harm. Instead, Protocol IV demonstrated that the international community could act before a technology became normalised, thereby avoiding the cycle of use, outrage, and delayed prohibition.

In practical terms, it helped ensure that blinding laser weapons never entered mainstream military arsenals, effectively eliminating an entire category of inhumane weaponry at inception. The protocol also reinforced a critical normative principle: certain forms of harm, such

as irreversible, targeted blindness, are inherently unacceptable, regardless of their potential military utility. By establishing this boundary early, it shaped both state behaviour and weapons development pathways, embedding humanitarian considerations into the innovation process itself.

For advocates of preventive regulation of LAWS, Protocol IV represents the closest historical precedent for acting before humanitarian harm becomes widespread and strategically entrenched. In the context of AWS, where capabilities are still evolving, it underscores the importance of acting before deployment creates strategic dependence and political resistance to regulation. In this sense, Protocol IV stands as a rare but powerful example of how international law can function not merely as a response mechanism but also as a tool of prevention, shaping the future conduct of warfare rather than reacting to its consequences.

Protocol V: Explosive Remnants of War—Extending Responsibility beyond the Battlefield

Protocol V, on explosive remnants of war, represents a significant evolution in the CCW framework, shifting attention from the immediate effects of weapons to their long-term humanitarian consequences. It addresses the dangers posed by unexploded ordnance (UXO) and abandoned explosive device remnants that continue to kill, injure, and disrupt civilian life long after active hostilities have ceased. Unlike other protocols that regulate the use or design of weapons, Protocol V focuses on the aftermath of conflict, recognising that the impact of warfare is not confined to the battlefield or the duration of hostilities. In doing so, it broadens the temporal horizon of humanitarian law from the conduct of war to the legacy of war, emphasising that responsibility does not necessarily end when hostilities cease.

In many post-conflict environments UXO munitions remain embedded in civilian spaces, such as fields, roads, and homes, transforming everyday activities into life-threatening risks. In countries affected by prolonged conflicts, such as Laos, Lebanon, and Iraq, UXO contamination has obstructed agricultural use, delayed infrastructure reconstruction, and perpetuated cycles of displacement and poverty.

To address these humanitarian challenges, Protocol V establishes positive obligations⁷ requiring High Contracting Parties to:

1. Clear, remove, or destroy explosive remnants of war (Article 3);
2. Record, retain, and share information concerning explosive ordnance (Article 4);
3. Other precautions for the protection of the civilian population, individual civilians, and civilian objects from the risks and effects of explosive remnants of war, including warnings, risk education, marking, fencing, and monitoring of affected areas where feasible. (Article 5);
4. Assistance with respect to existing explosive remnants of war (Article 7);
5. International cooperation, technical assistance, and support for victims and affected communities (Article 8).

These obligations mark an important shift in IHL: from restricting conduct during hostilities to mandating responsibility after conflict ends. In doing so, the Protocol reinforces the principle that States remain accountable not only for how they fight wars but also for the enduring humanitarian consequences of the weapons they employ. Its relevance is particularly evident in the context of cluster munitions, whose high failure rates can leave behind large numbers of unexploded submunitions that continue to endanger civilian populations long after hostilities have ceased. During discussions within the CCW, efforts were made to address these humanitarian concerns by improving the technical reliability of cluster munitions, including proposals requiring self-destruct and self-deactivation mechanisms to minimise unexploded remnants. However, Protocol V itself neither regulates nor prohibits the use of cluster munitions, instead addressing only their post-conflict consequences through obligations relating to clearance, information sharing, risk education, and victim assistance.

The Emergence of the Convention on Cluster Munitions (CCM)

The inability of States Parties to reach consensus within the CCW on a legally binding instrument specifically regulating cluster munitions

ultimately led to the separate Oslo Process, culminating in the adoption of the 2008 Convention on Cluster Munitions (CCM).⁸ The CCM prohibits the use, production, stockpiling, and transfer of cluster munitions. India, however, is not a Party to the Convention, maintaining that legitimate military requirements, national security considerations, and the absence of universal participation make a comprehensive prohibition inappropriate.⁹ Instead, India has supported efforts to improve the reliability and safety of cluster munitions, including the incorporation of self-destruct and self-deactivation features to reduce unexploded ordnance. This development illustrates a recurring pattern within the evolution of weapons law: where consensus cannot be achieved within the CCW, humanitarian concerns have at times prompted negotiations through alternative diplomatic processes. The CCW has frequently provided the technical expertise, normative framework, and negotiating experience upon which subsequent legal instruments have been built.

LESSONS FROM THE CCW EXPERIENCE FOR AUTONOMOUS WEAPONS

Taken together, Protocols I–V of the CCW reveal a clear trajectory in the evolution of IHL, from regulating specific weapon effects to addressing the broader humanitarian consequences of warfare across time, space, and technological design (Table 5.2). Protocol I intervenes at the level of weapon design, eliminating particularly harmful characteristics before they proliferate. Protocol II attempts to manage persistent and indiscriminate harm, though with limited success, ultimately prompting stronger parallel regimes. Protocol III reflects the challenge of constraining weapons whose effects, such as fire, are inherently difficult to control, highlighting the limits of partial regulation. Protocol IV stands out as a rare instance of anticipatory prohibition, demonstrating that timely normative action can prevent the emergence of inhumane technologies altogether. Finally, Protocol V extends the reach of IHL beyond active hostilities, embedding responsibility for the long-term legacy of conflict.

Table 5.2: CCW Protocols and their Regulatory Logic

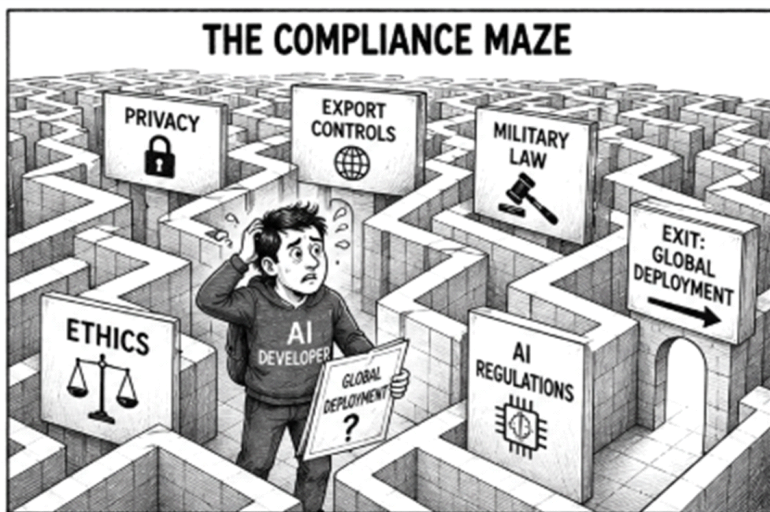
Protocol	Core Focus	Type of Regulation	Humanitarian Problem Addressed	Key Achievement	Limitation	Relevance for Emerging Tech (LAWS/AI)
Protocol I (Non-detectable Fragments)	Weapon design	Design-based prohibition	Undetectable injuries causing prolonged suffering.	Prevented adoption of harmful design features.	Narrow scope.	Model for regulating harmful system features (e.g., opaque algorithms).
Protocol II (Mines, Booby Traps)	Persistent weapons	Use regulation plus technical constraints	Indiscriminate and long-term civilian harm.	Introduced rules on detectability, recording, and clearance.	Failed to eliminate anti-personnel mines led to Ottawa Convention.	Shows limits of regulation where harm is systemic and enduring.
Protocol III (Incendiary Weapons)	Effects of fire	Use restrictions	Uncontrollable, widespread burns and destruction.	Reinforced IHL principles (distinction, proportionality).	Partial regulation; loopholes remain.	Illustrates difficulty of regulating unpredictable, environment-driven effects.
Protocol IV (Blinding Lasers)	Specific weapon category	Pre-emptive prohibition	Permanent, irreversible blindness.	Prevented deployment of an inhumane weapon.	Rare success; conditions not easily replicable.	Strong model for anticipatory regulation of AI/autonomous systems.
Protocol V (Explosive Remnants of War)	Post-conflict harm	Obligations after use	UXO causing long-term civilian risk.	Extended IHL into post-conflict phase.	Does not ban source weapons (e.g., cluster munitions).	Highlights need to regulate long-term/systemic consequences of technology.

Source: Author.

The evolution of the five Protocols demonstrates how the CCW has repeatedly adapted to humanitarian challenges arising from technological change. The emergence of LAWS, however, presented a qualitatively different challenge. Unlike earlier negotiations, which focused on regulating the characteristics or humanitarian effects of particular weapons, LAWS raised more fundamental questions concerning human control, accountability, and the delegation of decisions over the use of force to machines. These unprecedented issues led States Parties to establish a dedicated process within the CCW to examine the legal, ethical, military, and technological implications of autonomous weapons.

Collectively, these Protocols demonstrate that the CCW has historically responded to humanitarian concerns arising from new weapons technologies through incremental, consensus-based regulation. Autonomous weapons, however, presented a qualitatively different challenge. Rather than regulating the effects of a particular weapon, the debate shifted to whether the delegation of lethal decision-making to machines remained compatible with the fundamental principles of International Humanitarian Law. It was this unprecedented challenge that led States Parties to establish the Group of Governmental Experts (GGE) on Lethal Autonomous Weapon Systems.

Figure 5.2: International Compliance Maze



Source: Prepared by the author using OpenAI's generative AI tools

THE GGE'S 11 GUIDING PRINCIPLES ON LAWS

Since its establishment, the GGE has served as the principal multilateral forum for negotiations on LAWS. Its discussions have focused on the definition of autonomy, meaningful human control, accountability, and the applicability of IHL. Although significant differences remain among States, the GGE's most important achievement has been the adoption, in 2019, of the 11 Guiding Principles on Emerging Technologies in the Area of LAWS, summarised in Table 5.3 below.

Table 5.3: The Eleven Guiding Principles on LAWS Adopted by the CCW (2019)

Guiding Principle	Summary
1	International humanitarian law continues to apply fully to all weapons systems, including the potential development and use of lethal autonomous weapons systems.
2	Human responsibility for decisions on the use of weapons systems must be retained since accountability cannot be transferred to machines. This should be considered across the entire life cycle of the weapons system.
3	Human-machine interaction, which may take various forms and be implemented at various stages of the life cycle of a weapon, should ensure that the potential use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems is in compliance with applicable international law, in particular IHL. In determining the quality and extent of human-machine interaction, a range of factors should be considered including the operational context, and the characteristics and capabilities of the weapons system as a whole.
4	Accountability for developing, deploying and using any emerging weapons system in the framework of the CCW must be ensured in accordance with applicable international law, including through the operation of such systems within a responsible chain of human command and control.
5	In accordance with States' obligations under international law, in the study, development, acquisition, or adoption of a new weapon, means or method of warfare, determination must be made whether its employment would, in some or all circumstances, be prohibited by international law.

Guiding Principle	Summary
6	When developing or acquiring new weapons systems based on emerging technologies in the area of lethal autonomous weapons systems, physical security, appropriate non-physical safeguards (including cyber-security against hacking or data spoofing), the risk of acquisition by terrorist groups and the risk of proliferation should be considered.
7	Risk assessments and mitigation measures should be part of the design, development, testing and deployment cycle of emerging technologies in any weapons systems.
8	Consideration should be given to the use of emerging technologies in the area of lethal autonomous weapons systems in upholding compliance with IHL and other applicable international legal obligations.
9	In crafting potential policy measures, emerging technologies in the area of lethal autonomous weapons systems should not be anthropomorphized.
10	Discussions and any potential policy measures taken within the context of the CCW should not hamper progress in or access to peaceful uses of intelligent autonomous technologies.
11	The CCW offers an appropriate framework for dealing with the issue of emerging technologies in the area of lethal autonomous weapons systems within the context of the objectives and purposes of the Convention, which seeks to strike a balance between military necessity and humanitarian considerations.

Source: CCW, *Report of the 2019 Session of the Group of Governmental Experts on Emerging Technologies in the Area of LAWS*, Annex IV, Guiding Principles, UN Doc. **CCW/GGE.1/2019/3**.

The 2019 Guiding Principles reaffirm that international humanitarian law applies fully to all weapons systems, including those incorporating autonomous functions, and emphasise that responsibility for decisions relating to the use of force must remain with human actors. Although politically significant, the Guiding Principles are not legally binding and leave unresolved fundamental disagreements concerning the degree of human control required, the definition of LAWS, and the desirability of negotiating new international legal restrictions. Consequently, despite

more than a decade of discussions, the CCW process has yet to produce a legally binding instrument governing autonomous weapon systems. However, it remains the principal international forum through which States continue to negotiate the relationship between technological innovation, military necessity, humanitarian protection, and human accountability.

Article 36 Weapons Reviews: A Notable Omission

A noteworthy feature of the Guiding Principles is the absence of any explicit reference to Article 36 of Additional Protocol I, notwithstanding the widespread recognition within the CCW process that national weapons reviews constitute an important safeguard for assessing the legality of emerging weapons technologies. This omission reflects the fact that the CCW includes States that are not Parties to Additional Protocol I and are therefore not legally bound by Article 36. Accordingly, the absence of an explicit reference should not be interpreted as diminishing the importance of weapons reviews; rather, it represents a negotiated compromise intended to preserve consensus among States with differing treaty obligations while allowing broader agreement on the application of IHL to autonomous weapon systems.

CCW and the Limits of Consensus-based Regulation

Although the CCW remains the principal multilateral forum for discussions on LAWS, its consensus-based decision-making process has struggled to keep pace with rapid technological developments. Progress has been constrained by divergent views on meaningful human control, the dual-use nature of AI technologies, and the strategic incentives of major military powers. Consequently, the CCW has evolved less as a treaty-making forum than as a forum for dialogue, confidence-building, and the gradual clarification of legal and normative principles.

Where earlier CCW Protocols primarily regulated the characteristics or humanitarian effects of particular weapons, the challenge posed by LAWS lies in governing the decision-making processes that produce those effects. In this sense, the debate surrounding LAWS is not merely about technology. At its core, it concerns whether human judgement will remain the foundation of lawful warfare or whether it will gradually be displaced by systems whose speed, complexity, and opacity exceed meaningful human control.

COMPETING APPROACHES TO THE GOVERNANCE OF LAWS

The continuing inability of the CCW to move beyond general principles reflects a more fundamental divergence among States regarding the appropriate governance of LAWS. Although there is broad agreement that artificial intelligence will increasingly shape the future of warfare and that IHL continues to apply to autonomous weapon systems, States remain divided over whether these systems should be prohibited, regulated through a new international instrument, or governed under existing international law. Three competing approaches have consequently emerged within the CCW process.

1. **The prohibition approach:** States, civil society organisations, and many humanitarian actors argue that autonomous weapons capable of selecting and engaging targets without meaningful human control should be prohibited through a legally binding international instrument. Drawing parallels with Protocol IV of the CCW and other preventive arms control agreements, proponents contend that decisions involving the use of lethal force should never be delegated entirely to machines.
2. **The regulation approach:** A second group accepts that increasing levels of autonomy will become an integral feature of future military systems but argues that legally binding regulation should establish clear limits to ensure meaningful human judgement, accountability, predictability, and compliance with IHL. Rather than advocating a comprehensive prohibition, this approach seeks to distinguish between acceptable and unacceptable forms of autonomy.
3. **The existing law approach:** A third position, advanced primarily by technologically advanced military powers, maintains that existing IHL, together with national legal weapons review mechanisms consistent with Article 36 of Additional Protocol I and responsible State practice, already provides an adequate framework for assessing autonomous systems. According to this view, additional international legal instruments are unnecessary and could impede legitimate technological innovation and military capability development.

Although these approaches provide a useful analytical framework, most states do not fit neatly into a single category. National policies often

reflect a combination of legal, ethical, technological, and strategic considerations. Nevertheless, three questions continue to shape international deliberations: how autonomy should be defined, how compliance with core IHL principles can be ensured, and how legal responsibility should be attributed when autonomous systems contribute to unlawful outcomes. These issues remain at the heart of discussions within the CCW and largely explain the continuing divergence among states. Ultimately, the debate is not whether autonomy will transform warfare, but whether it should be managed as a strategic necessity or constrained as a humanitarian risk.

CONCLUSION

The evolution of the CCW process demonstrates both the strengths and limitations of consensus-based arms control. Over four decades, the Convention has adapted to successive humanitarian challenges through incremental, protocol-based regulation and, more recently, has provided the principal forum for international deliberations on LAWS. While it has succeeded in developing common principles and fostering sustained international dialogue, it has thus far been unable to reconcile divergent state positions on the future regulation of autonomous weapons. Whether the CCW can evolve from a forum for dialogue into one capable of producing a broadly accepted regulatory framework for LAWS will shape not only the future of the Convention but also the future relationship between technological innovation, military necessity, and humanitarian protection.

PRACTITIONER'S NOTE: PREPARING FOR CCW AND GGE MEETINGS

Participation in Meetings of High Contracting Parties, Review Conferences, and sessions of the Group of Governmental Experts (GGE) requires preparation that extends well beyond familiarity with International Humanitarian Law. Effective participation demands a sound understanding of the legal, military, technological, diplomatic, and procedural dimensions of the issues under discussion. Although national procedures differ, successful participation generally requires careful preparation before, during, and after each negotiating session. The indicative checklist below is intended as a practical reference for officials, military officers, legal advisers, diplomats, researchers, and other practitioners participating in the CCW process.

Before the Meeting

- Review the provisional agenda, programme of work, and meeting documentation issued by the CCW Secretariat (UNODA).
- Study previous GGE reports, Chair's summaries, Chair's reports, Conference Room Papers (CRPs), Working Papers (WPs), and relevant national submissions.
- Understand your Government's negotiating position, including policy objectives, legal position, negotiating mandate, and areas of flexibility.
- Examine the positions of major stakeholders, regional groups, and like-minded States.
- Consult relevant ministries, legal advisers, military authorities, scientific and technical experts, industry representatives, and other stakeholders, as appropriate.
- Prepare national statements, briefing notes, talking points, and working papers where required.

During the Meeting

- Participate actively in plenary sessions, informal consultations, Chair-led consultations, bilateral meetings, and regional coordination meetings.
- Engage with representatives of international organisations, including the ICRC and UN agencies, as well as academic institutions, technical experts, and civil society organisations participating as observers.
- Monitor evolving draft texts, amendments, and areas of emerging consensus.
- Report significant developments to national authorities and seek additional guidance where necessary.

After the Meeting

- Review the Chair's report, recommendations, and agreed outcomes.
- Assess their implications for national policy, military doctrine, legal practice, and technological development.

- Conduct inter-ministerial consultations to evaluate the outcomes and identify follow-up actions.
- Update national positions and prepare for subsequent sessions of the GGE or Meetings of High Contracting Parties.

Understanding the Negotiating Process

The CCW process comprises a variety of formal and informal negotiating formats, each serving a distinct purpose in facilitating consensus among High Contracting Parties. Familiarity with these processes assists delegates in understanding how negotiations evolve during a CCW meeting. The principal meeting formats are summarised below.

Meeting Format	Purpose
Plenary Session	Formal presentation of national statements, official interventions, and negotiations.
Informal Consultations	Smaller discussions aimed at narrowing differences, exploring compromise language, and building consensus.
Chair-led Consultations	Meetings convened by the Chair to resolve contentious issues and facilitate agreement.
Bilateral Meetings	Discussions between individual delegations to clarify positions, exchange views, or negotiate specific proposals.
Regional Coordination Meetings	Consultations among regional or like-minded groups to develop common positions before formal negotiations.
Side Events	Expert discussions organised by States, international organisations, research institutions, academia, or civil society on legal, technical, ethical, and military aspects of LAWS.

Practice Insight: *While formal negotiations take place in plenary sessions, much of the substantive progress in Geneva is achieved through informal consultations, bilateral engagements, regional coordination, and Chair-led discussions. Careful preparation, sustained engagement, and a thorough understanding of both national and international positions are therefore essential to effective participation in the CCW process.*

Figure 5.3 illustrates the typical negotiation cycle within the CCW process, demonstrating how national positions are developed, advanced through multilateral negotiations, and translated into international outcomes. Although institutional arrangements vary among States, the figure reflects the general sequence followed by delegations participating in CCW and GGE meetings.

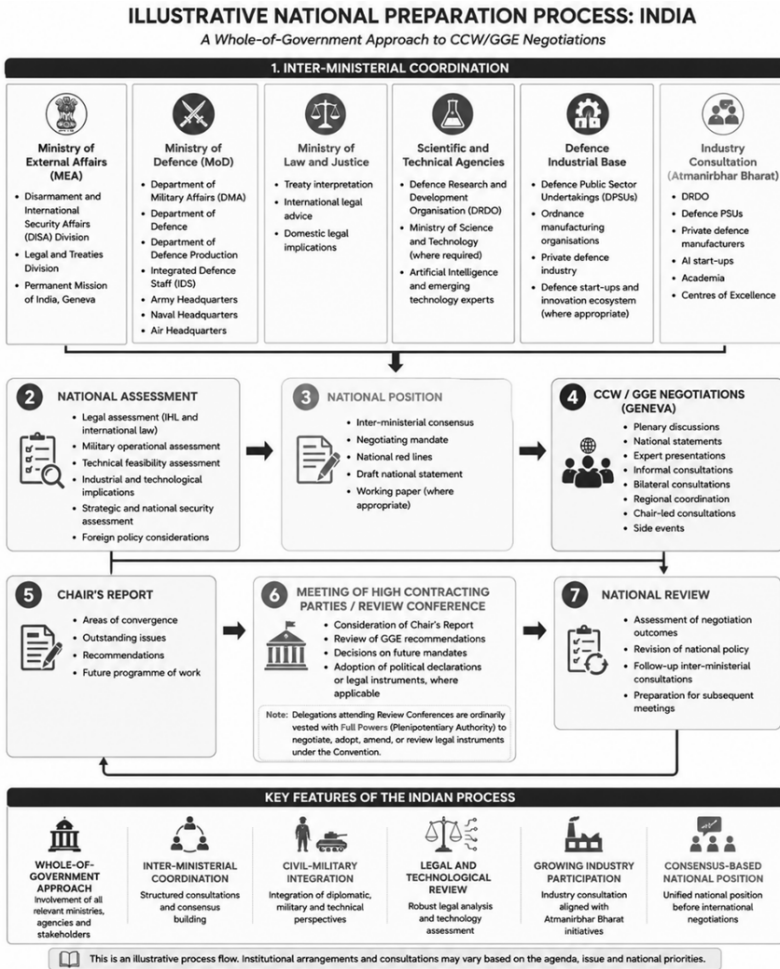
**Figure 5.3: From National Position to International Outcome:
The CCW/GGE Negotiation Cycle**



Source: Prepared by the author using OpenAI’s generative AI tools; content reviewed and verified by the author.

Figure 5.4 illustrates the standard national preparation process for sessions of the Convention on Certain Conventional Weapons (CCW) and the Group of Governmental Experts (GGE), demonstrating how national positions are formulated across relevant ministries and departments.

Figure 5.4: National Preparation Process: India
A whole-of-Government approach to CCW/GGE Negotiation



Source: Prepared by the author using OpenAI's generative AI tools; content reviewed and verified by the author.

This diagram reflects the general institutional framework; in practice, this structured sequence cannot always be rigidly followed. More often than not nominations for CCW and GGE meetings are at short notice. Understanding this baseline process is therefore intended to serve as a practical guide and reference to assist future delegates in navigating the complexities of multilateral arms control negotiations.

ESSENTIAL READING AND PRIMARY SOURCES ON LAWS

The practical guidance outlined above complements the substantive legal discussion presented throughout this chapter. Readers wishing to explore the CCW process in greater depth should consult the official documentation and primary sources listed below.

- Reports of the **Group of Governmental Experts (GGE) on LAWS**.
- National statements and working papers submitted by States.
- Chair's summaries and reports.
- Meeting documents and proposals on regulation, prohibition, and Meaningful Human Control.
- Official submissions by international organisations, including the ICRC and UNIDIR.

Collectively, these documents trace the evolution of international thinking on autonomous weapon systems and are indispensable for understanding the legal, ethical, military, and diplomatic dimensions of the debate.

Resource	What It Contains	Why It Is Important	Where to Access
Existing International Humanitarian Law Applicable to LAWS (CCW/GGE.1/2024/CRP.3)	Chair's background paper analysing the application of existing IHL to LAWS. Covers weapons law, targeting law, Articles 35 and 36 AP I, distinction, proportionality, precautions in attack, accountability, and agreed GGE conclusions.	One of the most authoritative summaries of how existing IHL governs LAWS and the legal foundation of the current international debate. (UNODA Docs Library)	UNODA – Existing International Humanitarian Law Applicable to LAWS available at https://meetings.unoda.org/meeting/71623/ documents
Group of Governmental Experts (GGE) on LAWS	Official intergovernmental negotiating forum established by the High Contracting Parties to the CCW to examine emerging technologies in the area of LAWS. Includes annual sessions, national statements, Chair's summaries, working papers, and negotiated texts.	The principal multilateral forum shaping international discussions on the regulation of LAWS. (United Nations Meetings)	UNODA – GGE on LAWS (2025) Available at https://meetings.unoda.org/meeting/74853?utm

Resource	What It Contains	Why It Is Important	Where to Access
Official UNODA Documents Repository	Comprehensive collection of official GGE documents, including agendas, programmes of work, Chair's summaries, conference room papers (CRPs), working papers (WPs), national submissions, revised rolling texts, and reports.	The primary repository for tracking the evolution of negotiations, State positions, and proposed regulatory frameworks. (United Nations Meetings)	UNODA – Official Documents Repository https://meetings.unoda.org/meeting/71623/document?s=utm
Chair's Summaries and Rolling Texts	Summaries of negotiations, areas of agreement and disagreement, proposed treaty language, and evolving draft texts.	Essential for understanding how consensus is developing and where States continue to diverge on regulation, prohibition, and meaningful human control. (UNODA Docs Library)	Available through the UNODA Documents Repository.
National Working Papers and Position Papers	Official submissions by States setting out national legal, technical, military, and policy positions on LAWS.	Provide insight into the differing approaches adopted by States regarding prohibition, regulation, human control, accountability, and Article 36 weapon reviews. (United Nations Meetings)	Available through the UNODA Documents Repository.

Resource	What It Contains	Why It Is Important	Where to Access
India's Official Statements to the CCW and GGE	Official statements delivered by the Permanent Mission of India to the Conference on Disarmament during CCW Meetings of Experts and the Group of Governmental Experts (GGE) on LAWS. Includes India's evolving position on IHL, meaningful human control, accountability, responsible military AI, and the future regulation of autonomous weapons.	The authoritative source for understanding India's official position on LAWS and the evolution of its policy within the CCW process. Readers are encouraged to consult these statements alongside the UNODA documentation.	Permanent Mission of India to the Conference on Disarmament, Geneva – Statements: https://pmindiaun.gov.in/Cdgeneva/statement_list/MjI
These documents provide the most comprehensive and authoritative record of the international debate on LAWS. They complement the academic literature by documenting the evolving positions of States, international organisations, and technical experts, and should be regarded as essential primary sources for any detailed study of the legal and policy issues surrounding autonomous weapon systems. Readers interested in the positions of individual States should consult both the UNODA repository and the official websites of national delegations, such as the Permanent Mission of India to the Conference on Disarmament, which provides a consolidated archive of India's statements to the CCW and the GGE.			

Notes:

- ¹ Philip Alston, Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, UN Doc. A/65/321 (United Nations General Assembly, 23 August 2010). The report marked the first major United Nations intervention on autonomous weapon systems, identifying the legal, ethical, and humanitarian issues that subsequently shaped the international debate on LAWS. Available at <https://digitallibrary.un.org/record/690463?v=pdf#files>, accessed on 15 July 2026.
- ² Alston identified four principal areas requiring international attention: (i) the rapid development of increasingly autonomous robotic systems; (ii) the prospect of weapon systems capable of selecting and engaging targets with minimal or no human intervention; (iii) unresolved legal and ethical questions concerning definitions, responsibility, accountability, safeguards, civilian protection, and compliance with international law; and (iv) the need for a multidisciplinary expert process involving military practitioners, lawyers, ethicists, scientists, and technologists to assess the implications of autonomous weapons. See preceding note, paras. 21–44.
- ³ United Nations Human Rights Council, “*Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions*, Christof Heyns”, UNGA Report A/HRC/23/47, UN, Geneva, 2013.
- ⁴ Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices, as amended on 3 May 1996 (Amended Protocol II to the Convention on Certain Conventional Weapons), especially arts 3–11 and the Technical Annex, available at: <https://ihl-databases.icrc.org/en/ihl-treaties/ccw-amended-protocol-ii-1996> accessed 16 July 2026. May also see United Nations Office for Disarmament Affairs (UNODA), *Convention on Certain Conventional Weapons (CCW)*, available at <https://disarmament.unoda.org/en/our-work/conventional-arms/convention-certain-conventional-weapons>, accessed on 16 July 2026.
- ⁵ Amended Protocol II required anti-personnel mines produced after 1 January 1997 to comply with the detectability requirements contained in the Technical Annex. High Contracting Parties were permitted a transitional period of up to nine years from the Protocol’s entry into force for that State to bring existing stockpiles into compliance with the detectability standard. See Amended Protocol II, Technical Annex, Part 3, para. 2. It states that in their ‘*construction a material or device that enables the mine to be detected by commonly available technical mine detection equipment and provides a response signal equivalent to a signal from 8 grams or more of iron in a single coherent mass*’. Under the Technical Annex, Part 2 (Specifications on Detectability), paragraph 2(c) of Amended Protocol II, a High Contracting Party that could not immediately make its pre-1 January 1997 anti-personnel mines compliant with the 8-gram detectability requirement could defer compliance for up to nine years from the date the Protocol entered into force for that State. During that period, it

was required, to the extent feasible, to minimise the use of non-compliant mines.

- ⁶ International Campaign to Ban Landmines has 166 States Parties, comprising 133 ratifications and 33 accessions, with 31 States remaining outside the Convention. ICBL also received the 1997 Nobel Peace Prize with its founding coordinator Jody Williams. More detail available at: <https://www.icbl.org>, accessed on 16 July 2026.
- ⁷ United Nations Office for Disarmament Affairs (UNODA), *Convention on Certain Conventional Weapons (CCW)*, available at <https://disarmament.unoda.org/en/our-work/conventional-arms/convention-certain-conventional-weapons>, accessed on 16 July 2026.
- ⁸ The Convention was adopted in Dublin by 107 States on 30 May 2008 and signed in Oslo on 3 December the same year. The Convention became binding international law when it entered into force on 1 August 2010. To date, a total of 123 States have committed to the goals of the Convention – 112 States Parties and 12 Signatories. Convention on Cluster Munitions, States Parties and Signatories, available at: <https://www.clusterconvention.org/states-parties/>, accessed on 16 July 2026.
- ⁹ Landmine and Cluster Munition Monitor, *India: Cluster Munition Ban Policy* (14 August 2022), <https://archives2.the-monitor.org/en-gb/reports/2022/india/cluster-munition-ban-policy.aspx>, accessed on 16 July 2026.

THE ICRC's HUMANITARIAN FRAMEWORK FOR REGULATING LAWS

Since its founding in 1863, the ICRC has historically stood at the forefront of developing and defending IHL. Just as it shaped the legal response to traditional weapons over the past century and a half, the ICRC has emerged as the leading humanitarian institution guiding the contemporary debate on LAWS. Drawing upon its mandate to promote and strengthen IHL, the ICRC has consistently argued that the central challenge posed by autonomous weapon systems is not simply technological, but fundamentally legal and humanitarian

Building upon this broader perspective, the ICRC has developed one of the most comprehensive normative frameworks for assessing autonomous weapon systems and AI-enabled military technologies. This framework rests on four interrelated pillars: meaningful human control, predictability, reliability, and accountability. Together, these principles seek to ensure that advancing autonomy does not displace the human judgement necessary for the lawful conduct of hostilities, providing the analytical foundation for the discussion that follows.

Figure 6.1: System Error: The human cost of algorithmic warfare



Source: prepared by Author using Generative AI

Human Control in the Age of Algorithmic Warfare

The emergence of AI-enabled Decision Support Systems (DSS) presents a challenge fundamentally different from those posed by earlier weapons technologies. Whereas previous arms control efforts focused primarily on regulating the characteristics or effects of weapons, contemporary AI systems increasingly influence the processes through which military decisions are made. As the ICRC has observed, “it is humans, not machines, that comply with and implement International Humanitarian Law, and it is humans who can be held accountable for violations.”¹ Accordingly, legal determinations in armed conflict must remain inherently human acts, even where advanced computational systems are employed. The ICRC therefore argues that AI-enabled DSS present a qualitatively different legal and humanitarian challenge because they influence the exercise of human judgement rather than simply the operation of weapons themselves. Unlike conventional weapons, which are assessed primarily by reference to their effects, AI-enabled decision support systems shape the processes through which legal and operational decisions are made.²

Building upon this distinction, the ICRC identifies several structural characteristics of machine learning-enabled DSS that may undermine meaningful human control if not properly governed. These challenges arise not only from the technical complexity of AI systems but also from their increasing influence over operational decision-making. They include:

- Epistemic opacity: Commanders may not understand how outputs are generated (the “black box” problem).
- Probabilistic reasoning: Outputs are not deterministic but statistical inferences, often based on incomplete or biased data.
- Automation bias: Human operators may defer to machine recommendations, leading to what the ICRC describes as the “rubber stamp” phenomenon.

Taken together, these characteristics challenge the assumption that human supervision necessarily guarantees meaningful human control. A human operator may remain formally involved in the decision-

making chain while lacking the practical ability to understand, evaluate, or effectively challenge machine-generated recommendations.

The ICRC further observes that AI-enabled decision support systems are progressively compressing military decision-making timelines, enabling processes that previously required hours of human deliberation to be completed within minutes or even seconds. Although this acceleration may provide significant operational advantages, it also creates substantial challenges for compliance with IHL. Core obligations of distinction, proportionality, and the duty to take feasible precautions often require careful contextual assessment and reasoned human judgement, both of which may be undermined when operational tempo increasingly favours algorithmic speed over deliberative decision-making.

As indicated in Chapter 3, proponents often argue that AI can enhance compliance with IHL by improving data processing, target identification, and situational awareness. While this argument has merit, the ICRC cautions that the military value of AI-enabled decision support systems should not be equated with legal compliance.³ Enhanced computational capability may improve the speed and scope of information processing, but it does not replace the contextual human judgement required to apply the principles of distinction, proportionality, and precaution under IHL. Indeed, the ICRC emphasises that AI-enabled DSS may also introduce new risks by reducing transparency, encouraging automation bias, compressing decision-making timelines, and diminishing opportunities for meaningful human oversight. While DSS may improve information processing and situational awareness, they also introduce risks:

- over-reliance on algorithmic outputs may mask uncertainty rather than reduce it;
- biases embedded in training data can systematically distort targeting decisions; and
- complex systems may fail in unpredictable and cascading ways, especially in adversarial environments.

Thus, the promise of “algorithmic precision” may conceal a deeper fragility in human decision-making. Reflecting these concerns, the ICRC

advocates a human-centred approach to the governance of AI in warfare.⁴ Drawing together the ICRC's analysis, four interrelated operational requirements emerge for preserving meaningful human control over AI-enabled military systems:

- meaningful human control over critical functions;
- the ability of operators to understand and critically assess system outputs;
- adequate time and operational space for human deliberation; and
- clear attribution of responsibility across the decision-making chain.

Collectively, these requirements demonstrate that the challenge posed by AI-enabled warfare extends beyond the legality of particular weapons systems to the preservation of human judgement as the foundation of lawful military decision-making. The central question is no longer simply whether a weapon complies with IHL, but whether increasingly automated decision-making processes can preserve the contextual understanding, moral responsibility, and legal accountability upon which that law depends. If these elements are eroded, the risk is not merely unlawful harm but the gradual weakening of the normative foundations of IHL itself. This concern lies at the heart of the ICRC's concept of meaningful human control and informs its broader approach to the humanitarian governance of autonomous weapon systems.

EXAMINING THE KEY CONSIDERATIONS

The preceding discussion reveals that the central challenge posed by LAWS is not simply technological but normative. If the preservation of meaningful human judgement is essential to the continued application of IHL, it becomes necessary to identify the specific conditions under which increasingly autonomous systems may be employed lawfully. The ICRC, in its analysis of AWS and IHL, identifies several interrelated considerations that lie at the heart of this inquiry.

In a study, the ICRC highlights the fundamental legal and ethical challenges posed by the increasing autonomy of weapons systems.⁵ Central to this debate is not merely the performance of such systems, but the nature of decision making in warfare itself. Debate surrounding

AWS is frequently framed as a contest between human and machine decision making. Proponents of increased autonomy emphasise human limitations, including cognitive bias, fatigue, and emotional stress, all of which may impair judgement in high-pressure combat environments. From this perspective, AI-enabled systems offer advantages in data processing, pattern recognition, and consistency, potentially improving targeting accuracy and reducing incidental harm. However, this framing is analytically insufficient. Critics argue that machine-driven decision making introduces distinct and equally serious risks, including algorithmic bias, unpredictability in complex operational environments, and the erosion of accountability when decision making is partially or wholly delegated to machines. Unlike human actors, such systems rely on probabilistic models that may fail to capture the contextual nuance required for the application of IHL.

More fundamentally, the question is not whether machines can outperform humans, but whether human judgement can be meaningfully preserved in increasingly automated systems of warfare. Decisions in armed conflict are not reducible to computational outputs; they involve ethical reasoning, contextual awareness, and an appreciation of political and social consequences. These elements are integral to the application of IHL and cannot be easily replicated through algorithmic processes. Accordingly, the challenge lies in determining how autonomous systems may be integrated into military operations without displacing the human agency upon which legal responsibility depends. This requires a structured examination of the conditions under which such systems can operate in compliance with IHL.

The concerns identified by the ICRC ultimately converge on a common requirement: the ability of human operators and commanders to understand, anticipate, and control the effects of autonomous systems. If legal responsibility is to remain meaningful, those deploying such systems must be capable of reasonably foreseeing how they will behave in operational environments and ensuring that their actions remain consistent with IHL. In this regard, two closely related operational considerations become central to any meaningful legal and operational assessment of LAWS: predictability and reliability. Together, these constitute the practical conditions necessary for preserving meaningful human judgement and ensuring that legal accountability remains with human decision-makers.

Before examining these concepts in detail, it is useful to distinguish predictability from reliability, as both are fundamental to the ICRC's assessment of autonomous weapon systems but address different dimensions of system performance. The following table clarifies this distinction by answering two practical questions that underpin the legal analysis: Can the behaviour of the system be reasonably anticipated? (predictability), and Will the system perform consistently as intended under operational conditions? (reliability). Understanding this distinction provides the analytical framework for the discussion that follows.

Table 6.1: Distinguishing Predictability and Reliability in the Assessment of LAWS

Concept	Predictability	Reliability
Core Question	Can the system's behaviour be reasonably anticipated before and during deployment?	Will the system perform consistently and as intended under operational conditions?
Primary Concern	Understanding and controlling system behaviour.	Dependability and robustness of system performance.
Focus	Transparency, explainability, bounded adaptability, and human oversight.	Verification, validation, testing, resilience, cybersecurity, and maintenance.
Risk if Absent	Operators cannot foresee how the system will respond in changing environments, undermining meaningful human judgement.	Systems may malfunction, degrade, or be compromised, leading to unintended or unlawful outcomes.
Relevance to IHL	Enables informed application of distinction, proportionality, and precautions in attack.	Ensures that systems consistently perform within legal and operational parameters throughout their life cycle.
Relationship to Human Control	Allows commanders to anticipate and evaluate system behaviour before acting.	Provides confidence that the system will execute decisions in accordance with human intent.

Source: Adapted from the ICRC's analysis of autonomous weapon systems and AI-enabled decision support systems.

As the table illustrates, predictability and reliability are complementary but distinct concepts. The discussion begins with predictability because the ability to anticipate system behaviour is a prerequisite for meaningful human judgement and legal compliance under IHL.

Predictability in its Usage

Predictability is a foundational requirement for the lawful and responsible use of LAWS. For a system to comply with IHL, its behaviour must be sufficiently understandable, reliable, and controllable in diverse operational environments. This necessitates a degree of transparency in algorithmic design, enabling scrutiny of decision-making processes and identification of potential biases. It also requires consistent performance across varying conditions, ensuring that system outputs remain aligned with legal and operational expectations. While adaptability is often cited as a strength of AI-enabled systems, it introduces additional risks if not properly constrained. Systems that evolve or respond dynamically to changing conditions may produce outcomes that are difficult to anticipate, thereby undermining compliance with IHL. Accordingly, adaptability must be bounded by clearly defined parameters and subject to meaningful human oversight. Crucially, robust safeguards, including fail-safes, override mechanisms, and monitoring systems, must be embedded to ensure that human operators retain the capacity to intervene where necessary.

Reliability

Reliability is equally critical to the legitimacy and effectiveness of LAWS. These systems must function as intended under operational conditions, resist external interference, and maintain performance over time. This includes resilience against cyberthreats, such as hacking or spoofing, which could otherwise result in unintended or unlawful actions. It also requires durability in challenging environments and the capacity for sustained operation without degradation. Verification and validation processes play a central role in ensuring reliability, requiring rigorous testing across a range of scenarios. Regular maintenance and oversight further ensure continued compliance with legal and operational standards. Ultimately, reliability underpins trust not only in the technology itself but also in the broader framework governing its use. Without demonstrable reliability, claims regarding precision, compliance, and reduced harm remain speculative.

ICRC's Legal Argument: From Loss of Control to Legal Incompatibility

Building on the requirements of predictability and reliability just outlined, the ICRC advances a more fundamental claim: the challenge posed by AWS is not merely technological, but one of legal compatibility with the structure of IHL itself. At the heart of this argument lies the principle that legal responsibility in armed conflict is inherently human. As emphasised earlier, it is not machines but humans who must comply with and implement IHL, and who can be held accountable for violations. Autonomous weapons systems, defined as those systems that are capable of selecting and engaging targets without further human intervention after activation, disrupt this foundational structure. Once activated, such systems may operate on the basis of environmental inputs, sensor data, and algorithmic processing, meaning that the user may no longer determine or in some circumstances even know who or what will ultimately be targeted, or when and where force will be applied. This introduces a condition of indeterminacy that is fundamentally at odds with the requirements of IHL, which depend on context-specific and situationally aware human judgement at the moment of attack.

The implications of this shift are profound. Core legal principles, including distinction, proportionality, and precaution, require ongoing human evaluation, interpretation, and the ability to adapt to changing circumstances. Yet, autonomous systems, particularly those relying on machine learning, may operate in ways that are not fully predictable, explainable, or controllable. This creates a structural gap between legal obligations and operational execution, raising the possibility that compliance with IHL may, in certain cases, become practically unattainable. Moreover, the burden placed on commanders becomes significantly intensified. Under existing legal frameworks, those deploying weapons must ensure that their use complies with IHL in all circumstances. In the context of autonomous systems, this would require anticipating and validating the legality of all potential outcomes prior to activation an expectation that becomes increasingly unrealistic in complex and dynamic environments.

Taken together, these concerns point towards a deeper conclusion: the challenge of autonomous weapons is not simply one of regulating

new technologies, but of preserving the legal architecture of warfare itself. Where systems cannot be understood, predicted, or meaningfully controlled, they risk being considered indiscriminate in nature, and therefore unlawful under existing IHL principles. It is on this basis that the ICRC has called for the development of new legally binding rules, including prohibitions and restrictions, to ensure that emerging technologies remain within the bounds of humanitarian law. The ICRC’s position, therefore, extends beyond concerns regarding technical performance. It reflects a broader argument that the preservation of human judgement is a legal prerequisite for the lawful conduct of hostilities. This position can be understood through the interrelated legal and operational concerns given in Table 6.2.

Table 6.2: Core Elements of the ICRC’s Legal Argument on AWS

Theme	ICRC Argument	Legal Implication (IHL)	Why it Matters
Definition of AWS	Systems select and engage targets without further human intervention.	Human not involved at moment of attack.	Breaks link between decision and responsibility.
Loss of Human Control	User cannot determine who/what/when/where force is applied.	Undermines legal accountability.	Decisions become structurally detached from humans.
Indeterminacy Problem	Outcomes cannot be precisely predicted.	Violates requirement of controlled use of force.	Law requires foreseeability.
Human Judgement Requirement	IHL decisions must be made by humans.	Non-delegable legal obligation.	Machines cannot bear responsibility.
Context-specific Decisions	Targeting requires interpretation of dynamic situations.	Cannot be reduced to code or fixed rules.	War is not a purely computational environment.

Theme	ICRC Argument	Legal Implication (IHL)	Why it Matters
Distinction Challenge	Difficulty distinguishing civilians vs combatants.	Risk of unlawful targeting.	Requires contextual and moral judgement.
Proportionality Problem	Cannot reliably assess collateral damage vs military advantage.	Core IHL principle compromised.	Requires value-based balancing
Precaution Obligations	Requires ability to cancel or adapt attacks.	AWS may lack real-time control.	Removes ongoing human oversight.
Opacity (“Black Box”)	Systems may not be understandable or explainable.	Lack of accountability.	Cannot justify decisions legally.
Pre-activation Burden	Commander must ensure all possible uses are lawful.	Practically impossible in complex environments.	Legal burden becomes unrealistic.
Reliability and Predictability	Systems must be predictable and controllable to permit meaningful human judgement.	Necessary for lawful application of IHL.	Without them, meaningful human judgement and legal accountability cannot be sustained
Indiscriminate-ness Risk	If effects cannot be limited, then the weapon may be unlawful.	Could be prohibited under IHL.	Core threshold of legality.
Accountability Gap	No clear actor responsible for decisions.	Weakens enforcement of IHL.	Undermines legal system itself.
Normative Position	Need for new legally binding rules.	Supports legally binding prohibitions and restrictions.	Existing law may be insufficient.

Source: Author.

Taken together, the structural risks outlined above demonstrate why the ICRC concluded that existing frameworks are insufficient on their own, prompting its call for a two-tiered regulatory architecture of specific prohibitions and operational restrictions to safeguard the legal foundations of IHL.

CONCLUSION

This chapter has examined the ICRC's contribution to the contemporary debate on LAWS. Its analysis demonstrates that the principal challenge posed by increasingly autonomous systems is not merely technological but legal and humanitarian. By extending its assessment beyond autonomous weapons to AI-enabled decision-support systems, the ICRC argues that meaningful human judgement, predictability, reliability, and accountability remain indispensable prerequisites for compliance with IHL.

The ICRC's analysis further demonstrates that the central issue is no longer simply the legality of particular weapons, but the preservation of meaningful human judgement, legal responsibility, and accountability throughout the use of force. As advances in artificial intelligence increasingly influence military decision-making, the regulatory challenge confronting the international community lies in ensuring that technological innovation enhances, rather than diminishes, compliance with international humanitarian law.

Although broad agreement exists that autonomous weapon systems must remain subject to international humanitarian law, there is no corresponding consensus on how that objective should be achieved. States continue to differ on the adequacy of existing legal frameworks, the meaning of meaningful human control, and the need for new international legal instruments. The absence of an internationally agreed definition of meaningful human control reflects the broader lack of consensus regarding the appropriate legal regulation of autonomous weapon systems. These competing perspectives have become the defining feature of discussions within the CCW and continue to shape the contemporary international debate on the future regulation of LAWS. It is this interaction between competing national positions and evolving multilateral negotiations that provides the focus of the next chapter.

Notes:

- ¹ ICRC, “*Decisions, Decisions, Decisions: Computation and Artificial Intelligence in Military Decision-Making*”, *ICRC Report*, Geneva, 2024, p. 4.
- ² Ibid.
- ³ ICRC, Artificial Intelligence and Machine Learning in Decision Support Systems for Military Targeting, Available at <https://www.icrc.org/en/publication/building-responsible-humanitarian-approach-icrcs-policy-artificial-intelligence> accessed on 07 July 2026.
- ⁴ Ibid.
- ⁵ ICRC, “Autonomous Weapon Systems and International Humanitarian Law: Selected Issues”, *Position Paper*, 2026, available at <https://www.icrc.org/en/article/autonomous-weapon-systems-and-international-humanitarian-law-selected-issues>, accessed on 07 July 2026.

INTERNATIONAL PROCESSES AND EMERGING GOVERNANCE FRAMEWORKS FOR AI AND LAWS

The preceding chapters examined CCW process and the ICRC's humanitarian framework for regulating LAWS. Although the ICRC's analysis has significantly influenced international discussions, its recommendations do not, by themselves, create binding international law. Rather than developing through a single negotiating forum, the governance of AI and LAWS has evolved into an increasingly decentralised and multi-layered process. Consequently, recent governance initiatives have expanded beyond autonomous weapons alone to promote broader principles for the responsible development and military use of AI. Although many of these initiatives are not directed exclusively at LAWS, they contribute to the evolving normative environment within which autonomous weapons are developed, deployed, and employed. Alongside discussions within the CCW, important contributions have emerged from the United Nations General Assembly, the International Committee of the Red Cross, civil society organisations, political declarations, regional initiatives, and national regulatory frameworks.

Such initiatives and developments have generated an increasingly dense body of resolutions, political declarations, voluntary commitments, and national policy frameworks. Collectively, they reflect continuing efforts to reconcile military innovation with humanitarian protection while promoting common expectations regarding human control, accountability, and compliance with IHL. This chapter examines how these complementary initiatives have contributed to the gradual emergence of an international governance architecture for AI and LAWS. Although Chapter 4 examined the evolution of the CCW process in detail, the CCW remains the globally accepted principal institutional foundation of this broader governance framework. It is

therefore useful to begin by considering the normative convergence that has emerged within the CCW before examining how parallel initiatives undertaken by the United Nations General Assembly (UNGA), civil society organisations, political declarations, and national policy frameworks have collectively expanded and reinforced this evolving governance architecture. Table 7.1 illustrates the evolution of normative convergence within the CCW process between 2014 and 2025, highlighting both the areas in which broad agreement has emerged and the principal issues that continue to divide States.

Table 7.1: Evolution of Normative Convergence within the CCW Process (2014–2025)

Issue	2014	2017	2019	2022	2023–2025
Applicability of IHL	Widely accepted	Broad consensus	General consensus	Consensus	Consensus
Meaningful human control	Emerging concern	Increasing discussion	Broad acceptance	Strong convergence	Near-universal recognition about the need
Accountability	Emerging concern	Growing convergence	Growing convergence	Growing convergence	General consensus on human responsibility
Article 36 weapons reviews*	Recognised by many States	Increasing recognition	Broad support	Broad Support	Accepted as good practice* but is not binding
Risk-based regulation	Absent	Emerging	Moderate support	Continued support	Not yet attained convergence
Legally binding treaty	Initial proposals	Deeply divided	Divided	Growing support	Still divided

Issue	2014	2017	2019	2022	2023–2025
Two-tier regulatory approach	Not articulated	Emerging	Developing	Broad discussion	Widely discussed
Note: The issue of lethal autonomous weapon systems was first placed on the agenda of the Convention on Certain Conventional Weapons in 2013. The CCW subsequently convened its first Informal Meeting of Experts on LAWS in 2014, followed by annual meetings and the establishment of the Group of Governmental Experts (GGE) in 2016.					
* Article 36 of Additional Protocol I requires States Parties to determine, during the study, development, acquisition, or adoption of a new weapon, whether its employment would be prohibited under international law. Although many States participating in the CCW viewed national weapons reviews as an important safeguard, several major participants—including India, the United States, Israel, Pakistan, and Turkey—are not Parties to Additional Protocol I and are therefore not legally bound by Article 36. Consequently, the 2019 Guiding Principles avoided explicit reference to Article 36, instead adopting broader language requiring the legality of new weapons to be assessed in accordance with applicable international law.					

Source: Compiled by the author from official reports of the CCW Meetings of Experts and the Group of Governmental Experts (2014–2025). The classifications of “convergence” presented in this table are the author’s analytical interpretation of the evolution of State positions and do not appear in this form in any official CCW document.

UNGA RESOLUTIONS AND MULTILATERAL INITIATIVES

The United Nations General Assembly (UNGA) has assumed an increasingly important role in discussions concerning AI and LAWS. Unlike the CCW, whose consensus-based procedures have limited progress towards a binding legal instrument, the UNGA provides a broader and more representative forum through which States can articulate political positions, shape emerging norms, and sustain international attention on the governance of autonomous weapons and military AI. This expanded role was reflected in the adoption of Resolution 78/241 on 22 December 2023 by a vote of 152 in favour, four against, and eleven abstentions.¹ Though this consensus-based process has facilitated sustained international dialogue and the

development of important normative principles, it has not produced a legally binding instrument. This limitation has encouraged parallel governance initiatives through the United Nations, humanitarian organisations, civil society, political declarations, and national policy frameworks, collectively contributing to an increasingly pluralistic international governance architecture. In recent years, the UNGA has increasingly addressed issues relating to autonomous weapons and military applications of AI, reflecting a recognition that the implications of these technologies extend beyond traditional arms control discussions.² Although its resolutions are not legally binding, they have helped sustain international attention on LAWS, broaden participation in the debate, and reinforce the need for continued international engagement on the governance of autonomous weapons and military AI.³ Beyond formal inter-governmental negotiations, the United Nations has also contributed to the governance debate through analytical and policy-oriented initiatives. A notable example is UNODA's Governance of Artificial Intelligence in the Military Domain (2024), which surveys the opportunities and risks associated with military AI, examines areas of diplomatic disagreement, and outlines policy options for multilateral governance. By broadening the discussion beyond autonomous weapon systems, the report reflects an emerging recognition that governance of military AI encompasses not only weapons but also decision-support systems, cyber resilience, data governance, human oversight, and institutional accountability.⁴

CIVIL SOCIETY ADVOCACY, AND THE CAMPAIGN TO STOP KILLER ROBOTS

Beyond inter-governmental negotiations, humanitarian organisations and civil society have played an increasingly influential role in shaping international discussions on LAWS. Although they possess no formal law-making authority, these actors have contributed significantly to the development of emerging normative expectations concerning human control, accountability, and compliance with IHL.

Civil society organisations have complemented these humanitarian efforts by mobilising public awareness, shaping political debate, and advocating stronger international regulation. Much like the Ottawa Convention and Oslo Process referred to in Chapter 4, these

organisations have sought to influence international negotiations by building political momentum for new legal norms. The most prominent initiative is the Campaign to Stop Killer Robots⁵, a global coalition of non-governmental organisations established in 2013 to promote a legally binding international instrument prohibiting autonomous weapons that operate without meaningful human control. Framing autonomous weapons as both a humanitarian and ethical challenge, the Campaign argues that decisions over life and death should never be delegated to machines. It has consistently highlighted concerns relating to accountability gaps, algorithmic bias, unpredictability, and the erosion of human dignity. Through advocacy, expert engagement, public awareness campaigns, and active participation in international negotiations, the Campaign has helped sustain political momentum for stronger regulation of autonomous weapons. Although States remain divided over the desirability of a legally binding prohibition, civil society organisations have played an important agenda-setting role by ensuring that humanitarian and ethical considerations remain central to international discussions. Their efforts have contributed significantly to the gradual emergence of normative expectations regarding meaningful human control, accountability, and the limits of autonomy in warfare.

POLITICAL DECLARATIONS AND EMERGING GOVERNANCE FRAMEWORKS

Beyond resolutions and humanitarian advocacy, international efforts to govern AI and autonomous weapons have increasingly taken the form of political declarations, voluntary commitments, and policy frameworks. Recent initiatives illustrate this evolving approach. Examples include the United States' Political Declaration on Responsible Military Use of Artificial Intelligence and Autonomy, NATO's Principles of Responsible Use of Artificial Intelligence, the REAIM (Responsible AI in the Military Domain)⁶, process, and other political declarations concerning the responsible military use of AI. While differing in institutional origin and legal status, these initiatives consistently emphasise human responsibility, legal compliance, reliability, predictability, accountability, and meaningful human control. Although these instruments do not create legally binding obligations, they play an important role in developing common standards of responsible

behaviour and influencing state practice. Together, they represent an intermediate layer of governance situated between formal international law and purely domestic policy. These developments suggest that a body of emerging norms is beginning to take shape, even in the absence of a dedicated international treaty.

Although substantial disagreements remain regarding the future regulation of LAWS, there is increasing convergence around certain foundational principles, particularly the need to preserve meaningful human involvement in decisions concerning the use of lethal force. All these initiatives reflect a multi-layered and evolving governance architecture. Thus, rather than a single coherent legal regime, the regulation of LAWS is being shaped through a combination of formal intergovernmental negotiations, humanitarian advocacy, civil society mobilisation, political declarations, and national regulatory frameworks. As observed by UNODA, governance of military AI is increasingly characterised by a multi-layered architecture comprising international law, political commitments, national policies, military doctrine, and technical governance mechanisms. Although these initiatives differ in legal status, they collectively contribute to the emergence of common expectations regarding the responsible development and use of AI-enabled military systems.⁷

EXISTING NATIONAL REGULATIONS AND POLICIES

While international initiatives have contributed to the development of common normative expectations, implementation ultimately depends upon national policy. Several technologically advanced States have therefore adopted domestic strategies and military doctrines governing the development and use of AI-enabled military systems. These frameworks do not constitute comprehensive international legal regimes, but they demonstrate how States are translating emerging international principles into domestic policy and military doctrine. Approaches vary significantly, reflecting differences in strategic culture, capability, and interpretations of IHL.

The United States has developed the most detailed publicly available military framework through DoD Directive 3000.09,⁸ which requires appropriate levels of human judgement, extensive testing, and compliance with the law of armed conflict. The United Kingdom has

adopted a similarly comprehensive approach through its Defence Artificial Intelligence Strategy,⁹ the Defence AI Playbook,¹⁰ and the Defence Artificial Intelligence Centre (DAIC), emphasising responsible AI adoption, operational assurance, and collaboration between government, industry, academia, and international partners. Other states, including France and Australia, have likewise adopted policy frameworks stressing responsible military use of AI and continued human involvement in decisions relating to the use of force. Despite differences in strategic priorities and regulatory approaches, these national frameworks reveal increasing convergence around principles such as human judgement, rigorous testing and validation, legal review, reliability, predictability, accountability, and compliance with IHL. These initiatives consistently emphasise human responsibility, legal compliance, reliability, predictability, accountability, and meaningful human control.

Figure 7.1: International Consensus



Beyond defence-specific initiatives, the European Union has adopted the Artificial Intelligence Act (AI Act), the world's first comprehensive legal framework governing artificial intelligence. Although the Regulation expressly excludes AI systems developed or used exclusively for military, defence, or national security purposes, it establishes a risk-based approach centred on human oversight, transparency, accountability, and trustworthy AI. While not directly applicable to autonomous weapon

systems, the AI Act illustrates the broader global trend towards comprehensive AI governance and may indirectly influence future discussions on responsible military AI.¹¹ Table 7.2 summarises the principal components of this evolving governance architecture.

Table 7.2: International Governance Architecture for AI and LAWS

Process Institution	Primary Role	Key Contribution	Limitation
Convention on Certain Conventional Weapons (CCW)	Principal multilateral forum for LAWS discussions.	Provides framework for negotiations on legal, ethical, military, and humanitarian implications of autonomy.	Consensus-based process slows progress.
Group of Governmental Experts (GGE) on LAWS	Dedicated expert forum established in 2016.	Developed shared concepts, such as meaningful human control and autonomy, and adopted 11 guiding principles (2019).	No legally binding outcome.
United Nations General Assembly (UNGA)	Broader multilateral platform.	Expands participation beyond CCW and maintains political attention on LAWS.	Resolutions are generally non-binding.
International Committee of the Red Cross (ICRC)	Humanitarian and legal authority.	Advocates preservation of human judgement, accountability, and IHL compliance.	Cannot create binding law.
Campaign to Stop Killer Robots	Civil society coalition.	Mobilises public awareness and advocates prohibition of fully autonomous weapons.	Influence depends on state support.
National Frameworks and Policies	National Policies and Military Frameworks.	Establish standards for testing, human control, accountability, and responsible AI use.	Significant variation between states.

Process Institution	Primary Role	Key Contribution	Limitation
Political Declarations and NATO Principles	Norm-building mechanisms.	Promote common standards on responsible military AI use.	Lack legal enforceability.
Cumulative Governance Architecture	Interaction of international institutions, political commitments, humanitarian initiatives, and national frameworks.	Gradual convergence around human control, accountability, and IHL compliance.	No binding global treaty or universal consensus.

Source: Author.

As Table 7.2 demonstrates, the governance of AI and LAWS has progressively expanded beyond formal treaty negotiations to encompass a broader ecosystem of international organisations, humanitarian actors, political commitments, and national policy frameworks. Although these initiatives differ considerably in their legal authority, they collectively reveal increasing normative convergence around principles such as human responsibility, accountability, transparency, and compliance with international humanitarian law. At the same time, the absence of a dedicated international legal instrument reflects continuing strategic differences over the future regulation of autonomous weapons, leaving States considerable discretion in translating these emerging norms into national policy. Consequently, understanding the future governance of LAWS requires not only an appreciation of international processes but also an examination of how individual States interpret, implement, and contribute to these evolving norms. The following chapter therefore examines India’s position on LAWS, analysing its official statements, legal approach, and policy perspectives within the broader international debate.

Notes:

- ¹ UN General Assembly Resolution 78/241, adopted on December 22, 2023. References provided in Chapter 4.
- ² United Nations General Assembly, *Lethal Autonomous Weapons Systems*, UN Doc. A/RES/78/241, adopted 22 December 2023 available at <https://meetings.unoda.org/meeting/74853?utm>, accessed on 14 July 2026.
- ³ United Nations, *Governing AI for Humanity: Final Report of the High-level Advisory Body on Artificial Intelligence*, September 2024, available at: https://www.un.org/sites/un2.un.org/files/governing_ai_for_humankind_final_report_en.pdf, accessed on 14 July 2026.
- ⁴ United Nations Office for Disarmament Affairs (UNODA), *Governance of Artificial Intelligence in the Military Domain*, UNODA Occasional Papers No. 42, June 2024, available at: <https://unodaweb.unoda.org/public/2024-06/OP42.pdf>, accessed on 14 July 2026.
- ⁵ Campaign to Stop Killer Robots, *About Us*, available at: <https://www.stopkillerrobots.org/about-us/>, accessed on 14 July 2026.
- ⁶ North Atlantic Treaty Organization (NATO), *NATO's Principles of Responsible Use of Artificial Intelligence*, available at: <https://www.nato.int/en/about-us/official-texts-and-resources/official-texts/2024/07/10/summary-of-natos-revised-artificial-intelligence-ai-strategy>, accessed on 14 July 2026.
- ⁷ Beyza Unal and Ulysse Richard, *Governance of Artificial Intelligence in the Military Domain*, United Nations Office for Disarmament Affairs (UNODA) Occasional Papers No. 42, June 2024, available at: UNODA Occasional Papers No. 42 PDF, accessed on 14 July 2026.
- ⁸ US DoD, “DoD Directive 3000.09: *Autonomy in Weapon Systems*”, Washington, DC, 2023.
- ⁹ UK Ministry of Defence, *Defence Artificial Intelligence Strategy*, Ministry of Defence, London, 2022.
- ¹⁰ UK Ministry of Defence, *Defence Artificial Intelligence (AI) Playbook: Opening Doors for Industry to Collaborate with Defence on AI Development for the Strategic Advantage of our Armed Forces*, 2022, available at: <https://www.gov.uk/government/publications/defence-artificial-intelligence-ai-playbook> ; and UK Ministry of Defence, *Defence Artificial Intelligence Centre (DAIC)*, available at: <https://www.gov.uk/government/groups/defence-artificial-intelligence-centre>, accessed on 14 July 2026.
- ¹¹ Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act), Official Journal of the European Union, L 1689, 12 July 2024, available at: <https://eur-lex.europa.eu/eli/reg/2024/1689/oj>, accessed on 14 July 2026.

INDIA'S STRATEGIC AND LEGAL APPROACH TO AI AND AUTONOMOUS WEAPONS

India occupies a distinctive position in the international debate on the military applications of artificial intelligence and autonomous weapon systems. While recognising the strategic importance of AI for national security and defence modernisation, it has consistently emphasised that the development and use of autonomous capabilities must remain consistent with IHL and subject to continued human responsibility.

India's commitment to the Convention on Certain Conventional Weapons (CCW), process reflects its broader belief that the Convention remains the most appropriate forum for addressing the challenges posed by autonomous weapons, as it balances military necessity with humanitarian protection. During the 2024 session of the Group of Governmental Experts (GGE), India reaffirmed that future negotiations should build upon the substantial conceptual progress already achieved within the CCW, particularly the Guiding Principles adopted in 2019 and the common terminology developed through previous GGE reports. India also reiterated its long-standing position that emerging technologies in the area of LAWS are not exempt from the prohibitions, restrictions, and limitations imposed by IHL. While supporting legally binding arms control instruments as a matter of principle, India argued that further conceptual and technical convergence is required before negotiations on a comprehensive treaty can meaningfully commence.

However, India has not yet publicly articulated a comprehensive national policy governing the development and use of autonomous weapon systems. This measured approach appears to be influenced by several inter-related considerations: the desire to preserve strategic autonomy; the need to retain policy flexibility while international norms remain unsettled; the dual-use character of AI technologies, which complicates

rigid regulatory approaches; and the continuing uncertainty surrounding the future direction of international regulation. Consequently, India has preferred to engage constructively within multilateral processes while preserving the flexibility necessary to respond to evolving technological, legal, and operational developments.

India has contributed substantively to the evolution of international norms. India's Chairmanship of the 2017 Group of Governmental Experts on LAWS marked an important milestone in the development of the CCW process, facilitating structured discussions on the legal, ethical, military, technological, and humanitarian dimensions of autonomous weapons. India's interventions during the 2025 GGE negotiations significantly refined its negotiating philosophy by addressing both the legal characterisation of LAWS and the functional elements of autonomy.

A particularly significant contribution concerned the legal characterisation of LAWS. India argued that future regulation should focus on weapon systems rather than the underlying technologies that enable them. It cautioned that an overly broad definition could inadvertently encompass general-purpose and dual-use AI technologies, such as software, sensors, and processors, which are widely used in civilian applications. Illustrating this distinction, India observed that objects such as kitchen knives, medicines, self-driving cars, or autonomous construction equipment may possess the capacity to cause harm but are not designed as weapons. Accordingly, India proposed that the defining criterion should be the inherent design and intended military function of a system, rather than its mere capacity to inflict injury. This approach seeks to preserve legal certainty while avoiding unintended regulation of civilian technologies that may also have military applications.¹

India further proposed refining the functional definition of autonomy by recognising target identification, target selection, and target engagement as three distinct and indispensable stages of the targeting process. It argued that systems capable only of selecting and engaging a target already identified by a human operator, such as certain fire-and-forget missiles, should not automatically be characterised as fully autonomous weapon systems because they do not independently perform the critical function of target identification. In India's view, all three functions identification, selection, and engagement must be

considered together when assessing whether a system possesses genuine autonomous capability. These interventions illustrate India’s preference for carefully defined legal concepts, preservation of meaningful human judgement, and consensus-based norm development. The evolution of India’s position in international negotiations is summarised in Table 8.1 below :

Table 8.1: Evolution of India’s Position on LAWS (2017–2025)

Year	Development	Contribution to India's Position
2017	India chaired the first Group of Governmental Experts (GGE) on LAWS under the CCW.	Established India as an important facilitator of multilateral discussions and demonstrated its commitment to consensus-based international engagement on autonomous weapons.
2019	Adoption of the CCW GGE's 11 Guiding Principles , supported by India.	Reinforced India's position that IHL applies fully to autonomous weapon systems and that human responsibility for decisions relating to the use of force must be retained.
2024	India’s statement to the GGE on LAWS ² .	Reaffirmed the CCW as the preferred multilateral forum, supported building upon the existing Guiding Principles, recognised the military reality of AI-enabled warfare, opposed fragmentation of international norms, and argued that further conceptual work should precede negotiations on a legally binding instrument.
2025	India's statements on Characterisation of LAWS and Context-Appropriate Human Control and Judgement during the Second Session of the GGE.	Clarified India's negotiating position by advocating precise legal definitions of LAWS, distinguishing autonomous weapon systems from general-purpose and dual-use AI technologies, emphasising human judgement throughout the weapon life cycle, and promoting consensus-based development of future international norms.

Source: Compiled by the author from India’s statements to the CCW Group of Governmental Experts on LAWS (2017–2025).

India's position can be characterised by the following key elements:

1. ***Precision in characterisation:*** India has argued that any future international instrument should define LAWS with sufficient precision to regulate autonomous weapon systems without inadvertently encompassing general-purpose or dual-use AI technologies. It has therefore supported limiting regulation to technologies that are integral to weapon systems
2. ***Human judgement and responsibility:*** India has consistently maintained that decisions involving the use of force must remain subject to human judgement and responsibility. It has further argued that appropriate human judgement may be exercised throughout the weapon life cycle including system design, programming, mission planning, and deployment rather than requiring continuous human intervention during system operation.
3. ***Compliance with IHL:*** India is a strong supporter of IHL and has consistently called for the development and use of LAWS to be in accordance with its principles. This includes ensuring distinction between combatants and civilians, proportionality in the use of force, and the avoidance of unnecessary suffering.
4. ***Focus on responsible development:*** India has also emphasised that emerging technologies are not exempt from the prohibitions and limitations imposed by IHL because of its dual use in both civilian and military.
5. ***Consensus-based multilateral engagement:*** India continues to support negotiations within the CCW and advocates an inclusive, consensus-based approach to developing international norms while avoiding parallel regulatory initiatives that could weaken the multilateral system.

Taken together, these elements demonstrate that India's negotiating position is founded on a coherent set of legal, strategic, and technological principles. The principal features of India's current position are summarised in Table 8.2.

Table 8.2: Key Elements of India’s Position on AI and LAWS

Dimension	India's Position	Significance
Characterisation of LAWS	Supports precise legal definitions distinguishing autonomous weapon systems from general-purpose and dual-use AI technologies. Regulation should focus on weapon systems rather than the enabling technologies themselves.	Prevents overbroad regulation while preserving civilian and dual-use AI innovation.
Human Judgement and Responsibility	Supports context-appropriate human judgement throughout the weapon life cycle and maintains that human responsibility for the use of force must always be retained.	Preserves accountability while recognising different forms of human involvement depending on the operational context.
Compliance with IHL	Affirms that autonomous weapon systems remain fully subject to the principles of distinction, proportionality, precaution, and other applicable rules of IHL.	Reinforces that emerging technologies are not exempt from existing international law.
Responsible Development	Supports responsible development and use of AI-enabled weapon systems. Regulation should address the military application of AI without unnecessarily restricting civilian or dual-use technologies.	Balances technological innovation with humanitarian protection and legal certainty.
Multilateral Engagement	Supports the CCW as the appropriate forum for developing international norms and advocates consensus-based negotiations.	Reinforces confidence in multilateral norm development and avoids fragmented regulatory approaches.

Dimension	India's Position	Significance
National Implementation	Supports nationally determined implementation measures while recognising that states bear responsibility for ensuring compliance with IHL.	Preserves state sovereignty and implementation flexibility.
Position on Prohibition	Does not support a blanket prohibition of LAWS. Supports prohibiting only those autonomous weapon systems that cannot be used in accordance with IHL.	Seeks to prohibit unacceptable systems while permitting responsible military innovation.
Overall Approach	Supports a balanced, consensus-based regulatory framework founded on precise legal definitions, context-appropriate human judgement, state responsibility, and compliance with IHL.	Positions India between comprehensive prohibition and unrestricted technological development.

Source: Compiled by the author from various statements at the CCW, GGE on LAWS.

Table 8.2 demonstrates that India's position is founded on a coherent and internally consistent set of legal and strategic principles. Rather than viewing artificial intelligence and autonomous weapon systems solely through the lens of arms control, India approaches them as dual-use technologies requiring a careful balance between technological innovation, military necessity, humanitarian responsibility, and state sovereignty. Its interventions consistently emphasise precise legal characterisation, context-appropriate human judgement, continued human responsibility, and the full applicability of International Humanitarian Law, while advocating consensus-based norm development within the CCW. At the same time, India rejects both a blanket prohibition that could constrain legitimate technological development and an unrestricted approach that could leave humanitarian concerns inadequately addressed. Collectively, these principles position

India as a pragmatic middle power seeking to reconcile strategic autonomy with the responsible international governance of AI-enabled warfare.

Figure 8.1: India's Balancing Act



Source: Prepared by the author using OpenAI's generative AI tools

INDIA'S CONSISTENT PREFERENCE FOR TECHNICAL REGULATION

India's position on LAWS is consistent with its broader approach to conventional weapons regulation under the CCW. Rather than favouring comprehensive prohibitions, India has generally supported technical and operational measures that seek to reconcile humanitarian protection with legitimate military requirements. This approach was evident during the negotiations on Amended Protocol II governing mines, booby-traps, and other devices, where India accepted measures such as enhanced detectability requirements, recording and marking of minefields, and post-conflict clearance obligations, while opposing a comprehensive prohibition on anti-personnel landmines.

India's regulatory approach has, however, attracted scrutiny. During Operation Parakram (2001–02), Landmine Monitor reported that India undertook one of the world's largest mine-laying operations in many

years along the India–Pakistan border.³ While acknowledging India's obligations under Amended Protocol II to the CCW, the report expressed concern over civilian casualties during the operation and questioned whether the measures required to protect civilians had been fully implemented. It also raised concerns that India may have deployed NMM-14 anti-personnel blast mines, a minimum-metal mine believed to fall below the detectability standards introduced by Amended Protocol II.⁴ India has not publicly accepted these allegations. Nevertheless, the episode illustrates that agreeing to humanitarian technical standards is only one aspect of arms control; ensuring their consistent implementation during military operations presents a distinct legal and operational challenge. It also demonstrates the important role played by independent monitoring mechanisms in scrutinising state practice under international humanitarian law.

A similar pattern is evident in India's approach to cluster munitions. India did not participate in the Oslo Process leading to the 2008 CCM and remains a non-signatory. While acknowledging the humanitarian concerns associated with the irresponsible use of cluster munitions, India has consistently maintained that such weapons remain legitimate when employed in accordance with IHL. Instead of supporting a comprehensive prohibition, India favoured negotiations within the CCW aimed at improving the technical reliability of cluster munitions, including the incorporation of self-destruct and self-deactivation mechanisms designed to minimise unexploded submunitions and reduce post-conflict risks to civilians. Following the failure of the CCW negotiations in 2011, India expressed regret that no consensus had been reached but continued to remain outside the CCM. India's continued production and promotion of cluster munition-capable systems has nevertheless attracted criticism from humanitarian organisations. At the 2018 and 2022 Eurosatory defence exhibitions in Paris, the display of Indian-produced cluster munition components and the Pinaka cluster munition variant prompted objections from civil society organisations, which argued that such exhibits were inconsistent with the exhibition's rules prohibiting the promotion of cluster munitions.⁵ Taken together, India's positions on anti-personnel mines and cluster munitions reveal a consistent philosophy that also informs its approach to LAWS. Rather than advocating categorical prohibitions, India has generally favoured universal, consensus-based

regulation under the CCW, seeking to reconcile humanitarian considerations with legitimate military requirements through technical safeguards, operational restrictions, and compliance with IHL. This continuity helps explain India's preference for regulating autonomous weapon systems through existing legal frameworks rather than negotiating a new treaty prohibiting such systems.

STRATEGIC DRIVERS OF INDIA'S POSITION

India's position on LAWS cannot be understood solely through its official statements within the CCW. It is equally shaped by the country's strategic environment, technological ambitions, and long-standing emphasis on strategic autonomy. As a major military power confronting multiple security challenges, India must balance humanitarian considerations with the operational realities of an increasingly technology-driven battlespace. This strategic context explains why India has consistently favoured the gradual development of international norms through consensus rather than supporting either an immediate prohibition or overly prescriptive regulation of autonomous weapon systems.

India's own strategic experience reinforces this lesson. Throughout its history, the subcontinent has repeatedly confronted adversaries that transformed the character of warfare through technological and organisational innovation. The First Battle of Panipat in 1526 demonstrated the decisive effect of gunpowder artillery, disciplined infantry, and integrated battlefield tactics against numerically superior forces. The arrival of Vasco da Gama in 1498, followed by heavily armed Portuguese warships capable of dominating the Indian Ocean sea lanes, fundamentally altered the maritime balance of power. For centuries, the oceans had served primarily as highways of commerce; they now became instruments of imperial domination, allowing European powers to project military force, control trade, and reshape the political and control economic order of India. This maritime revolution was followed by the growing military and organisational superiority of the East India Company, which, through disciplined training, superior command structures, financial resources, and increasingly effective firearms and artillery, transformed a commercial enterprise into a territorial power after the Battle of Plassey in 1757.

The Industrial Revolution introduced yet another transformation through mechanised warfare, railways, rapid mobilisation, and mass industrial production, culminating in the unprecedented scale of destruction witnessed during the First and Second World Wars. Each of these military revolutions fundamentally altered the balance of power and demonstrated that technological, organisational, and institutional innovation could decisively influence the outcome of conflict irrespective of the relative size or resources of competing powers.

The importance of technological self-reliance is not a new lesson in India's strategic history. Similar challenges have confronted the subcontinent before. The collapse of the Vijayanagar Empire, one of the largest and most prosperous empires of medieval South India, illustrates the dangers of importing military capability. Despite investing enormous wealth in importing superior Arabian horses, Vijayanagar never established an indigenous breeding programme and remained dependent on foreign suppliers. Its principal adversaries, the Deccan Sultanates, fielded more effective cavalry and exploited this structural weakness during the Battle of Talikota (1565), contributing significantly to the empire's defeat. The modern equivalent is the acquisition of advanced AI-enabled defence systems without sovereign control over their software, source code, data, and lifecycle support. Modern history provides several cautionary examples of such dependence. During the 1982 Falklands War, after Argentine forces sank HMS Sheffield using the French-made AM39 Exocet missile, France as a NATO ally immediately suspended further military support to Argentina and provided the United Kingdom with critical technical information, including the missile's electronic signatures and operational characteristics, enabling British forces to develop effective countermeasures. Argentina's operational capability rapidly declined as missile stocks were exhausted and technical support ceased. The episode demonstrated that even sophisticated imported weapon systems remain dependent upon the political decisions of the supplier state. A similar vulnerability confronted India during the 1999 Kargil conflict. As Indian forces sought to recapture heavily fortified positions on Tololing, Tiger Hill, and other high-altitude objectives, they requested access to high-precision military GPS data from the United States to improve artillery accuracy, navigation, and target acquisition. The request was declined on grounds of neutrality, compelling Indian forces to rely on less accurate civilian

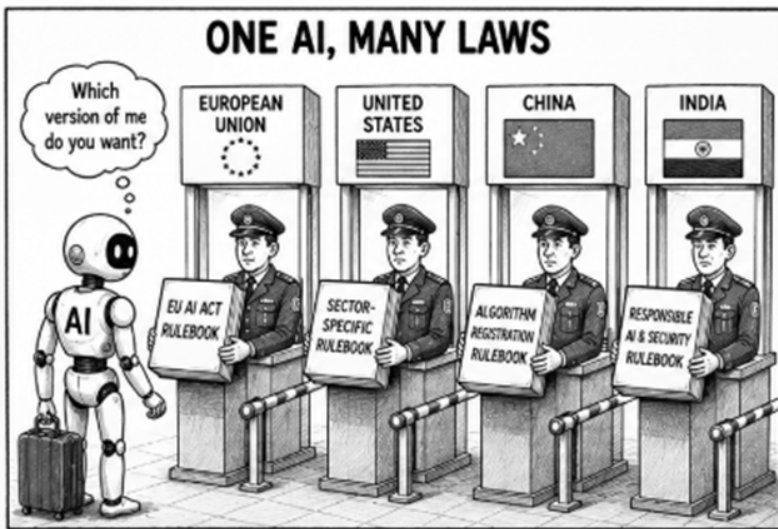
GPS signals and conventional methods. The episode exposed the strategic risks of dependence on foreign-controlled navigation systems and became a decisive catalyst for the development of India's indigenous Navigation with Indian Constellation (NavIC) satellite navigation system.

Contemporary regional developments reinforce these historical lessons. China's rapid integration of artificial intelligence into military modernisation, intelligentised warfare, autonomous systems, and civil-military fusion is reshaping the regional strategic environment. At the same time, Pakistan continues to modernise its armed forces through the acquisition of advanced drones, precision-guided weapons, satellite-enabled intelligence, and other emerging technologies, supported by expanding defence cooperation with external partners, particularly China and Turkey. These developments underline the importance for India of preserving technological flexibility while strengthening indigenous research, innovation, and defence industrial capabilities.

The changing character of warfare has reinforced this approach. Recent conflicts including the Hamas attacks on Israel on 7 October 2023, the Russia-Ukraine conflict, and India's experience during Operation Sindoor have demonstrated that military advantage increasingly depends upon the integration of artificial intelligence, autonomous systems, cyber capabilities, satellite-enabled intelligence, electronic warfare, precision-guided weapons, and networked command-and-control rather than conventional force ratios alone. These conflicts have shown that AI is no longer confined to individual weapon systems but is increasingly integrated across the entire military decision-making cycle, from intelligence collection and target identification to operational planning, logistics, precision engagement, and post-strike assessment. They also demonstrate that technological superiority alone cannot guarantee security, yet technologically capable States cannot afford to ignore the military implications of emerging technologies. Artificial intelligence and autonomous systems represent the latest phase of this continuing evolution. More recently, the strategic significance of digital dependence was illustrated by the United States' 2026 export controls on frontier AI models. In June 2026, the U.S. Administration directed Anthropic to suspend overseas access to its most advanced foundation models, including Mythos 5 and Claude Fable 5, citing national security concerns. Although the restrictions primarily affected access to advanced AI

services rather than military systems, they demonstrated that frontier AI capabilities, cloud infrastructure, and software platforms can be restricted unilaterally by the state in which they are developed. The incident reinforced a broader strategic lesson: future military power will depend not only on acquiring advanced AI-enabled systems but also on maintaining sovereign control over the software, data, algorithms, computing infrastructure, and engineering expertise upon which they depend.

Figure 8.2: One AI – Many Uses



Source: Prepared by the author using OpenAI’s generative AI tools

FROM WOOTZ STEEL TO ALGORITHMIC ARCHITECTS: OVERCOMING THE ASYMMETRICAL BRAIN DRAIN

Beyond the operational dangers of lagging behind military revolutions, India’s strategic history reveals a second, equally critical vulnerability: acting as a net exporter of foundational material and intellectual genius while failing to capture or control the finished strategic capability. A powerful historical precedent lies in Wootz steel, an ultra-high-carbon crucible steel developed in ancient India that helped manufacture the legendary Damascus blades.⁶ Despite its indigenous origin, the industrial scaling, systematic scientific analysis, and military commercialisation of

the metallurgy were taken away during the colonial era, leaving India as a supplier of raw materials rather than a master of the finished strategic product. A parallel dynamic has historically governed human capital from the extraction of Indian indentured labour to construct imperial infrastructure across the globe, to the contemporary migration of India's premier scientific and engineering talent. In the contemporary era of algorithmic warfare, this historical vulnerability has manifested as an asymmetrical brain drain in frontier technologies. Today, Indian-born technologists, scientists, and engineers occupy leadership positions across the world's foremost technology enterprises directing research, designing complex algorithmic architectures, and driving the artificial intelligence revolution in Silicon Valley and beyond. Yet, for a civilisational state of over 1.4 billion people, the steady departure of this elite echelon represents a profound strategic deficit.

In artificial intelligence, where global dominance is often determined by a remarkably concentrated tier of apex researchers and system architects, the loss of even a few hundred leading technologists alters the strategic balance. This migration is rarely driven by a lack of national resolve, but by a structural deficit of domestic opportunity. Apex technologists require an ecosystem that provides sovereign frontier computing infrastructure, venture-scale research funding, institutional agility, and an environment tolerant of high-risk, breakthrough experimentation. When these conditions are absent at home, India's intellectual capital inevitably flows to foreign innovation hubs capable of harvesting it. The strategic consequences of this modern diaspora are profound. In the AI era, human capital is the foundational infrastructure of military power. When a nation's brightest minds design foundation models, autonomous systems, and dual-use architectures within foreign jurisdictions, the resulting intellectual property, economic value, and geopolitical leverage accrue entirely to host nations. As demonstrated by unilateral export controls on advanced AI systems, relying on foreign-controlled technologies even those engineered by Indian minds abroad introduces acute operational vulnerability during crises.

The trajectory of the Chinese technology diaspora provides a vital strategic lesson for India: sovereign military capability cannot be sustained while a nation remains a net exporter of its premier intellectual

talent. This trajectory is rooted in a profound geopolitical irony. The modern U.S.-China relationship began with National Security Advisor Henry Kissinger's secret July 1971 flight to Beijing, a diplomatic manoeuvre staged from Islamabad, with Pakistani facilitation at the exact peak of the 1971 Indian subcontinent crisis. That historic thaw initiated a sweeping bilateral exchange of scholars and technologists, sending tens of thousands of Chinese minds to American universities and frontier research laboratories. While this initially manifested as a severe brain drain, Deng Xiaoping who had himself participated in a work-study program in France as a youth recognised that China's survival depended on reclaiming this expertise. In their seminal work *The Commanding Heights*, Daniel Yergin and Joseph Stanislaw document how governments historically sought to seize and control the "commanding heights" of the economy the critical industries and strategic assets that dictate national power. In the twenty-first-century battlespace, the "commanding heights" of military power are no longer merely heavy steel foundries; they are the frontier algorithmic architectures, sovereign computing platforms, and the apex human capital capable of designing them. By engineering a systematic "reverse brain drain" through world-class research infrastructure, state-sponsored scientific incentives, and the creation of global innovation hubs in cities like Shenzhen and Beijing, China successfully reclaimed the human expertise necessary to dominate these new heights, directly accelerating its intelligented military modernisation. India must absorb this lesson: to secure its strategic autonomy and avoid the historical trap of exporting raw potential while importing finished military products, it must actively construct a domestic innovation ecosystem capable of attracting, retaining, and empowering its own algorithmic architects to hold the commanding heights of the AI era.⁷

True strategic autonomy demands that India learn from both its own history and contemporary geopolitical realities to reverse this cycle. India must transition from being a net exporter of algorithmic talent to building a sovereign innovation engine. By establishing specialised military-civilian pathways, world-class research laboratories, and robust industrial incentives, India can attract, retain, and convert its immense intellectual capital into enduring national military power. Against this background, India's approach to the governance of AI and autonomous weapon systems seeks to reconcile four interrelated objectives: preserving

strategic autonomy, maintaining operational effectiveness, ensuring compliance with International Humanitarian Law, and supporting the responsible governance of military AI through multilateral consensus. Unlike many states that rely upon alliance structures for technological access and security guarantees, India has historically pursued a policy of strategic autonomy, seeking to preserve independent decision-making while developing indigenous capabilities across critical sectors. This imperative is reinforced by India's geopolitical environment as a major civilisational state, economic power, and regional actor situated amidst a complex security landscape.

THE “ALGORITHMIC ICEBERG”: WHY INDUSTRIAL STRATEGY IS MILITARY STRATEGY IN LAWS

Within the GGE at Geneva, discourse on military AI is too often confined to legalistic interpretations of IHL, abstract bioethics, and procedural kill-switch mechanics. This obscures a vital geopolitical truth: LAWS are merely the visible tip of an algorithmic iceberg supported by sovereign semiconductors, cloud infrastructure, and apex human talent. Unlike conventional military imports where the buying state still operated the machine, LAWS rely on continuous software updates, proprietary datasets, and frontier algorithms. Consequently, autonomous weapon governance cannot be divorced from industrial policy. A state lacking indigenous silicon, hardware fabrication, and talent cannot claim true sovereign control over its defence, rendering “meaningful human control” an illusion if the foundational code is authored in foreign capitals.

Unlike NATO allies accepting US technological subordination, India stands as a steadfast champion of multi-alignment and strategic autonomy. Moreover, India uniquely possesses the demographic and intellectual capacity to rival the US and China in algorithmic architecture. As a voice for the Global South, India is positioned to lead a third way: demonstrating that responsible AI governance requires democratising technological power. By charting a transition from exporting raw talent (“cyber coolies” and colonial manpower) to building sovereign technology emulating the institutional scale of South Korea's Chaebols and China's talent reclamation India offers a concrete blueprint for the developing world, ensuring future rules of

intelligentised warfare are shaped by international consensus rather than an algorithmic duopoly.

By linking industrial sovereignty to autonomous warfare, India elevates the LAWS debate from procedural arms control to a civilisational imperative. Many Global South nations fear LAWS precisely because they are becoming mere data-extraction zones and targets for algorithms trained in Silicon Valley or Shenzhen. Furthermore, when Indian engineers design apex AI abroad, intellectual property, kill-switch authority, and geopolitical leverage accrue entirely to foreign capitals. This structural extraction of intellectual capital explains both India's pragmatic CCW posture and its leadership mandate. India systematically rejects the binary split between dominant states pushing unrestricted proliferation and developing nations demanding blanket bans. A total prohibition on dual-use AI would freeze the global hierarchy and cripple indigenous defence initiatives whereas unregulated proliferation risks regional instability.

For India, artificial intelligence is therefore not simply a regulatory challenge but a strategic capability. Because many of the enabling technologies for AI are inherently dual-use, rigid technology-specific prohibitions could inadvertently constrain innovation in areas extending well beyond autonomous weapons. India's international position is reinforced by its domestic AI strategy. Initiatives such as the IndiaAI Mission⁸, AIRAWAT,⁹ the Defence AI Council,¹⁰ the Defence AI Project Agency¹¹, iDEX,¹² ADITI,¹³ DRDO's AI programmes, and the broader Atmanirbhar Bharat¹⁴ initiative demonstrate that India regards artificial intelligence as a strategic capability essential to economic development, technological self-reliance, and defence modernisation. India's commitment to developing indigenous AI capabilities is also reflected in its defence policy.

In July 2022, the Ministry of Defence recognised the need and organised the first AI in Defence (AIDef) Symposium and Exhibition, during which the Raksha Mantri (Defence Minister) launched seventy-five AI-enabled products and technologies developed by the Armed Forces, DRDO, Defence Public Sector Undertakings, iDEX start-ups, academia, and private industry. The symposium highlighted India's efforts to integrate AI into defence while strengthening indigenous

innovation. The Minister emphasised that AI would play a defining role in future warfare and that India must develop these capabilities to remain technologically competitive. India's objective, however, is not technological dominance but technological sovereignty the ability to harness AI to safeguard national security while ensuring that it is developed and employed responsibly for the benefit of humanity. This emphasis also explains India's preference for regulatory approaches that preserve innovation in dual-use technologies rather than impose overly restrictive controls.

INDIA'S POSITION IN PERSPECTIVE

In comparative perspective, India occupies a pragmatic middle ground within the contemporary debate on LAWS governance. Unlike States advocating a comprehensive prohibition of autonomous weapon systems, India has not supported a blanket ban. Equally, unlike States that rely exclusively on existing International Humanitarian Law without further normative development, India has consistently supported the progressive evolution of international norms through consensus-based multilateral negotiations. Taken together, India's official statements, working papers, and interventions reproduced in Annexures reflect a coherent negotiating philosophy that seeks to reconcile technological innovation, military necessity, humanitarian responsibility, and strategic autonomy. As artificial intelligence becomes increasingly integral to future warfare, this balanced and pragmatic approach positions India as an important bridge between competing approaches to the governance of autonomous weapon systems.

Notes:

- ¹ Ministry of External Affairs, Government of India, "Statement Delivered by India on Characterization (Box-I), Second Session of the Group of Governmental Experts on Lethal Autonomous Weapon Systems (LAWS)," Geneva, 1 September 2025, CCW GGE on LAWS Documents Portal accessed 15 July 2026.
- ² Attached in Annexures
- ³ Landmine Monitor, *Landmine Monitor Report 2002: Toward a Mine-Free World* (Human Rights Watch et al., 2002), 658–668. The report describes Operation Parakram as one of the largest mine-laying operations in recent years, reports concerns regarding civilian casualties, and raises questions about the possible

deployment of low-metal-content NMM-14 anti-personnel mines that may not have complied with the detectability requirements of Amended Protocol II.

- ⁴ Convention on Certain Conventional Weapons, Amended Protocol II on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices (as amended on 3 May 1996), Technical Annex, para. 2, requiring anti-personnel mines produced after the entry into force of the amended Protocol to incorporate a detectable material equivalent to at least 8 grams of iron in a single coherent mass. See also Chapter 4 of this monograph, “Protocol II: Mines, Booby-Traps, and Other Devices—Regulating Persistence and Indiscriminate Harm.”
- ⁵ Landmine and Cluster Munition Monitor, “India: Cluster Munition Ban Policy,” Cluster Munition Monitor 2022 (updated 14 August 2022), available at <https://archives2.the-monitor.org/en-gb/reports/2022/india/cluster-munition-ban-policy.aspx#ftn13>, accessed on 15 July 2026.
- ⁶ For centuries, Southern India was the premier exporter of Wootz steel (*Hinduwani*), an ultra-high-carbon crucible steel universally regarded as the finest material for ancient and medieval weaponry. However, India functioned primarily as an exporter of raw “Wootz cakes,” while weaponsmiths in hubs like Damascus captured the finished strategic value. During the colonial era, British surveyors dispatched samples to London where Michael Faraday’s 1820 experiments on Wootz laid the groundwork for modern Western alloy science. The systematic dismantling of India’s furnaces via colonial taxation and resource restrictions reduced the subcontinent to a dependent importer of British metal industry, a trajectory that underscores the strategic imperative of not remaining a mere supplier of raw intellectual capital while importing finished autonomous military capabilities.
- ⁷ For a detailed analysis of the shift from state control to market-driven strategic assets, see Daniel Yergin and Joseph Stanislaw, *The Commanding Heights: The Battle for the World Economy* (Simon & Schuster, 1998). The authors trace how the “commanding heights”, a phrase originally attributed to Vladimir Lenin to describe key segments of a national economy, became the focal point of the global struggle between government planning and market-driven innovation. This transition is essential to understanding why modern military power is increasingly tethered to frontier technological ecosystems rather than traditional state-owned industrial complexes.
- ⁸ The IndiaAI Mission, approved by the Government of India in 2024, is the country’s flagship programme for strengthening AI infrastructure, computing capacity, datasets, innovation, skills development, and startup ecosystems to position India as a global AI leader. Available at <https://indiaai.gov.in/> accessed on 14 July 2026.
- ⁹ AIRAWAT (AI Research, Analytics and Knowledge Assimilation Platform) is India’s proposed national AI computing infrastructure designed to provide

high-performance computing resources for AI research, development, and innovation. Available at <https://cdac.gov.in/index.aspx> accessed on 14 July 2026.

- ¹⁰ The Defence AI Council (DAIC), established by the Ministry of Defence in 2019, provides strategic direction for the adoption and integration of artificial intelligence across India's defence services.
- ¹¹ Defence AI Project Agency (DAIPA), created under the Ministry of Defence, coordinates the implementation of AI projects, facilitates collaboration among stakeholders, and accelerates the operational adoption of AI-enabled defence technologies.
- ¹² Innovations for Defence Excellence (iDEX), launched by the Ministry of Defence in 2018, promotes innovation by supporting startups, MSMEs, academia, and innovators in developing indigenous technologies for India's armed forces. Please see <https://idex.gov.in//idex> accessed on 14 July 2026.
- ¹³ ADITI (Acing Development of Innovative Technologies with iDEX) is a Ministry of Defence initiative launched in 2024 to support the development of critical and strategically significant defence technologies, including AI, through grants and innovation challenges.
- ¹⁴ Atmanirbhar Bharat ("Self-Reliant India") is the Government of India's national policy initiative aimed at strengthening indigenous manufacturing, technological innovation, and strategic autonomy, including in the defence and high-technology sectors.

STATE PRACTICE, OPERATIONAL EXPERIENCE, AND EMERGING NORMS IN AI-ENABLED WARFARE

History demonstrates that states which successfully harnessed military innovation have repeatedly transformed the character of warfare, altered the balance of power, and reshaped the international order. From gunpowder and artillery to mechanisation, air power, nuclear weapons, and precision-guided munitions, technological advances have consistently redefined military power. Artificial intelligence and autonomous systems represent the latest phase of this evolution. The central question is therefore not whether AI will transform warfare, but how it should be developed, employed, and governed in a manner consistent with military necessity, international law, and humanitarian principles.

Unlike previous military revolutions, which depended upon mass industrial production and expensive military platforms, the AI revolution is being driven by software, data, commercially available processors, and relatively inexpensive autonomous systems. Recent conflicts have shown that low-cost drones and loitering munitions can impose disproportionate costs on tanks, aircraft, warships, and strategic infrastructure worth millions of dollars. Military advantage is therefore becoming less dependent on the size of national arsenals and increasingly determined by the ability to innovate rapidly, integrate commercial technologies, exploit AI, and adapt faster than potential adversaries.

This transformation has also changed the drivers of military innovation. Governments now work alongside defence industries, commercial AI companies, start-ups, and research institutions to develop capabilities at a pace unmatched during previous military revolutions. Understanding how states are integrating these technologies into military doctrine, operational practice, and legal policy is therefore essential to assessing the future of AI-enabled and autonomous warfare.

Against this background, states have adopted markedly different approaches to the development, regulation, and employment of AI-enabled and autonomous military systems. These differences reflect variations in strategic culture, military doctrine, technological capability, operational experience, and interpretations of international humanitarian law. Examining national practice therefore provides valuable insight into how AI is likely to shape the future character of warfare and the prospects for international governance. The following sections examine the approaches adopted by the United States, China, Israel, Russia, and other technologically significant states.

POSITION OF THE UNITED STATES ON LAWS

The United States has been the principal driver of successive military-technological revolutions for more than seven decades. Following the Soviet Union's launch of *Sputnik* in 1957¹, the United States established the Advanced Research Projects Agency (ARPA, later DARPA) to prevent technological surprise and maintain technological leadership. Many Transformative technologies developed through this innovation ecosystem including ARPANET (the precursor to the Internet), the Global Positioning System (GPS), stealth technology, precision-guided munitions, advanced robotics, and, more recently, artificial intelligence originated within the United States' defence innovation ecosystem before transforming both military operations and civilian society. This sustained investment in defence innovation has enabled the United States to remain at the forefront of emerging military technologies, including autonomous and AI-enabled weapon systems.

The United States' technological leadership rests not only on sustained defence investment but also on an innovation ecosystem that closely integrates government agencies, defence laboratories, universities, start-ups, venture capital, and leading technology companies such as Google, Microsoft, NVIDIA, Palantir, Anduril, OpenAI, Amazon, and Adobe, many of which maintain close partnerships with the US defence establishment. Significantly, many scientists, engineers, and technology leaders within these organisations are of Indian origin, demonstrating that India does not lack intellectual talent. The strategic lesson for India is that leadership in AI-enabled warfare and autonomous weapon systems depends not simply upon excellence in artificial intelligence

alone, but upon an integrated innovation ecosystem capable of developing and fielding the enabling technologies, including advanced sensors, robotics, autonomous platforms, secure communications, computing, software, navigation, and human–machine teaming, supported by institutions able to translate research rapidly into military capability.

Reflecting this integration of technological innovation and institutional governance, the United States maintains that existing IHL, supported by rigorous national weapons review processes and responsible state practice, provides an adequate legal framework for the development and employment of autonomous weapon systems. Accordingly, the United States argues that the continued implementation of existing IHL through robust national governance and responsible State practice offers a more effective approach than negotiating new legally binding international obligations. In its statements before the CCW Group of Governmental Experts (GGE), the United States has consistently argued that autonomous weapon systems should be assessed according to how they are designed, tested, reviewed, and employed, rather than by their degree of autonomy alone.² It therefore advocates a governance model founded on appropriate levels of human judgement, comprehensive weapons reviews, rigorous testing and validation, legal accountability, and senior-level oversight. These principles are operationalised through Department of Defense Directive (DoDD) 3000.09, *Autonomy in Weapon Systems* (2023),³ which establishes the policy framework governing the design, development, testing, deployment, and employment of autonomous and semi-autonomous weapon systems by the US Department of Defense. Its principal features include:

1. **Appropriate Human Judgement** – Human operators must retain appropriate judgement over the use of force.
2. **Compliance with IHL** – Systems must comply with the law of armed conflict through legal review and operational doctrine.
3. **Testing and Validation** – Extensive verification and operational testing before deployment.
4. **Risk Mitigation** – Safety, cybersecurity, transparency, and fail-safe mechanisms.

- 5. **Senior-Level Approval** – Certain autonomous systems require high-level authorisation before development and fielding.
- 6. **Responsible AI** – Compliance with the DoD AI Ethical Principles.

Beyond explaining the United States’ approach to LAWS, DoDD 3000.09 demonstrates how broad legal and ethical principles can be translated into practical institutional mechanisms governing autonomous weapon systems. For India, the principal lesson lies not in replicating American policy but in establishing a coherent national governance framework that institutionalises legal review, testing, validation, accountability, and appropriate human judgement throughout the life cycle of AI-enabled weapon systems. In this respect, DoDD 3000.09 provides a useful governance model from which valuable lessons can be drawn, even though any Indian framework would necessarily reflect India’s own constitutional, military, and strategic requirements.

Table 9.1 compares the principal elements of the United States’ national governance framework with the emerging CCW principles, illustrating the substantial convergence between US practice and the evolving international debate while highlighting the United States’ preference for national implementation over new legally binding international obligations.

Table 9.1: Assessment of the United States’ Approach to LAWS in Light of Emerging CCW Principles

Principle	US Position	Assessment
Applicability of IHL	Accepts that existing IHL fully applies to autonomous weapons.	Fully consistent with CCW Guiding Principles.
Need for New Treaty	Opposes a legally binding prohibition or new treaty; existing law is considered sufficient.	Consistent with the "existing law" approach adopted by several technologically advanced states.
Human Judgement	Requires "appropriate levels of human judgment" over the use of force (DoDD 3000.09).	Equivalent to retaining human responsibility, although the US deliberately avoids the term "meaningful human control."

Principle	US Position	Assessment
Weapons Review	Mandatory legal review, testing, verification, validation and operational evaluation before deployment.	Strong implementation of Article 36-type review, although the US is not a party to Additional Protocol I.
Reliability and Predictability	Extensive testing, cybersecurity, fail-safe mechanisms and explainable AI are required.	Closely aligned with GGE principles on reliability, predictability and safety.
Accountability	Human commanders remain legally responsible for decisions involving the use of force.	Consistent with IHL principles of command responsibility.
Operational Philosophy	Progressive integration of AI into military operations while retaining human oversight.	Represents a governance-based rather than prohibition-based model of regulation.
Overall Assessment	Supports responsible military AI through national governance rather than additional international regulation.	High degree of practical compliance with CCW principles while resisting new legally binding obligations.

The US position therefore reflects a governance-based model in which compliance with IHL is achieved through national policy, rigorous weapons review, testing, and operational oversight rather than through new international legal obligations. This philosophy is reflected in the diverse range of autonomous and AI-enabled capabilities currently fielded or under development by the United States. Rather than pursuing a single class of autonomous weapon, the United States has progressively integrated AI across air and missile defence, intelligence, surveillance and reconnaissance, precision strike, autonomous navigation, manned–unmanned teaming, maritime operations, and decision-support systems. Representative systems illustrating this graduated approach are shown in Table 9.2.

Table 9.2: Representative US Autonomous and AI-enabled Military Systems

System	Type	Level of Autonomy	Core Function	AI/Advanced Features	Human Control Model
Phalanx CIWS ⁴	Defensive system	High (automated engagement)	Intercepts incoming missiles and threats.	Radar tracking and automated targeting.	Human-on-the-loop
Aegis Combat System ⁵	Integrated defence system	Semi-autonomous	Missile detection, tracking, and interception.	Sensor fusion and automated response.	Human-on-the-loop
Patriot Missile System ⁶	Air and missile defence	Semi-autonomous	Intercepts aircraft and ballistic missiles.	Radar + automated tracking and engagement.	Human-in/on-the-loop
MQ-9 Reaper ⁷	Armed UAV	Low-moderate	Surveillance and precision strikes.	AI-assisted targeting and ISR ^ integration.	Human-in-the-loop
X-47B ⁸	Experimental UAV	High (navigation)	Carrier-based autonomous flight.	Autonomous take-off, landing, and navigation.	Human supervised

System	Type	Level of Autonomy	Core Function	AI/Advanced Features	Human Control Model
Loyal Wingman (Skyborg) ⁴	Autonomous combat drone	Increasing autonomy	Manned–unmanned teaming.	AI-enabled coordination and mission autonomy.	Human-on-the-loop
Project Maven ⁵	AI targeting system	Decision support	Image analysis for target identification.	Machine learning and computer vision.	Human decision authority
Sea Hunter (ACTUV*) ⁶	Autonomous naval platform	High (navigation)	Anti-submarine warfare and surveillance.	Autonomous navigation and tracking.	Human supervised
Switchblade drone ⁷	Loitering munition	Semi-autonomous	Target tracking and strike.	Sensor-based targeting and guided autonomy.	Human-in-the-loop
Perdix drone swarm ⁸	Swarm system	Distributed autonomy	Coordinated swarm operations.	Collective decision-making algorithms.	Human supervised

Source: Compiled by Author.

Note:

⁴ISR: intelligence, surveillance, and reconnaissance;

*ACTUV: Anti-Submarine Warfare Continuous Trail Unmanned Vessel.

What these Systems Tell Us: Compliance in Form, Pressure in Practice

Although these systems differ considerably in their operational roles, together they reveal a common pattern in the United States' approach to AI-enabled warfare. None are designed to delegate the decision to use lethal force entirely to a machine. Instead, they progressively integrate autonomy into sensing, target detection, navigation, coordination, and defensive engagement while retaining varying degrees of human judgement and command responsibility. This reflects the United States' broader governance philosophy that the legality of autonomous weapon systems depends not on the degree of autonomy they possess, but on how they are designed, tested, reviewed, and operationally employed.

On paper, these systems adhere closely to the principles articulated within the CCW process, the UN GGE on LAWS, and the ICRC, particularly the retention of human responsibility, compliance with IHL, and the avoidance of inherently unpredictable effects. In practice, however, the integration of AI into sensing, targeting, coordination, and mission execution is progressively reshaping the locus of decision-making. Human control is retained formally, but increasingly exercised in a supervisory rather than deliberative capacity, while algorithmic processes increasingly influence the speed, structure, and parameters of engagement. This produces a condition best described as “compliance in form, pressure in practice”, as illustrated in Table 9.3.

Table 9.3: US Autonomous Systems and Emerging LAWS Norms: Compliance in Form, Pressure in Practice

<i>System Type</i>	<i>Example</i>	<i>Control Model</i>	<i>Norm Alignment (CCW/GGE/ICRC)</i>	<i>Pressure/Tension Point</i>
Automated Defensive Systems	Phalanx CIWS and Aegis Combat System	Human-on-the- loop	Strong alignment: defensive use, constrained targets, and IHL compliant.	Speed compresses human judgement; control becomes supervisory.
Air and Missile Defence	Patriot Missile System	Human-in/on- the-loop	Generally compliant with distinction and proportionality.	Automated engagement reduces deliberation time.
Remotely Piloted Strike Systems	MQ-9 Reaper	Human-in-the- loop	High compliance: human authorisation of force.	Dependence on AI-assisted targeting introduces bias/error risks.
Autonomous Platforms (navigation/teaming)	X-47B, Skyborg, and Sea Hunter	Human supervised	Partial alignment: autonomy outside lethal decision.	Boundary between assistance and decision making begins to blur.
AI Targeting Systems	Project Maven	Human decision authority	Formally compliant: advisory role only.	Accountability becomes opaque due to algorithmic mediation.
Loitering Munitions	Switchblade	Human-in-the- loop (varies)	Conditional compliance depending on use.	Autonomous tracking/strike raises distinction concerns.
Swarm Systems	Perdix	Human supervised	Weak/contested alignment.	Distributed autonomy reduces traceability and control.

Source: Author.

The United States' approach to AI-enabled warfare and autonomous weapon systems reflects far more than technological superiority; it demonstrates the long-term strategic value of institutional vision. From the shock of Sputnik in 1957 emerged an innovation ecosystem that transformed a perceived strategic setback into decades of technological leadership. From the shock of Sputnik in 1957 emerged an innovation ecosystem that transformed a perceived strategic setback into decades of technological leadership. Rather than responding with a single technological programme, the United States fundamentally reorganised the relationship between government, universities, defence laboratories, industry, and private enterprise. Over the following decades, this ecosystem repeatedly converted scientific discovery into military capability, producing technologies that reshaped both warfare and civilian society. Many of the technologies that now underpin modern autonomous weapon systems including advanced computing, navigation, artificial intelligence, robotics, networking, and precision guidance are products of this ecosystem. Its leadership in AI-enabled warfare therefore rests not on any single breakthrough, but on an enduring capacity to innovate, adapt, and institutionalise technological change.

For India, the principal lesson extends well beyond autonomous weapon systems themselves. Technological leadership cannot be achieved through isolated research projects or platform acquisition alone. It requires an integrated national ecosystem that connects research institutions, universities, start-ups, private industry, defence laboratories, the armed forces, and government into a continuous cycle of innovation and operational adaptation. Equally important is the ability to retain and empower scientific talent. The presence of large numbers of Indian-origin scientists, engineers, entrepreneurs, and technology leaders at the forefront of the American innovation ecosystem demonstrates that India does not lack human capital in this field. The strategic challenge lies in creating institutions capable of nurturing that talent and translating it into indigenous strategic capability.

Ultimately, the United States illustrates that leadership in AI-enabled warfare is not determined solely by advances in artificial intelligence or autonomous weapon systems. It is the product of strategic vision, institutional continuity, sustained investment, effective civil–military–industrial collaboration, and the ability to convert technological

innovation into operational advantage. For India, the enduring lesson of the American experience is that success in AI-enabled warfare will depend not merely on acquiring autonomous weapon systems, but on building the institutions, innovation ecosystem, and strategic vision capable of sustaining technological leadership over the long term.

CHINA: ADVANCED AUTONOMOUS AND AI-ENABLED WEAPON SYSTEMS

To understand China's current posture in advanced autonomous and AI-enabled weapon systems, one must first examine its unprecedented structural transformation. Over the span of four decades, China has systematically transitioned from a legacy agrarian economy into a frontier technological superpower, a trajectory driven by a single-minded national focus on seizing the dominating heights of modern industry and warfare. Recognising that indigenous basic research alone could not close the technological gap with the West at the pace demanded by its strategic ambitions, Beijing orchestrated a comprehensive, state-directed technology acquisition apparatus. This strategy leveraged a spectrum of legal, commercial, and illicit vectors to systematically absorb frontier intellectual property (IP) and human capital across critical domains.¹⁴ This national acquisition model operates across several primary pillars to directly feed the domestic military-industrial complex:

- **Apex Talent Recruitment:** Initiatives like the Thousand Talents Plan (TTP), launched in 2008, aggressively recruited overseas experts and nanoscientists to transfer cutting-edge dual-use knowledge directly into Chinese research laboratories.¹⁵
- **Asymmetric Industrial and Economic Espionage:** Targeted acquisition of Western proprietary technology has directly accelerated military modernisation. Notable examples include the reverse-engineering of critical aviation components for the Chengdu J-20 stealth fighter from hacked defence designs, and the acquisition of advanced semiconductor trade secrets from firms like Micron Technology to undermine foreign silicon dominance.¹⁶
- **Academic "Shadow Labs" and Tech Scouting:** Beijing has systematically leveraged academic collaborations with foreign universities particularly in Australia and North America to conduct dual-use research in artificial intelligence, autonomous systems, and

hypersonic aviation, blurring the lines between civilian research and military application.¹⁷

- **Strategic Corporate Acquisitions:** Through state-aligned capital, China has strategically acquired foreign high-tech firms to satisfy its “Made in China 2025” initiatives.¹⁸
- **State-Backed Cyber Harvesting:** The deployment of state-sponsored advanced persistent threat (APT) groups, such as APT10’s *Operation Cloud Hopper*, has enabled the global harvesting of managed service providers, siphoning critical IP in aviation, healthcare, and manufacturing directly into domestic industries.¹⁹

By systematically absorbing frontier IP in robotics, semiconductors, aerospace, and computing infrastructure, China built the foundational industrial base required to deploy autonomy at scale. Today, China has pursued the rapid integration of these technologies into military systems under the doctrine of “intelligentised warfare”. Unlike the US, which emphasises calibrated integration under regulatory oversight, China’s approach is characterised by scale, speed, and systemic integration across domains from drone swarms to AI-enabled command systems. Further, in the US, discussions often centre on the governance of autonomous systems, whereas Chinese military writings increasingly frame AI as a core enabler of future warfare, suggesting a deeper integration of autonomy into operational concepts rather than merely individual weapons platforms. China’s investments²⁰ focus on:

1. swarm technologies and loitering munitions;
2. AI-enabled ISR and targeting;
3. autonomous maritime and ground platforms; and
4. integration of AI into command and decision-support systems.

Reflecting this broader military strategy, China’s position within the CCW has sought to balance the military utility of AI with concerns over humanitarian risks. While supporting continued international discussions on LAWS, China opposes broad or pre-emptive prohibitions, arguing that regulation should preserve states’ rights to technological development and national security. A defining feature of its position is its narrow definition of LAWS, limited to systems possessing fully autonomous lethal capabilities, thereby excluding many AI-enabled military applications from regulation.

China further distinguishes between “unacceptable” systems that are fully autonomous, uncontrollable, and indiscriminate, and “acceptable” systems that remain under meaningful human supervision and operate in accordance with international humanitarian law. Consequently, China advocates a tiered regulatory framework that combines human oversight, risk mitigation, and ethical norms with respect for state sovereignty and national implementation. Rather than rejecting regulation outright, Beijing seeks to shape it in a manner that accommodates continued technological innovation and military modernisation. The principal elements of China’s regulatory approach are summarised in Table 9.4.

Table 9.4: Synthesis: What China’s Position Really Means

Element	China’s Position	Strategic Effect
Overall Approach	Two-track approach: negotiate a legally binding instrument while permitting continued AI development.	Balances regulation with technological advancement.
Definition of LAWS	Narrow definition limited to fully autonomous lethal weapon systems.	Restricts the scope of any future prohibition.
Regulatory Model	Categorisation of acceptable and unacceptable systems.	Allows continued development of most AI-enabled military systems.
Prohibition Threshold	Ban only narrowly defined fully autonomous lethal weapons.	Avoids broad constraints on military AI.
Human Control	Human responsibility over the use of lethal force should be maintained.	Permits increasing autonomy under human supervision.
Governance	State-led regulation respecting sovereignty and national security.	Opposes intrusive international oversight while preserving national flexibility.

Source: People’s Republic of China, Working Paper on Lethal Autonomous Weapons Systems, CCW/GGE.1/2022/WP.6, Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, Convention on Certain Conventional Weapons, Geneva, 2022. China also released an official English translation of the working paper.²¹

China’s regulatory approach is closely reflected in the development of its military capabilities. The PLA has invested heavily in autonomous and AI-enabled systems spanning the air, maritime, and information domains, demonstrating that intelligentised warfare extends beyond individual weapons to encompass broader command-and-control and decision-support architectures. Representative examples are summarised in Table 9.5.

Table 9.5: China’s Advanced Autonomous and AI-enabled Systems

System	Type	Level of Autonomy	Core Function	AI/ Advanced Features	Human Control Model
CH series drones ²²	UAV/ loitering systems	Moderate–high	Surveillance and strike.	AI-assisted targeting and pattern recognition.	Human-in/on-the-loop
Blowfish A3 ²³	Armed autonomous drone	High (reported)	Autonomous patrol and engagement.	Facial recognition and autonomous targeting (claimed).	Unclear/ variable
JARI USV ²⁴	Autonomous naval vessel	High (navigation /combat support)	Maritime patrol and ISR^.	Autonomous navigation and sensor fusion.	Human supervised
AI ISR systems ²⁵	Targeting/ ISR	Decision support	Data processing and targeting support.	Machine learning and big data fusion.	Human decision authority
Drone swarms (PLA demos) ²⁶	Swarm systems	Distributed autonomy	Coordinated attacks/ISR.	Collective algorithms and swarm intelligence.	Human supervised

Source: Author

What distinguishes the Chinese approach is not opposition to regulation, but the manner in which regulation is defined. By adopting a narrow definition of LAWS, limiting discussion to weapons with autonomous killing capabilities, emphasising state sovereignty, and advocating tiered and categorised regulation over comprehensive legal prohibition, China preserves considerable flexibility for the continued development and operational integration of AI-enabled military capabilities.

At the same time, China formally supports human control, risk mitigation, compliance with international humanitarian law, and the development of ethical norms. Consequently, China's approach seeks not to reject international regulation, but to shape its scope in a manner that accommodates technological innovation, military modernisation, and national implementation based on state discretion.

ISRAEL, AI WARFARE, AND THE REALITY OF LAWS

If the United States represents the regulated integration of autonomy and China its strategic expansion under the doctrine of intelligentised warfare, Israel represents a third model: the employment of AI-enabled systems under real combat conditions. Rather than developing autonomy primarily as a future capability, Israel has integrated AI into intelligence, surveillance, targeting, air defence, and loitering munitions during ongoing military operations. Supported by close collaboration between the Israel Defence Forces (IDF), the defence industry, and the technology sector, Israel has become one of the world's leading examples of AI-enabled warfare. AI is viewed primarily as a force multiplier that enhances situational awareness, accelerates decision-making, improves precision, and reduces risk to military personnel.

Consequently, Israel has focused on integrating AI into operational processes rather than developing autonomous weapon systems in isolation. The principal characteristics of Israel's approach are summarised in Table 9.6.

Table 9.6: Key Elements of Israel’s AI-enabled Warfare Approach

Element	Israel’s Position	Strategic Effect
Overall Approach	Operational integration of AI under battlefield conditions.	Demonstrates real-world military employment.
AI Philosophy	AI as a force multiplier rather than an independent decision-maker.	Accelerates operational tempo and effectiveness.
Human Control	Human approval formally retained throughout targeting cycle.	Preserves legal accountability while compressing decision time.
Operational Focus	Intelligence, surveillance, targeting, air defence, and loitering munitions.	Enhances precision and reduces cognitive burden.
Governance	Existing IHL and operational procedures rather than new regulatory frameworks.	Prioritises operational effectiveness over new legal constraints.
Strategic Objective	Speed, precision, force protection, and information superiority.	Maximises battlefield advantage through AI integration.

Israel’s approach is characterised by pragmatic deployment, where AI-enabled systems are integrated into active operational environments. This makes it one of the most important case studies for assessing how emerging norms function under battlefield pressures. These principles are reflected in a range of autonomous and AI-enabled systems deployed across air defence, loitering munitions, border surveillance, intelligence, and AI-assisted targeting. Representative examples are summarised in Table 9.7.

Table 9.7: Israel's Advanced Autonomous and AI-enabled Systems

System	Type	Level of Autonomy	Core Function	AI/Advanced Features	Human Control Model
IAI Harop	Loitering munition	High (target seeking)	Strike radar/targets.	Autonomous loitering and target detection.	Human-in/on-the-loop
IAI Harpy	Loitering munition	High	Anti-radiation attack.	Autonomous emission tracking.	Human supervised
Iron Dome	Air defence	High automation	Intercept rockets/missiles.	Automated detection and interception.	Human-on-the-loop
AI Targeting Systems	ISR/targeting	Decision support	Target identification and prioritisation.	Data fusion and pattern recognition.	Human decision authority
Autonomous Border Systems	Surveillance	Moderate-high	Monitoring and threat detection.	Sensor fusion and automated alerts.	Human supervised

Source: Author.

In recent conflicts, the Israel Defence Forces (IDF) has demonstrated one of the most advanced integrations of AI into the targeting cycle, moving towards a system in which algorithms generate, filter, and prioritise targets at scale. The AI-enabled platforms, such as “The Gospel” and “Lavender”,²⁷ have been used to process vast streams of intelligence satellite imagery, communications data, and behavioural patterns to identify infrastructure, operational networks, and individuals for attack, including high-value militant commanders. As noted in a 2021 publication attributed to a senior Israeli intelligence officer, the development of AI-enabled targeting systems was intended to overcome what was described as a “human bottleneck” in identifying and approving targets, highlighting a shift towards machine-assisted generation of targets at scale.²⁸

These systems have reportedly enabled the rapid generation of thousands of targets, dramatically accelerating the tempo of operations and expanding the scope of strikes beyond what human analysts alone could sustain. At the same time, this shift has compressed human decision making to moments of validation rather than deliberation, with operators increasingly relying on algorithmically curated target lists under conditions of time pressure and operational intensity. Table 9.8 compares these operational practices with the principal normative expectations articulated by the CCW, the UN GGE on LAWS, and the ICRC, highlighting the areas where increasing autonomy places growing pressure on existing legal and ethical principles. The result is not the elimination of human control, but its transformation: decisions remain formally human, yet are increasingly structured by machine-driven processes that shape what is seen, selected, and ultimately struck, raising profound questions about accountability, proportionality, and the limits of meaningful human judgement in contemporary warfare.

Table 9.8: Israel’s AI/LAWS Practice versus International Norms

Normative Requirement	CCW/GGE/ICRC Expectation	Observed Practice (Israel)	Assessment
Meaningful Human Control	Humans must retain real decision authority.	Humans approve strikes, but rely on AI-generated target lists.	Human control retained, but increasingly procedural and compressed.
Distinction (civilian vs combatant)	Clear identification of military targets.	AI-assisted identification at scale (risk of misidentification).	Generally supported by AI, but remains susceptible to errors and operational constraints.
Proportionality	Avoid excessive civilian harm.	High tempo and large target sets complicate proportionality assessment.	Operates under significant operational pressure; human review remains, with documented instances of aborted strikes.

Normative Requirement	CCW/GGE/ICRC Expectation	Observed Practice (Israel)	Assessment
Predictability	Systems must be controllable and foreseeable.	AI-driven systems depend on complex data and models.	Predictability depends on rigorous testing and may diminish in complex operational environments.
Accountability	Clear attribution of decisions.	Algorithmic mediation blurs responsibility chains.	Responsibility remains formally human but becomes progressively diffused.

Source: Author.

The evidence demonstrates that Israel has emerged as one of the world's most operationally advanced users of AI-enabled and LAWS-relevant systems. Through the integration of AI into intelligence, surveillance, and targeting cycles, the IDF has addressed many of the principal drivers behind autonomous systems: processing vast volumes of data, overcoming human cognitive limits, accelerating decision-making, and reducing risk to military personnel. In this sense, the long-standing rationale for LAWS enhancing precision, increasing operational tempo, and protecting soldiers is no longer theoretical but increasingly reflected in operational practice. However, this same transformation reveals the central tension identified in international debates: while human involvement is formally retained, it is progressively compressed, mediated, and shaped by algorithmic systems.

Israel demonstrates that AI-enabled warfare is no longer an emerging capability but an operational reality. Its experience confirms that artificial intelligence can substantially enhance operational tempo, intelligence processing, precision, and force protection. At the same time, it illustrates the central dilemma confronting LAWS governance. Human control is formally retained but increasingly mediated by algorithmic systems that shape target identification, prioritisation, and decision-making. Israel therefore highlights the widening gap between existing legal frameworks and the operational realities of AI-enabled warfare, where responsibility remains legally human but is increasingly mediated by autonomous technologies.

RUSSIA AND UKRAINE: MILITARY NECESSITY AND THE BATTLEFIELD LOGIC OF AUTONOMY

Russia has consistently maintained within the CCW that existing International Humanitarian Law provides an adequate framework for regulating autonomous weapon systems and has opposed proposals for new legally binding restrictions. It further maintains that the CCW remains the appropriate and indeed the only multilateral forum for negotiating issues relating to LAWS, arguing that parallel initiatives in other international forums risk undermining the consensus-based process established under the Convention.²⁹ This position reflects Russia’s emphasis on military necessity, technological flexibility, state sovereignty, and the continued relevance of existing international law. The principal elements of Russia’s position are summarised in Table 9.9.

Table 9.9: What Russia’s Position Means

Element	Russia's Position	Strategic Effect
Legal Framework	Existing International Humanitarian Law is fully applicable to LAWS; no new legal instrument is required.	Preserves the existing legal framework and avoids additional treaty obligations.
Position on Prohibition	Opposes legally binding restrictions, moratoria, or premature prohibitions on LAWS.	Protects military flexibility and continued technological development.
Human Control	Human control should be maintained, but its form and degree should remain a matter for individual States.	Preserves national discretion over military doctrine and operational practice.
Meaningful Human Control	Rejects internationally prescribed concepts such as "meaningful human control" as legally unnecessary and potentially politicising the debate.	Limits the creation of new normative obligations beyond existing IHL.

Element	Russia's Position	Strategic Effect
Weapons Review	Supports national weapons reviews under Article 36 of Additional Protocol I but opposes mandatory international review mechanisms specific to LAWS.	Reinforces state sovereignty and existing national review processes.
Technological Development	Warns against restrictions that could impede military innovation or the peaceful development of AI and robotics. Argues that autonomy may reduce human error and improve precision.	Preserves freedom for continued technological advancement and dual-use AI development.
Preferred Forum	Maintains that the CCW GGE is the only appropriate multilateral forum for discussing LAWS and opposes parallel initiatives in the UN or other forums.	Preserves the consensus-based CCW process and resists alternative norm-making mechanisms.
Overall Approach	Supports the continued application of existing IHL, state responsibility, national implementation, technological flexibility, and consensus-based discussions within the CCW.	Positions Russia as a strong defender of the existing legal framework rather than the creation of new international regulation.

Source: Compiled by the author from the Russian Federation, Position Paper on Emerging Technologies in the Area of Lethal Autonomous Weapon Systems, CCW/MSP/2024/WP.42 (2024); Considerations for the Report of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapon Systems (2021); and Statement by Mr. Konstantin Vorontsov, Deputy Head of the Delegation of the Russian Federation, First Committee of the 80th Session of the UN General Assembly, 24 October 2025.

The Russia–Ukraine conflict, however, represents a fourth model of AI-enabled warfare, one driven less by regulatory debate than by the

operational demands of sustained high-intensity conflict. Rather than demonstrating the deployment of fully autonomous weapon systems as envisaged in many LAWS discussions, the conflict illustrates how artificial intelligence has been progressively integrated into intelligence, targeting, electronic warfare, loitering munitions, autonomous navigation, and battlefield decision support under the pressures of continuous combat. **Representative Russian AI-enabled military systems employed during the conflict are summarised in Table 9.10**

Table 9.10: Select Russian Autonomous and AI-enabled Military Systems

System	Type	Level of Autonomy	Core Function	AI/ Advanced Features	Human Control Model
Lancet	Loitering munition	Semi-autonomous	Precision strike	Autonomous navigation and terminal target tracking	Human-in-the-loop (launch), autonomous terminal guidance
Uran-9	Unmanned Ground Combat Vehicle	Moderate	Reconn- aissance and fire support	Autonomous navigation functions	Human supervised
Marker UGV	Experimental autonomous ground vehicle	High (experimental)	Reconn- aissance, logistics, target engagement	AI-assisted navigation and object recognition	Human supervised
Orlan-10	ISR UAV	Low– moderate	Intelligence, surveillance and reconaissance	AI-assisted image processing and electronic warfare support	Human-in-the-loop
Geran-2 (Shahed-136)	Long-range loitering munition	Semi-autonomous	Long-range precision strike	Autonomous navigation (GPS/INS) and terminal guidance	Human-in-the-loop (mission planning)

System	Type	Level of Autonomy	Core Function	AI/Advanced Features	Human Control Model
Unmanned Maritime Systems	Surface drones	Increasing autonomy	Maritime strike and reconnaissance	Autonomous navigation and waypoint execution	Human supervised
AI-enabled ISR & Electronic Warfare Systems	Decision-support	Decision support	Target detection, intelligence fusion and electronic warfare	Machine learning, sensor fusion and data analytics	Human decision authority

Source: Compiled by the author from publicly available Russian defence sources and analyses of the Russia–Ukraine conflict.

Operational Adaptation under Conditions of High-Intensity Warfare

What distinguishes the Russia–Ukraine conflict from the approaches adopted by the United States, China, or Israel is not simply the systems employed but the speed with which operational experience has driven technological adaptation. Rather than developing AI-enabled capabilities primarily through long-term acquisition programmes or doctrinal planning, both Russia and Ukraine have continuously modified tactics, software, sensors, communications, and autonomous functions in response to battlefield experience. The conflict therefore represents a dynamic process of operational adaptation in which innovation occurs during combat rather than before it. Unlike the United States, which has emphasised governance mechanisms, testing, and rigorous validation before operational deployment, the Russia–Ukraine conflict demonstrates an innovation cycle measured in weeks rather than years. Lessons derived from battlefield experience are rapidly incorporated into new software, targeting algorithms, electronic warfare countermeasures, autonomous navigation systems, and drone tactics, producing a continuous process of adaptation driven by operational necessity.

The conflict has transformed the battlefield into a laboratory for increasingly autonomous systems. Reports from the region suggest

experimentation with AI-enabled drones capable of operating with minimal or no human intervention during the final stages of target engagement. In one widely reported case, Ukrainian developers described a battlefield test near Bakhmut and Chasiv Yar in which AI-controlled quadcopters, operating in a so-called “Terminator mode”, were allegedly launched without communications links or human oversight during the engagement phase. Once deployed, the drones reportedly used onboard machine-vision algorithms to identify and attack targets autonomously within a designated area. If verified, these reports would represent one of the earliest publicly documented instances of AI-enabled systems selecting and engaging human targets without direct human confirmation during the terminal phase of attack.³⁰

The conflict has also demonstrated how autonomy and unmanned systems can generate strategic effects far beyond their cost. For instance, Ukraine’s Operation Spider’s Web,³¹ which targeted elements of Russia’s strategic bomber fleet, illustrated how relatively inexpensive drones employing autonomous navigation, distributed launch concepts, and AI-assisted targeting could threaten platforms representing decades of investment and forming part of a nuclear-armed state’s strategic deterrent architecture. The operation challenged traditional assumptions regarding distance, sanctuary, and the survivability of high-value military assets far behind the front lines. Similarly, autonomous and remotely operated maritime drones operating in the Black Sea forced the Russian Navy to alter deployment patterns, relocate vessels, and reconsider long-standing assumptions regarding naval dominance and maritime security. Together, these developments demonstrate that relatively inexpensive autonomous systems can impose disproportionate costs on conventional military forces and reshape operational behaviour across entire theatres of conflict.

The experience of Russia and Ukraine highlights one of the central dilemmas confronting LAWS governance. Technologies that provide significant operational advantages are unlikely to be abandoned voluntarily during active conflict. As autonomy increasingly enhances speed, survivability, precision, and battlefield adaptation, military necessity is likely to outweigh diplomatic efforts to impose meaningful constraints. The conflict therefore demonstrates that autonomy is no longer a future possibility but an operational reality. Rather than

witnessing the emergence of fully autonomous weapon systems in isolation, the Russia–Ukraine war illustrates the progressive integration of artificial intelligence across the battlespace, where autonomy is increasingly embedded in intelligence, targeting, navigation, electronic warfare, logistics, and strike coordination. In this respect, it offers perhaps the clearest illustration yet of the tension between humanitarian regulation and the evolving character of warfare.

OTHER SIGNIFICANT STATE PRACTICE IN AI-ENABLED AND AUTONOMOUS WARFARE

Beyond the major powers examined in this chapter, several other states have made important advances in the development, deployment, and export of AI-enabled and autonomous military systems. Their representative capabilities illustrate the growing diffusion of autonomy across the international system and demonstrate that innovation is no longer confined to a small group of technologically dominant powers. A representative selection of these systems is summarised in Table 9.11.

Table 9.11: Representative AI-enabled and Autonomous Military Systems of Selected States

State	Representative Systems / Programmes	General Approach to LAWS	Distinctive Feature
France	nEUROn UCAV ³² , SCORPION Programme ³³	Supports legally binding regulation while preserving human control	Strong advocate of a two-tier regulatory framework within the CCW
South Korea	SGR-A1 Sentry Robot ³⁴ , Arion-SMET UGV ³⁵ , KUS-LW UAV ³⁶	Supports responsible development with continued human oversight	Advanced robotics and AI integrated into defence modernisation
Turkey	Bayraktar TB2, ³⁷ Kargu-2 ³⁸ , Alpaga ³⁹	Prioritises operational deployment and exports	Extensive combat experience and global diffusion of autonomous drones

State	Representative Systems / Programmes	General Approach to LAWS	Distinctive Feature
Iran	Shahed-136/238 ⁴⁰ , Mohajer-6 ⁴¹ , Ababil UAVs ⁴²	Limited public engagement in LAWS regulation	Focuses on low-cost autonomous and loitering systems with widespread export
Australia	MQ-28 Ghost Bat ⁴³ , Ghost Shark XL-AUV ⁴⁴	Supports responsible military AI within international law	Combines advanced capability development with active international engagement
Japan	AI-enabled ISR, UGV and UAV programmes ⁴⁵	Supports responsible AI development consistent with IHL	Focuses on AI for defence modernisation while maintaining legal oversight

Source: Compiled by Author.

GLOBAL TYPOLOGY OF ACTORS IN AI-ENABLED WARFARE

Having examined the principal system-shaping powers the United States, China, and Israel together with the operational lessons emerging from the Russia–Ukraine conflict, it is now possible to place these approaches within a broader global framework. States differ not only in their technological capabilities but also in the strategic roles they play in the development, regulation, deployment, and diffusion of AI-enabled and autonomous military systems. Some drive technological innovation and doctrinal change; others seek to shape the legal and ethical framework governing these technologies; some prioritise rapid battlefield adaptation and operational deployment; while others pursue a balanced approach that combines indigenous capability development with active engagement in international norm-building. Viewed collectively, these approaches reveal a fragmented but interconnected global ecosystem of AI-enabled and autonomous warfare that can be understood through the typology presented in Table 9.12.

Table 9.12: Global Typology

Tier	States	Strategic Role
Tier 1 – System-Shaping Powers	United States, China, Israel	Define the technological, doctrinal, and operational trajectory of AI-enabled warfare.
Tier 2 – Normative and Advanced Technology Powers	United Kingdom, France, South Korea	Combine advanced technological capability with leadership in governance, legal norms, and responsible military AI.
Tier 3 – Operational Deployers and Battlefield Innovators	Russia, Ukraine, Turkey, Iran	Drive operational adaptation, battlefield innovation, rapid deployment, combat experimentation, and the diffusion of AI-enabled systems under real-world conflict conditions.
Tier 4 – Emerging Capability Builders	India, Australia, Japan	States investing in indigenous AI-enabled military capability and governance but whose influence on the technological, doctrinal, or operational evolution of AI-enabled warfare remains limited.
Note: The tiering is intended solely as an analytical device to distinguish the predominant strategic role played by different states in the evolution of AI-enabled warfare. It does not represent a hierarchy of technological capability, nor does it imply that states fit exclusively within a single category. As capabilities and strategic priorities evolve, states may move between categories over time.		

Source: Author.

At the forefront are the system-shaping powers the United States, China, and Israel which define the technological, doctrinal, and operational trajectory of AI-enabled and autonomous warfare through innovation, military integration, and battlefield employment. Alongside them are the normative and advanced technology powers, notably the United Kingdom, France, and South Korea, which combine advanced technological capabilities with efforts to shape the legal and ethical frameworks governing these technologies. In contrast, the operational deployers and battlefield innovators, including Russia, Ukraine, Turkey,

and Iran, prioritise battlefield employment, operational adaptation, export, and diffusion of autonomous systems, often allowing military necessity to outpace regulatory development. Finally, emerging strategic powers, such as India, Australia, and Japan, combine expanding technological capabilities with active participation in international regulatory discussions while seeking to balance military modernisation, strategic autonomy, and humanitarian considerations. Together, these categories illustrate that states influence the evolution of AI-enabled warfare through different but complementary pathways.

The typology demonstrates that the evolution of AI-enabled and autonomous warfare is no longer driven solely by technological capability but by differing strategic priorities. While Tier 1 states shape technological and doctrinal innovation, Tier 2 actors influence legal and ethical governance, Tier 3 states redefine operational practice through battlefield adaptation, and Tier 4 actors seek to balance technological development with strategic autonomy. This differentiation also explains why international agreement on LAWS remains elusive. The states driving technological innovation are not necessarily those advocating stronger regulation, while those emphasising humanitarian constraints often exert less influence over the pace of operational development. Consequently, AI-enabled warfare continues to evolve through the interaction of technological innovation, operational necessity, strategic competition, and normative development rather than any single regulatory process.

The tiers should therefore not be interpreted as a hierarchy of technological capability but as a classification of strategic behaviour. A state's position reflects the principal role it plays within the evolving AI-enabled warfare ecosystem whether as a technological innovator, a normative leader, an operational deployer, or an emerging strategic actor. Influence is exercised through multiple pathways, including technological leadership, legal norm development, battlefield experience, industrial capacity, arms exports, and strategic partnerships. States may also move between categories as their capabilities, operational experience, and strategic priorities evolve. Equally important, the analysis demonstrates that the future regulation of LAWS cannot be separated from the wider evolution of AI-enabled warfare. As autonomy becomes increasingly integrated into sensing, targeting, communications, decision support, logistics, cyber operations, and human-machine teaming, the legal and ethical challenges extend well beyond individual

weapon systems to the broader military AI ecosystem within which autonomous weapon systems operate.

For India, this typology highlights that future policy choices cannot be considered in isolation. They will require balancing technological innovation, military effectiveness, legal obligations under IHL, strategic autonomy, and participation in the evolving international discourse on LAWS. Understanding how different states reconcile these competing considerations is likely to prove increasingly important as AI-enabled warfare continues to evolve.

The comparative analysis undertaken in this chapter demonstrates that, although states broadly accept the applicability of International Humanitarian Law to AI-enabled and autonomous weapon systems, they continue to differ fundamentally on how these technologies should be governed, the degree of human judgement required, and whether existing legal frameworks remain sufficient. The resulting landscape is therefore characterised by growing technological convergence but continuing normative divergence. Understanding these differing national approaches is essential for assessing both the future trajectory of AI-enabled warfare and the prospects for developing an internationally accepted framework governing LAWS. These findings provide the analytical foundation for the recommendations presented in the concluding chapter.

Notes:

¹ Sputnik 1, launched by the Soviet Union on 4 October 1957, was the world's first artificial satellite and marked the beginning of the Space Age. Its successful launch demonstrated Soviet advances in rocket technology, suggesting the capability to deliver long-range ballistic missiles, and triggered widespread concern in the United States over a perceived technological and strategic gap. The subsequent launch of *Sputnik 2* on 3 November 1957, carrying the dog Laika—the first living creature to orbit the Earth—reinforced this perception and prompted major US investments in science, education, and defence research.

² United States, Implementing International Humanitarian Law in the Use of Autonomy in Weapon Systems, Working Paper submitted to the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, Convention on Certain Conventional Weapons (CCW), UN Doc. CCW/GGE.1/2019/WP.5, Geneva, 2019;

Available at <https://documents.un.org/doc/undoc/gen/g19/085/84/pdf/g1908584.pdf> accessed on 16 July 2026 and United States, The Autonomy Aspect of Lethal Autonomous Weapon Systems, Working Paper submitted to the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, Convention on Certain Conventional Weapons (CCW), UN Doc. CCW/GGE.1/2025/WP.6, Geneva, 2025, available at https://docs-library.unoda.org/Convention_on_Certain_Conventional_Weapons_Group_of_Governmental_Experts_on_Lethal_Autonomous_Weapons_Systems_%282025%29/CCW-GGE.1-2025-WP.6.pdf accessed on 16 July 2026. Both working papers reaffirm the US position that existing International Humanitarian Law provides an adequate legal framework for autonomous weapon systems, emphasise appropriate human judgement, rigorous national weapons review and testing, and oppose the negotiation of a new legally binding international instrument on LAWS.

- ³ US DoD, “DoD Directive 3000.09: *Autonomy in Weapon Systems*”, Washington, DC, 2023. Referred earlier.
- ⁴ The Phalanx Close-In Weapon System (CIWS) is a fast-reaction, radar-guided, 20 mm Gatling gun weapon system that forms the US Navy’s final line of defence against anti-ship missiles, aircraft, and close-range surface threats. Built by Raytheon, it has been deployed on nearly every major US surface combatant since the early 1980s. It integrates search, detection, threat evaluation, tracking, firing, and kill assessment within a single mount, operating autonomously or via ship command systems
- ⁵ The Aegis Combat System is an integrated naval weapons control and battle management system developed by the US for fleet air and missile defence. It enables warships to detect, track, and engage multiple airborne, surface, and subsurface threats simultaneously, forming the core of modern US Navy and allied maritime defence.
- ⁶ The Patriot missile system (MIM-104) is the US Army’s primary long-range, surface-to-air missile defence weapon. Built by Raytheon with missiles from Lockheed Martin, it protects against aircraft, cruise missiles, and tactical ballistic missiles. Fielded since the 1980s, it remains central to the US and allied integrated air-and-missile defence networks worldwide.
- ⁷ The MQ-9 Reaper is an American remotely piloted aircraft designed primarily for intelligence, surveillance, and reconnaissance (ISR) and precision strike missions. Operated by the US Air Force and several allied nations, it is a cornerstone of modern unmanned combat operations and long-endurance aerial surveillance.
- ⁸ The X-47B is an experimental, carrier-capable unmanned combat air vehicle developed by Northrop Grumman for the US Navy. It was designed to demonstrate autonomous launch, recovery, and aerial refuelling from aircraft carriers, representing a major advance in naval aviation automation.

- ⁹ Skyborg is an autonomous weapons and flight control programme developed by the US Air Force Research Laboratory. It aims to integrate AI into unmanned aircraft, creating low-cost, AI-enabled “loyal wingmen” that can accompany and support manned fighter jets in combat. The initiative is a cornerstone of the air force’s push towards autonomy and next-generation air combat systems.
- ¹⁰ Project Maven, officially known as the Algorithmic Warfare Cross-Functional Team, is a US DoD initiative launched in 2017 to accelerate the integration of AI into military operations. Its primary goal is to develop computer-vision algorithms capable of analysing vast amounts of drone and surveillance footage, helping analysts identify objects of interest more efficiently.
- ¹¹ The Sea Hunter is an experimental autonomous naval vessel developed for the US Navy and the Defense Advanced Research Projects Agency. Designed as a prototype unmanned surface vehicle, it demonstrates long-duration, crewless operations for anti-submarine warfare and other missions. Sea Hunter is notable for pioneering large-scale autonomy in naval warfare.
- ¹² The Switchblade is a family of small, tube-launched loitering munitions developed by AeroVironment for the US Armed Forces. Designed for precision strikes on personnel and light vehicles, it combines elements of a drone and guided missile, offering soldiers a portable, rapidly deployable strike capability.
- ¹³ The Perdix is a US DoD micro-drone system designed for autonomous swarm operations. Developed by the Strategic Capabilities Office and MIT Lincoln Laboratory, it demonstrates collaborative behaviour among large numbers of low-cost drones. Perdix swarms showcase emerging capabilities in distributed sensing, surveillance, and electronic warfare.
- ¹⁴ For an extensive open-source tracking and technical analysis of the People's Liberation Army (PLA) operationalising “intelligentised warfare” across these specific domains, see U.S. Department of Defense, Military and Security Developments Involving the People’s Republic of China, Annual Report to Congress, 2023; available at <https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-military-and-security-developments-involving-the-peoples-republic-of-china.pdf> accessed on 15 July 2026. To understand the trajectory of Chinese military AI procurement, see two complementary reports by the Center for Security and Emerging Technology (CSET): for an analysis of foundational AI defense supply chains and military-civil fusion based on PLA equipment contracts, see Ryan Fedasiuk, Jennifer Melot, and Ben Murphy, *Harnessed Lightning: How the Chinese Military is Adopting Artificial Intelligence* (October 2021), available at <https://cset.georgetown.edu/publication/harnessed-lightning/>; and for a recent examination of specific operational requirements—including AI-enabled decision support systems (AI-DSS) and cognitive warfare derived from PLA requests for proposal—see Emelia Probasco, Sam Bresnick, and Cole McFaul, *China’s Military AI Wish List: Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, Reconnaissance, and Targeting*

(C5ISRT) (February 2026), available at <https://cset.georgetown.edu/publication/chinas-military-ai-wish-list/>. Both CSET reports accessed on 15 July 2026.

- ¹⁵ See U.S. Department of Justice, “Harvard University Professor Found Guilty of Lying About His Ties to Chinese-Run Recruitment Program,” Press Release, 21 December 2021. Dr. Charles Lieber, former chair of Harvard’s Department of Chemistry and Chemical Biology, was convicted on federal charges of making false statements and tax offenses related to concealing his participation in the Thousand Talents Plan (TTP) and his affiliation with the Wuhan University of Technology. The TTP, initiated by the Chinese Communist Party in 2008, systematically targets elite overseas scientists and nanotechnologists by offering substantial research funding, personal financial stipends, and open laboratory access to incentivize the transfer of cutting-edge, dual-use intellectual property into domestic Chinese research institutions. Available at <https://www.justice.gov/usao-ma/pr/former-harvard-university-professor-sentenced-lying-about-his-affiliation-wuhan> accessed on 15 July 2026.
- ¹⁶ For the aviation espionage case involving the Chengdu J-20 stealth fighter and U.S. F-35 designs, see U.S. Department of Justice, “Chinese National Pleads Guilty to Conspiring to Hack into U.S. Defense Contractors’ Systems to Steal Sensitive Military Information,” Press Release, 23 March 2016. Available at <https://www.justice.gov/archives/opa/pr/chinese-national-pleads-guilty-conspiring-hack-us-defense-contractors-systems-steal-sensitive> accessed on 15 July 2026.
- ¹⁷ For empirical tracking of institutional dual-use research collaborations between Western universities and Chinese military-linked entities, see the Australian Strategic Policy Institute (ASPI), *China Defence Universities Tracker*, initially launched in November 2019 and updated in 2021 and 2025. The ASPI database documents how institutions aligned with the People’s Liberation Army (PLA). These collaborations actively facilitate dual-use advancements in artificial intelligence, autonomous systems, brain-computer interfaces, and hypersonic aviation, often exploiting open-science academic frameworks for military end-use. Available at <https://www.aspi.org.au/report/china-defence-universities-tracker/> accessed on 15 July 2026.
- ¹⁸ For an analysis of the KUKA robotics acquisition, see Freshfields Bruckhaus Deringer, “A Blueprint for Chinese Outbound Investment: Midea/Kuka Case Study,” 2016. The €4.5 billion acquisition of Augsburg-based KUKA AG, one of the world’s premier industrial robotics and automation manufacturers, by the Chinese state-aligned Midea Group directly supported Beijing’s ten-year industrial blueprint, “*Made in China 2025*”. Available at <https://www.freshfields.com/en/our-thinking/case-studies/midea-kuka-case-study> accessed on 15 July 2026.
- ¹⁹ See U.S. Department of Justice, “Two Chinese Hackers Associated With the Ministry of State Security Charged with Global Computer Intrusion Campaigns Targeting Intellectual Property and Confidential Business

Information,” Press Release, 20 December 2018; Available at <https://www.justice.gov/archives/opa/pr/two-chinese-hackers-associated-ministry-state-security-charged-global-computer-intrusion> accessed on 15 July 2026.

- ²⁰ For an extensive open-source tracking and technical analysis of the People’s Liberation Army (PLA) operationalising “intelligentised warfare” across these specific domains, see U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China*, Annual Report to Congress, 2023; listed earlier available at <https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-military-and-security-developments-involving-the-peoples-republic-of-china.pdf> accessed on 15 July 2026 ; see also Center for Security and Emerging Technology (CSET), *China’s Military AI Wish List*, Georgetown University, 2021 available at <https://cset.georgetown.edu/publication/chinas-military-ai-wish-list/> accessed on 15 July 2206.
- ²¹ People’s Republic of China, *Working Paper on Lethal Autonomous Weapons Systems*, CCW/GGE.1/2022/WP.6 (Geneva: Convention on Certain Conventional Weapons, 2022); *Working Paper of the People’s Republic of China on Lethal Autonomous Weapons Systems* (English Translation).
- ²² The Caihong (CH) is a family of UAVs developed by the China Aerospace Science and Technology Corporation. The series ranges from small reconnaissance UAVs to large, armed medium-altitude long-endurance UAVs and stealth combat drones. It has become one of China’s main drone export brands.
- ²³ The Blowfish A3 is an autonomous UAV developed by the state-owned Aviation Industry Corporation of China. It is designed as a vertical take-off and landing combat drone capable of reconnaissance, strike, and electronic warfare missions, reflecting China’s push towards advanced AI-enabled weapon systems.
- ²⁴ The JARI USV (unmanned surface vehicle) is an autonomous naval combat vessel developed by the China Shipbuilding Industry Corporation. It is designed as a multi-role unmanned combat platform capable of performing surveillance, anti-submarine, and anti-surface missions. Often described as a “mini destroyer”, it demonstrates China’s ambition to integrate AI and autonomy into maritime warfare.
- ²⁵ US DoD, *Military and Security Developments Involving the PRC*, Annual Report to Congress, 2023, available at <https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF?utm.accessed> on 14 July 2026 The PLA is advancing towards “intelligentised warfare”, integrating AI into ISR, data fusion, and targeting processes to enable real-time detection, analysis, and precision engagement across domains.
- ²⁶ China’s large-scale drone swarm demonstrations illustrate how autonomy is scaling from individual platforms to coordinated networks. A widely reported

2017 test by the China Electronics Technology Group Corporation involved approximately 1,000 UAVs operating in synchronised formations. Additional demonstrations of ground and air-launched swarms suggest a growing focus on scalable, distributed systems capable of coordinated operations. While these demonstrations do not confirm fully autonomous lethal decision making, they highlight emerging challenges for human control, accountability, and predictability in networked warfare. Please see Scott N. Romaniuk and Tobias Burgers, “China’s Swarms of Smart Drones Have Enormous Military Potential,” *The Diplomat*, 3 February 2018 available at <https://thediplomat.com/2018/02/chinas-swarms-of-smart-drones-have-enormous-military-potential/>, accessed on 15 July 2026.

- ²⁷ “‘Lavender’: The AI Machine Directing Israel’s Bombing Campaign in Gaza”, +972 Magazine, 2024, available at <https://www.972mag.com/lavender-ai-israeli-army-gaza/?utm>, accessed on 14 July 2026.
- ²⁸ +972 Magazine, “Israel Developing ChatGPT-like Tool That Weaponizes Surveillance of Palestinians,” +972 Magazine, 6 March 2025, <https://www.972mag.com/israeli-intelligence-chatgpt-8200-surveillance-ai/>, accessed 15 July 2026.
- ²⁹ Russian Federation, Position Paper on Emerging Technologies in the Area of Lethal Autonomous Weapon Systems, CCW Meeting of High Contracting Parties, CCW/MSP/2024/WP.42, 2024, available at: [https://docs-library.unoda.org/Convention_on_Certain_Conventional_Weapons_Meeting_of_High_Contracting_Parties_\(2024\)/CCW-MSP-2024-WP.42_EN.pdf](https://docs-library.unoda.org/Convention_on_Certain_Conventional_Weapons_Meeting_of_High_Contracting_Parties_(2024)/CCW-MSP-2024-WP.42_EN.pdf) accessed 16 July 2026. May also see Statement by Mr. Konstantin Vorontsov, Deputy Head of the Delegation of the Russian Federation, First Committee of the 80th Session of the UN General Assembly, 24 October 2025 available at <https://russiaun.ru/en/news/241020251>, accessed on 15 July 2026.
- ³⁰ Matthew Sparkes, “AI-controlled Drones may have Hunted and Killed People without Human Oversight in Ukraine”, *New Scientist*, June 10, 2026. See also Mark Tyson, “Ukraine Used Ten AI-controlled ‘Terminator’ Drones to kill Russian Soldiers Two Years Ago, Marking First Autonomous Killings of Humans”, *Tom’s Hardware*, June 13, 2026.
- ³¹ Kateryna Bondar, “How Ukraine’s Operation ‘Spider’s Web’ Redefines Asymmetric Warfare”, *Center for Strategic and International Studies*, June 2, 2025; and “How Ukraine Pulled Off an Audacious Attack Deep Inside Russia”, *Reuters*, June 4, 2025.
- ³² nEUROn is a European program for an unmanned combat air vehicle (UCAV) technology demonstrator, conducted by Dassault Aviation as prime contractor under the authority of French defence procurement agency DGA. It heralds tomorrow’s defence programs, since it federates expertise from across Europe (France, Italy, Sweden, Spain, Greece and Switzerland). The nEUROn program is designed to validate the development of complex

technologies representing all mission systems: high-level flight control and stealth, launching real air-to-ground weapons from an internal bay, integration in the C4I environment, innovative industrial collaboration processes, etc. Available at <https://www.dassault-aviation.com/en/defense/neuron/>, accessed on 15 July 2026.

- ³³ The Scorpion program (synergy of contact reinforced by versatility and information enhancement) aims to renew and modernize the combat capabilities of the Army through the arrival of new generation armored vehicles and the optimization of the networking of all systems, available at <https://www.defense.gouv.fr>, accessed on 15 July 2026.
- ³⁴ The SGR-A1 is a South Korean autonomous sentry system developed for border surveillance, incorporating automated target detection while retaining human authorisation for lethal engagement.
- ³⁵ Arion-SMET is an AI-enabled unmanned ground vehicle developed by Hanwha Aerospace for autonomous logistics, reconnaissance, and support missions.
- ³⁶ KUS-LW (Korean Unmanned System–Loyal Wingman) is an AI-enabled unmanned combat aircraft designed for manned–unmanned teaming with fighter aircraft.
- ³⁷ The Bayraktar TB2 is a Turkish medium-altitude, long-endurance unmanned combat aerial vehicle widely employed for intelligence, surveillance, reconnaissance, and precision strike missions.
- ³⁸ Kargu-2 is a Turkish rotary-wing loitering munition capable of autonomous navigation and AI-assisted target recognition.
- ³⁹ Alpagu is a fixed-wing loitering munition developed by STM for autonomous reconnaissance and precision strike operations.
- ⁴⁰ The Shahed-136 and Shahed-238 are Iranian long-range loitering munitions employing autonomous navigation for precision strike missions.
- ⁴¹ The Mohajer-6 is an Iranian medium-altitude unmanned aerial vehicle capable of intelligence, surveillance, reconnaissance, and precision strike operations.
- ⁴² The Ababil family comprises Iranian unmanned aerial vehicles employed for reconnaissance, surveillance, loitering, and attack missions.
- ⁴³ The MQ-28 Ghost Bat is an Australian-developed autonomous collaborative combat aircraft designed to operate alongside crewed aircraft in loyal wingman missions.
- ⁴⁴ Ghost Shark is an Australian extra-large autonomous underwater vehicle developed for long-range intelligence, surveillance, reconnaissance, and maritime operations.
- ⁴⁵ Japan Ministry of Defense Unveils First Basic Policy on Use of AI, The Japan Times, July 2, 2024, available at <https://www.japantimes.co.jp/news/2024/07/02/japan/sdf-cybersecurity/>, accessed on 25 September 2026.

RECOMMENDATIONS AND CONCLUSION

The international debate on lethal autonomous weapon systems has demonstrated that the central challenge is not simply whether autonomous technologies should be developed, but how their development and employment can remain consistent with IHL and subject to meaningful human responsibility. The emerging areas of convergence identified in the 2026 GGE provide a basis for further work while leaving the precise legal form of any future instrument to the continuing CCW process.¹ Four priorities emerge from the analysis undertaken in this study.

First, the applicability of International Humanitarian Law should remain the foundation of any future governance framework. The development of autonomous functions does not place their employment outside existing legal obligations. Distinction, proportionality, precautions in attack, accountability and other applicable rules of IHL must continue to govern the use of force.

Second, greater common understanding of terminology and the characteristics of autonomous weapon systems is required. Clear distinctions between artificial intelligence, autonomous functions, AI enabled decision support systems and autonomous weapon systems are necessary to avoid both under regulation of genuinely autonomous capabilities and unintended regulation of general purpose or dual use technologies.

Third, governance should extend across the lifecycle of autonomous weapon systems. Legal review, testing and evaluation, reliability, predictability, traceability, human machine interaction, training, operational constraints and mechanisms for investigating incidents should be addressed not only at the point of acquisition or deployment but throughout the system's lifecycle.

Fourth, the CCW process should continue to serve as a central multilateral forum for developing common understandings and

considering appropriate future measures on lethal autonomous weapon systems. Any future instrument should be developed on the basis of continued conceptual and technical convergence, while its precise legal form remains a matter for States to determine through the established multilateral process.

These priorities have direct implications for India. India's national preparedness and international engagement must therefore develop in parallel. India requires the technological, legal, institutional and operational capacity not only to understand and govern emerging autonomous military technologies, but also to test, evaluate and employ them responsibly. At the same time, it must contribute substantively to the international processes through which their future regulation will evolve.

It is in this context that the following six pillar framework is proposed. The framework translates the priorities identified above into a national approach for India. Taken together, the six pillars provide an integrated framework for India's responsible development, governance and employment of autonomous military technologies, while maintaining compliance with IHL, human responsibility and accountability. The six pillars can be summarised in the table 10.1 below:

Table 10.1 : Six Pillar Framework for India

Pillar	What it addresses
Governance and Legal Architecture	Can India govern autonomous military capability responsibly?
Technological Sovereignty and Military Capability	Can India develop and sustain the critical technologies required?
Human Capital and Institutional Adaptation	Does India have the people and institutions required to understand and manage them?
Operational Capability and Doctrine	Can India employ them effectively while preserving human judgement and accountability?
National Adaptation and Resilience	Can the system remain resilient in an increasingly autonomous & contested battlespace?
International Engagement and Strategic Partnerships	Can India convert its knowledge and capability into substantive international engagement?

Source: Prepared by Author

PILLAR I: GOVERNANCE AND LEGAL ARCHITECTURE

Technological transformation in warfare requires corresponding institutional adaptation. Without coherent governance, even advanced capabilities risk operational inconsistency, fragmented decision making and compromised accountability. India therefore requires a governance architecture that integrates legal review, operational doctrine, technological oversight and institutional responsibility. The following measures are recommended:

Establish a permanent inter agency mechanism for military AI and autonomous systems. This mechanism should bring together the Ministry of Defence, armed forces, DRDO, legal advisers, scientific and technical institutions and other relevant stakeholders to coordinate policy, acquisition, testing, deployment and oversight.

Establish a permanent national legal review mechanism for new weapons, means and methods of warfare. The mechanism should draw upon the **principles and methodology underlying Article 36 of Additional Protocol I**, while applying the international legal obligations binding on India. Although India is not a party to Additional Protocol I, the systematic legal review of new weapons, means and methods of warfare provides an important framework for assessing whether emerging capabilities are consistent with applicable international law. The review should involve **legal, operational, scientific and technical expertise** and should be revisited when significant technological or software modifications materially alter a system's capabilities or intended employment.

Establish clear accountability across the system lifecycle. Responsibility should remain identifiable across design, development, testing, authorisation, deployment, operation and post incident review. Accountability should not become diffused merely because a system incorporates autonomous functions.

Establish institutional mechanisms for incident investigation and lessons learned. Operational incidents involving autonomous or highly automated systems should be subject to structured investigation, documentation and review so that technical, legal and operational lessons can inform subsequent employment and system development.

Ensure that meaningful human judgement remains decisive in decisions involving the use of lethal force. The degree and nature of human involvement should be determined according to the capabilities, operational environment and intended employment of the system.

PILLAR II: TECHNOLOGICAL SOVEREIGNTY AND MILITARY CAPABILITY

Enduring military capability cannot depend exclusively on imported systems or external technological ecosystems. It requires indigenous knowledge, the ability to convert scientific research into operational capability and sustained technological innovation. At the same time, technological sovereignty should be understood as the capacity to understand, evaluate, modify and sustain critical technologies rather than as technological autarky. The following measures are recommended:

Prioritise investment in critical AI and autonomous systems technologies. Particular attention should be given to areas including machine learning, computer vision, autonomous navigation, robotics, secure communications, edge computing, sensor fusion, electronic warfare and resilient data systems.

Develop indigenous testing, evaluation, verification and validation capability. India should establish rigorous national standards and facilities for assessing reliability, predictability, robustness, cyber resilience and performance under realistic operational conditions.

Establish a closed loop between research, testing and operational feedback. Research programmes should be connected systematically to field experimentation and operational experience so that lessons from deployment can inform subsequent technological development.

Establish a long term national capability plan. A fifteen to twenty year roadmap should identify critical technologies, institutional responsibilities, research priorities, industrial capacity and measurable milestones for autonomous military capabilities.

PILLAR III: HUMAN CAPITAL AND INSTITUTIONAL ADAPTATION

Advanced military technologies require personnel capable of understanding not only their technical characteristics but also their legal, ethical and operational implications. India therefore requires a human capital framework capable of bringing together military expertise, scientific knowledge, engineering capability, legal understanding and operational experience. The following measures are recommended:

Create structured pathways for specialist technical talent into defence institutions. Lateral entry, specialist appointments and mobility between government, the armed forces, academia, research institutions and industry should be facilitated where appropriate.

Strengthen professional military education in AI and autonomous systems. Officers and personnel involved in acquisition, planning, command, legal review, testing and employment should receive education in AI, autonomy, human machine interaction, IHL, ethics and operational risk.

Develop interdisciplinary centres of expertise. Defence institutions and universities should establish programmes bringing together computer science, engineering, military studies, international law, ethics and strategic studies.

Create mechanisms for retaining specialist expertise. Career structures should recognise technical and interdisciplinary expertise so that critical knowledge is not lost through frequent institutional rotation.

PILLAR IV: OPERATIONAL CAPABILITY AND DOCTRINE

Technological capability acquires military significance only when it is integrated into doctrine, command structures and operational practice. Autonomous systems therefore require operational concepts that preserve human command authority while exploiting the advantages of machine processing, speed and persistence. The following measures are recommended:

Develop doctrine for the responsible employment of autonomous systems. Doctrine should establish the circumstances,

missions and operational environments in which autonomous functions may be employed and the circumstances in which human intervention is required.

Define operational parameters for autonomous employment.

These should include target categories, geographic boundaries, duration of autonomous operation, escalation thresholds, conditions for human intervention and mechanisms for termination or disengagement.

Integrate IHL considerations into operational planning and training.

Personnel should be trained to understand how distinction, proportionality, precautions and other applicable rules operate in systems incorporating autonomous functions.

Conduct realistic operational testing and exercises.

Testing should examine system behaviour under degraded communications, changing environmental conditions, adversarial interference, uncertain data and other conditions that may affect reliability and predictability.

Establish command responsibility and traceability.

The authorisation and operational boundaries of autonomous systems should remain identifiable so that decisions can be reconstructed and reviewed after an incident.

Pillar V: National Adaptation and Resilience

Autonomous military systems will operate within a wider ecosystem of cyber, space, communications, energy, information and physical infrastructure. Their effectiveness and resilience will therefore depend not only on the weapon system itself but also on the resilience of the national systems on which it depends. The following measures are recommended:

Integrate autonomous systems into broader national resilience planning.

Dependencies on communications, satellite systems, cloud infrastructure, navigation, energy and data networks should be identified and protected.

Strengthen resilience against cyber and electronic warfare.

Autonomous systems should be designed and tested to operate securely in contested electromagnetic and cyber environments.

Develop redundancy and degraded mode capabilities. Critical autonomous systems should have appropriate fallback mechanisms where communications, navigation, sensors or external data sources become unavailable or compromised.

Incorporate societal and economic resilience into national preparedness. The consequences of autonomous and AI enabled conflict may extend beyond the battlefield to critical infrastructure, financial systems, transportation, information ecosystems and public services.

PILLAR VI: INTERNATIONAL ENGAGEMENT AND STRATEGIC PARTNERSHIPS

India's approach to military AI should combine strategic autonomy with diversified international partnerships. Its contribution to international governance should be based on indigenous knowledge, operational experience, legal expertise and technological capability. The following measures are recommended:

Strengthen India's indigenous scholarship and policy research on military AI and autonomous weapons. Greater investment is required in interdisciplinary research linking technology, IHL, ethics, strategic studies and military doctrine.

Establish dedicated centres of excellence. Universities and defence institutions should develop courses and sustained research programmes on autonomous systems, IHL, meaningful human control, weapons reviews, AI assurance and international governance.

Expand international academic and professional partnerships. Fellowships, joint research, expert exchanges and international conferences should be used to strengthen India's participation in emerging debates.

Engage actively with the Global South. India can contribute to developing greater awareness and capacity among developing States, particularly on the legal, technological and institutional challenges associated with autonomous military technologies.

Sustain substantive engagement within the CCW , other relevant multilateral processes and hosting international conferences.

India's positions should be supported by hosting international conferences, technical expertise, legal analysis and operational experience, enabling it to contribute constructively to the development of common understandings and any future governance measures.

CONCLUSION

In conclusion, India's approach must find a practical balance between two extremes: an outright ban on autonomous weapons and their unchecked military use. A total ban is unrealistic given the pervasive, dual-use nature of AI and the strategic realities of peer competition. At the same time, allowing machines to make life-and-death decisions without human control violates international law and basic ethics. The real solution lies in strict regulation by setting clear legal boundaries, testing systems across their entire lifecycle, and ensuring that human judgement always governs the use of force.

India's own history provides an important foundation for such an approach. During the Korean War, at a time when hostilities had brought the conflict to a prolonged stalemate, India played an important diplomatic and humanitarian role. Through sustained negotiations, India helped bridge differences between the opposing sides and contributed to the eventual conclusion of the Korean Armistice. India also volunteered a nearly 6,000-strong Custodian Force to oversee the neutral repatriation of prisoners of war, helping implement the terms of the armistice and address one of the most difficult issues preventing a settlement. India's role demonstrated that military capability, when placed within a broader framework of diplomacy and humanitarian responsibility, can be used not simply to wage war but to help resolve its consequences, break diplomatic deadlocks, and create conditions for a lasting peace. During the East Pakistan crisis, India responded to a humanitarian emergency while managing the strategic consequences of the conflict. In 1971, the treatment and eventual repatriation of more than 90,000 prisoners of war demonstrated the application of humanitarian principles in the conduct of a major post-conflict responsibility. Beyond armed conflict, India's experience has similarly demonstrated how national capability can be translated into

humanitarian action. Its efforts to make HIV/AIDS treatment more affordable and accessible to poorer countries, its support for initiatives such as Pulse Polio, and its provision of vaccines and medical assistance during the COVID-19 pandemic demonstrate the use of national scientific, medical, industrial, and institutional capabilities in addressing challenges that extended beyond India's immediate national interests.

These experiences are significant not because the Korean War, public health crises, and autonomous warfare are identical phenomena, but because they demonstrate a consistent principle in Indian statecraft: humanitarian principles acquire credibility only when backed by institutional capacity, technical capability, and the political intent to act. India's experience shows that responsibility is not simply a matter of declaring noble principles. It requires the capacity and capability to act on them, particularly when circumstances are complex, resources are contested, and national security is at stake.

This dynamic connects directly to autonomous weapons. Strategic credibility rests on the interplay between capacity, capability, intent, and responsibility. A state cannot shape international rules from a position of technological weakness, nor can capability without clear legal intent and institutional responsibility build enduring security. For India, therefore, technological capability and humanitarian responsibility are not competing objectives; rather, national capacity provides the very means through which responsible intent is put into practice. India's role is to help forge a sensible middle ground that reconciles military necessity with ethical restraint. Ultimately, the legitimacy of military power rests not merely on what machines are capable of doing, but on the declared intent and human responsibility of those who command them.

This principle reflects an enduring civilisational foundation rooted in the distinction between just and unjust war. Indian philosophical traditions have consistently maintained that weapons are taken up not for unchecked destruction or conquest, but for the protection and preservation of an ethical order. The legitimacy of force is defined by the restraint that governs it: true power resides not in the capacity to destroy, but in the moral intent and discipline required to uphold the order it is pledged to defend. As military systems grow increasingly

autonomous, capability must remain anchored in this civilisational ethic of responsibility, ensuring that the technologies developed to protect an order never end up undermining its foundational values.

Notes:

- ¹ United Nations, Convention on Certain Conventional Weapons (CCW), Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, “Further consideration and formulation, by consensus, of a set of elements of an instrument, without prejudging its nature, and other possible measures,” CCW/GGE.1/2026/WP.2, Geneva, 2–6 March and 31 August–4 September 2026. Available at [https://docs-library.unoda.org/Convention_on_Certain_Conventional_Weapons_Group_of_Governmental_Experts_on_Lethal_Autonomous_Weapons_Systems_\(2026\)/CCW-GGE.1-2026-WP.2.pdf](https://docs-library.unoda.org/Convention_on_Certain_Conventional_Weapons_Group_of_Governmental_Experts_on_Lethal_Autonomous_Weapons_Systems_(2026)/CCW-GGE.1-2026-WP.2.pdf), accessed on 24 Sept 2026.

**Statements/Interventions during the First Session of GGE on
LAWS,
3-7 March 2025**

INTERVENTION I: Characteristics

Chair,

At the outset, let me on behalf of my delegation commend you for your efforts in advancing the work of this group and bringing us closer to a shared understanding on the subject and facilitate the GGE to successfully meet the mandate entrusted to it. Also, express gratitude to the friends of the chair for their efforts in building consensus.

Acknowledging the diversity in opinion and understanding on the conception of LAWS amongst High Contracting Parties, India endorses the approach adopted by the Chair of the GGE to identify a set of characteristics and build a shared understanding of systems and platforms relevant to these discussions. This would determine the scope of the instrument and is thus the most critical and challenging task ahead.

India's understanding on the subject of characteristics is as follows:

- **Lethality-** The instrument must restrict itself to the regulation of those autonomous weapon systems which are '**lethal**' in **ACCORDANCE WITH THE MANDATE OF THE GGE**. This remains a contested term and forms the core of the discussion around definitions and characterizations, which in turn determines the scope of the proposed instrument. Arriving at a **narrow, specific and precise** understanding of 'lethal' in the context of LAWS is critical to meeting the mandate of the GGE.
- In our understanding, **lethality** is a cumulative function of both the characteristics and the effect of the weapon system. This means that for a system to be regulated under this instrument, it must be specifically designed to be able to have a lethal effect and then be

used in in a manner which has a lethal effect. Both design and use features together create the function of lethality for the purpose of this instrument.

- The scope of the instrument is also closely tied to the question of **autonomy**. **In our view**, Autonomy is a **continuum** closely linked to the degree of **human oversight and control**.
- **It is our view that** for the purpose of this instrument- **Full autonomy** (*with a human completely out of the loop of the entire “kill chain”*)- is relevant only in the **execution of critical functions** or in the **use of lethal force**. These critical functions are identification, selection and engagement done together, as a **cumulative set of functions**. If a human is either in, or on the loop, in the execution of **either one or more of these** three functions, the system cannot be understood as being fully autonomous in carrying out lethal effects and would be **excluded from the scope of this instrument**.
- There are several systems already in use for several years that contain a degree of autonomy in their functioning but **do not meet the criteria to meet the threshold of LAWS as we understand them**. These include but are not limited to uncrewed autonomous platforms such as drones, remotely piloted vehicles etc., and are **excluded from the scope** of this instrument. We support the wording in para 2 of the text.
- And finally, we would like to reiterate that the scope of the discussion and the ensuing Regulation, limits and controls under this instrument must be limited to the **use and effects of the system**, and not to the **constituent technology and technological inputs**.
- And now let me share our specific textual edits to Para 1 of the text:

A lethal autonomous weapon system can be characterized as an integrated combination of] weapons along with their technological components that once activated enable the system to identify, select, and engage a target with lethal effect, without human intervention.

Session II: Intervention 3 March 2025, 1600 hrs**Thank you Chair**

The delegation of decision making around the use of force to machines raises legitimate legal and ethical challenges around the question of responsibility and accountability in case of violations of International Humanitarian Law which must continue to guide the conduct of armed conflict.

India is supportive of the concepts and ideas contained in this section and is broadly comfortable with the current wording. Some limited specific textual edits have been shared with your team.

However, let me take this opportunity to share our views on some of the debates and questions raised this afternoon by some delegations.

Development and use across the text!

- Regulation, limits and controls under this instrument must be limited to the **use and effects of the system**, and not to the **constituent technology and technological inputs**. Therefore, the focus of prohibitions and regulations as are being considered in this rolling text must be **on the actual operational use of the weapon system**
- This does not in any way dilute the applicability of existing bodies of relevant international law to the entire life-cycle of the weapon system, including its design, development and deployment, as also acknowledged in Guiding Principle (a) of the GGE.
- However, in our view the focus of this group is to identify specific regulatory measures and elements that would ensure that LAWS are **operated and used** in a manner that does not violate **International Humanitarian Law**.
- This is consistent with meeting obligations under IHL, where prohibitions and regulations are linked to the effects of use of weapons and not on their development unless specifically constrained by legal instruments or treaties.

Application of IHL

- **International Humanitarian Law**, and the cardinal principles of **distinction, proportionality and precaution**, contained therein, apply to all means and methods of warfare, those of the past, present and those of the future. These would include **lethal autonomous weapon systems that are fully autonomous**, which in our view are the subject of discussion in the GGE.
- **Human judgment and oversight** remain integral to ensure the use of LAWS in a manner that meets standards laid out under IHL.

Human control and judgement

- We heard from the many delegations earlier this afternoon about the difference between ‘control’ and ‘judgement’. It is our view that both these are subjective terms and it is not clear how they would be quantified
- We believe context appropriate human judgement is a broad umbrella term that contains within it ideas of command, control and oversight- and that control can be exercised through judgement. However, we agree that this is remains a contested concept and we will need to do more work as a group to arrive at a phraseology that is acceptable to all members of the GGE.
- Finally, with regards language in Para 2, we do not see the need for mentioning international and non-international after ‘armed conflict’ as we believe this is superfluous.

Section III

Thank you Chair.

- India acknowledges that emerging technologies in the area of lethal autonomous weapons systems raise legal and ethical challenges and concerns and endorse the approach put forward in sections III and IV to address these concerns.

- For the purpose of the instrument under consideration of the GGE, we fully endorse the principle that LAWS must comply with International Humanitarian Law and the principles of **distinction, proportionality, and precaution** as enshrined therein
- We believe that **human judgment** and **oversight** remain integral to ensure the use of LAWS in a manner that meets standards laid out under IHL.
- India supports a prohibition of use of Lethal Autonomous Weapons Systems that are fully autonomous and cannot be used in compliance with IHL.
- As such, we support fully the iteration of this important principle in Paras 1 and 2 of the text.
- With regards Para 3, we propose replacing references to “civilians” and “civilian objects” with “non-combatants” and “non-military objectives”. We believe this is essential to deal with current realities where we do have civilians participate in hostilities and grey-zone warfare.
- All other lethal autonomous weapon systems that may have elements or characteristics of autonomy may be used by states with prescribed controls and regulations to ensure their use is not in contravention of IHL.
- India supports efforts of the GGE to identify a set of regulatory measures for states to incorporate in their domestic guidelines and directives for the design, development and use of LAWS as is attempted to be done in Boxes III and IV.
- Para 5: We would like to delete reference to human control and keep only human judgement in this section; as also throughout the text. We have already heard from several delegations that there is still no consensus within the GGE on the principle of “human control”; and, also that control is possible to be exercised by several means for example through a software.
- Therefore, it is our view that human judgement is a broad enough term reflecting human cognition which would contain the ideas

of control and intervention. In other words, control human or through a machine- is exercised only through the application of human cognition or judgement.

- We would make the same proposal for the reference to human control in Para 7.
- Para 6 A- We endorse the idea and concepts proposed in this Para and understand that this is linked to the idea of being able to exercise human judgement and oversight. However, we would echo the concerns of some delegates around the legal ambiguities around these terms; as also the technical limits on realizing these obligations. We do believe these would need further discussion and clarification at future sessions of the GGE.
- Para 6 (C)- Chapeau: Limit the types of targets, duration, geographical scope, and scale of the operation of LAWS. We view these as possible options amongst many others to regulate the use of LAWS and would propose clarifying this through the addition of the following words- **“where appropriate and feasible, through measures including but not limited to”**
- delete (i) delete by a human user
- Delete (iii)
- (iv) replace with non-combatants and non-military objectives.
- V- Read as “Limiting the types of targets to legitimate military objectives”
- With regards the proposal of several delegations to replace the reference to use of LAWS with “development and use”, let me reiterate our views on this subject.
- IHL deals with regulating the conduct of armed conflict. Therefore regulation, limits and controls under this instrument must be limited to **actual operational use of the weapon system**.
- Imposing IHL obligations and its principles on the design and development stage goes beyond the purview of IHL. Imposing

legal uncertainties and hard to realize obligations will have the effect of stigmatizing technology, stall innovation and hamper R&D. This we believe goes against the letter and spirit of the GGE.

Section-IV

Thank you, Mr. Chairperson,

Appreciate your steering the work of the Group.

Acknowledge in-depth discussions that have taken place this week on various sections of rolling text.

We have seen very active participation and a high quality of argumentation, which reflects that the group remains appropriate forum for discussing lethal autonomous weapon systems and autonomy in weapon systems.

We view Section IV as an important section. There are several reasons to this. But the most important is that the section could become a place holder for those elements of the rolling text which fail to find convergence in sections above i.e. regulations and prohibitions.

I have four points to suggest.

First the Chapeau: -

Instead of should – we prefer use of “states are encouraged to”.

The Chapeau should read as *“Prior to potential employment and as applicable throughout the entire life cycle of LAWS, States are encouraged to”*.

- Distinguish risk mitigation measures from regulation measures. There is an intrinsic difference between the two. Risk mitigation measures, in our view are adjunct to primary obligations covered under Section III. Our amendment seeks to clarify this relationship.

We can support suggestion made by RoK, that these measures should not hamper progress in S&T advancements related to the convention.

Second:

In Para 4, we would like the language to be consistent with Para 1, where we qualify the sentence with “in accordance with obligations under IHL”.

We are also open to deleting this para, since it can be covered under para 1.

Third:

Revised para 5 should look as:

“Conduct rigorous testing and evaluation in realistic simulated operational environments” (we can delete the following part. It is subjective. It uses terms which are not necessary, but which also does not compromise the given provision)

Fourth:

The divergence/ opposing positions on traceability and explainability (and other terms) could be accommodated here.

Terms such as traceability and explainability contain in them important principles.

However, we note that there is inherent subjectivity in terms of what they mean. There was also a view that in any case the meanings that these terms would have to be interpreted nationally.

Therefore, as a compromise, we could have reference to these terms over here, with an understanding that these are not, per se, obligations but aimed at encouraging states to take them into account.

Lastly,

We can agree with the delegation of Australia on their amendments to para 6 and 7 concerning replacing harmful bias with unintended bias.

We can also agree with views that duplicative provisions in this section should be avoided.

Section-VI

Intervention

We want to thank you for providing the revised text.

We are only making textual suggestions because we believe that the focus of our discussions should be to reach consensus on the language of the possible elements of the instrument.

Our comments are preliminary and brief.

1. We support Israeli, Chinese and Singaporean interventions to introduce the element of “design”, which we feel is essential in characterisations.
2. The cumulative nature of the individual critical functions of identify selection and engagement must be carried out without any human intervention for it to be characterised as LAWS for the purpose of this instrument.
3. We also support the view expressed by US and others that the mandate of this GGE is to discuss only lethal autonomous weapons systems. We support language that respects this mandate.
4. We also support the German proposal on insertion of “once activated” before can “identify, select and engage a target”.

**Statement delivered by India on Characterization (Box-I),
during the 2nd Session of GGE Lethal Autonomous Weapon
System
1 September 2025**

Thank you Mr. Chair, good morning distinguished colleagues & excellencies.

My delegation wishes to thank you and your team for your work and effort in steering our discussions, very ably. I can confirm that you can count on our support, and that my delegation will engage constructively.

I also want to acknowledge the contributions of the ISU.

Mr. Chair,

We have taken note of valuable contributions by various delegations today morning. We would like to place our preliminary views on the characterization that you have provided.

When we talk about a characterization of LAWS, precision in language is essential.

A definition that is too broad, risks capturing technologies, that were never intended to fall under the instrument. Conversely, a definition that is too narrow, risks leaving genuine concerns unaddressed. Therefore, we must aim to strike a delicate balance.

In this connection, my delegation acknowledges the work on characterization done thus far, and that it serves as a constructive foundation for your future work.

We do not think that we are too far from a formulation that can get consensus support.

However, I would like to highlight areas where we have concerns and suggest possible edits.

Mr. Chair,

I have broadly three points.

First, we believe that the reference to technological components, as formulated now, is broad.

We are all aware that modern weapons rely on software, sensors, processors, and other technologies. These technologies however exist in countless civilian applications as well: cars, phones, medical equipment. To include all “technological components” without reference to their connection to a weapon would be like regulating the invention of the wheel because tanks also use wheels.

Therefore, we would like to add the word “their integral” before “technological components”. Our concern is weapons, not the general purpose technologies used in everyday life. By speaking of “their integral technological components,” we ensure that what is covered are weapon-related integral technologies as they function within a weapon system, not in isolation.

Second, we would like an explicit inclusion of the term “identify” alongside “select and engage”, as suggested by delegation of Singapore.

Targeting is not a single act; it is a sequence: first, a target must be identified, then it can be selected, and finally engaged. If we omit “identify,” the definition risks covering systems that are not truly autonomous in the sense that concerns us.

Take the example of a fire-and-forget missile. A soldier points it at a tank, pulls the trigger, and the missile will home in until impact. Such a missile can select and engage the designated object, but it does not identify what that object is. The human has already done that work relating to identification of the target. The system has no capacity to distinguish between, for example, a tank, a bus, or a civilian car. It simply follows what it has been told. A system that only continues chasing what a human has already marked is not exercising independent judgment. It cannot, therefore, be called a “lethal autonomous weapon system.”

For this reason, all three functions—identify, select, and engage—are indispensable. They are not interchangeable words; together, they form the test of true autonomy.

In addition, the 2019 report Para 19 (a) also recognizes “identification”, “selection” and “engagement” as essential characteristics, as was stated by delegation of China.

Our view is that if the general opinion of some is that the term “identification” can be subsumed within “selection” then there should be no substantive problem in repeating it, once independently and the second time under the term “selection”, as it should not impact the scope.

Third, we would like to emphasize the requirement of “inherent design” instead of “capacity” with regard to the elaboration of the term “lethal” given in para 2.

A kitchen knife has the capacity to kill, but it was not designed as a weapon. A medicine has the capacity to harm, but it was designed to heal. If we relied on “capacity” alone, we would risk calling these everyday items as weapons.

Similarly, take a self-driving car, as an example. If misused, it could strike and kill, but it is designed for transportation, not combat. Similarly, an autonomous bulldozer could theoretically cause death, yet it is built for construction. Relying on capacity would wrongly classify such systems as LAWS, diluting the definition and its focus.

By requiring inherent design, instead of capacity, we tether the definition firmly to weapons that are designed to cause death, while preventing overreach into technologies that are designed for peaceful purposes. We also take note of the comments by the delegation of the US with their emphasis on both design and/ or intended use.

Our delegation can also support comments by Russian Federation on positioning the first sentence of para 2, as part of the first paragraph.

Finally, on the question of exclusions.

My delegation can go along with your proposal of not listing particular systems that are to be excluded.

In any case, our view is that “uncrewed aerial vehicles” which are remotely piloted and currently in use, are not covered under this Characterization.

Mr. Chair,

In each of these respects, the aim is not to obscure but to focus. Like the lens of a camera, the sharper our definition, the clearer our picture of what is at stake.

Without these refinements, we risk a definition that either covers too much, and loses credibility, or covers too little, and loses relevance.

Thank you.

Annexure III

**Statement by India on Chair's Text delivered during the 2nd
Session of the GGE on Lethal Autonomous Weapon Systems,
Geneva,
2 September 2025**

Chair,

I want to begin by appreciating you Mr. Chair and your team's efforts in guiding the work of the Group.

We are going to be rather brief. Our comments are going to be specific to Box-II.

In general, my delegation believes that we would benefit from more discussion, on where this box and its paragraphs should be placed, and what purpose do they serve in respect of the elements of the instrument.

More specifically, we note that the para 5 introduces a concept or a term of a fundamental nature: "*Context Appropriate Human Control & Judgement*"

Our Group has agreed to the term "human judgement" being essential in 2019 report.

Our Group also agreed to the term "*control*" in 2023 report.

These terms, I would like to highlight, were agreed separately, without linking one with the other.

Regarding the term "context appropriate", we would like to point out that GGE has agreed in its guiding principle (c), that in determining the quality and extent of human-machine interaction, a range of factors should be considered including the operational context, and the characteristics and capabilities of the weapons system as a whole.

We note that you have clubbed "context-appropriate" with "human judgment and control"

Such a clubbing of terms, while helpful given the nature of divergences, might superficially make them susceptible to some sort of misrepresentation.

The uncertainties that surround this term, might lead to varied interpretations around what it means, the operational obligations that it might create - whether that is in terms of weapon design or deployment or use.

We believe that, if we have to seriously consider this term for inclusion, the Group must evolve a common interpretation of this term.

As far as my delegation is concerned, at this stage, we view it strictly in line from the understandings agreed in the past and the manner in which they were agreed.

This term, in our view, does not imply continuous human involvement during system operation, but it should be satisfiable through prior decisions at design, programming, and mission-planning stages. We are willing to discuss this further.

We also have conceptual questions, including as to which factors in specific - *whether that is in terms of environment complexity, mission type, target characteristics, weapon capabilities* - should be considered in laying out the “context” and in assessing the context appropriateness of LAWS, that shape or will shape the required level of human judgement and control.

Our delegation is not entirely opposed to the term. However, we view that the Group needs to do more work to come on the same page.

We will, therefore, continue to examine and assess this term, whether its inclusion has merits or not. We have heard views of some delegations in this session and look forward to listening from others.

It is also our view that the term, even if it is considered, it should be laid out in Box-III that covers obligations, instead over here.

Thank you.

ENDORSEMENTS

Amb Anupam Ray

Former Ambassador of India / Former Permanent Representative of India to the UN and other international organisations

I have read Col Pillay's work on AI and Lethal Automation Weapon Systems with great interest. It is an impressive work, and as far as I am aware, the first and only treatise on this topic in India.

Col Pillay's work is also timely. The regulation of emerging technologies, such as, but not exclusively, AI and robotics, is a major priority on the diplomatic landscape. The deployment of these technologies on the battlefield is immediate. International regulatory efforts are therefore proceeding hand in hand with multilateral initiatives on disarmament, arms control and international humanitarian law.

The impacts of these new technologies - one of the most significant being autonomy- raise complicated legal and ethical questions. This work provides a very useful framework for understanding some of these complex issues that have arisen in these diplomatic conversations. It does a good job of enumerating and describing conceptual aspects that have dominated these discussions.

This publication, accordingly, will be particularly useful for practitioners such as defence professionals and international affairs specialists who work at the intersection of emerging technologies and multilateral processes. It will also be a valuable resource for others who have an interest or a stake in the burgeoning demand for regulations and international understandings on the development and deployment of these technologies.

I have no doubt that this work will be very well received by those who are required to know more about these highly technical discussions and also by those who have a general curiosity about this topic.

Amb Debnath Shaw

Former Ambassador of India and Joint Secretary (Planning and International Cooperation), Ministry of Defence Secretariat 2005-2008

DPK Pillay's monograph, 'AI and Lethal Autonomous Weapons Systems (LAWS): The Intersection of History, Technology and International Law' is a ground breaking and unique study of an issue, which has not been covered in such detail so far. The author has meticulously traced the history and path taken in the development, manufacture, sale and use of autonomous weapons through time. The advent of AI adds a whole new dimension to such weapons, "...reconciling military necessity with ethical restraint and human responsibility" as stated by the author. The role of governments, international agencies like the CCW, ICRC, UNGA, of civil society organizations, political declarations, regional initiatives, and national regulatory framework, towards consensus building and agreement on a verifiable programme, with a view to minimizing damage to civilian life and infrastructure, is crucial. The author's induction into the CCW process, when he was in MOD, has been well utilized, as is evident in this detailed analysis and suggestions on the way forward.

I congratulate the author for his sterling work and advice all concerned to give deep thought to the recommendations made by the author on formulating India's articulate and clear position on LAWS.

Major General Manoj AR, VSM

Additional Judge Advocate General, Intergrated HQ of MoD (Army)

AI and LAWS: The Intersection of History, Technology, and International Law is a significant contribution to military legal scholarship. The absence of a comprehensive reference work of this nature on Lethal Autonomous Weapon Systems (LAWS) has long been felt, particularly given the growing importance of the subject within international security and military operations.

During my tenure at the United Nations Department of Peacekeeping Operations (UN DPKO) in New York, LAWS was an emerging subject that the United Nations was actively addressing through the Convention on Certain Conventional Weapons (CCW) and its Group of Governmental Experts (GGE). As a Military Law Officer, I had the opportunity to interact with officers from several foreign delegations who were well versed in the principles of international law applicable to military operations, including LAWS. This was, to a considerable extent, facilitated by the availability of extensive research and scholarly literature on these subjects in their respective countries. From the perspective of Indian military jurisprudence, this monograph addresses an important gap. The work reflects a high standard of research and articulation, bringing together the legal, operational, humanitarian and strategic dimensions of emerging military technologies. The manner in which it traces the evolution of warfare from its civilisational origins, through the development of International Humanitarian Law (IHL), to contemporary debates on Autonomous Weapon Systems and Artificial Intelligence, is particularly commendable. Equally impressive is its balanced treatment of the work undertaken under the CCW, the deliberations of the GGE, and the exposition of India's legal and strategic perspectives. The monograph is academically rigorous while remaining accessible and relevant to practitioners. The work effectively combines legal doctrine with the realities of the battlefield, which is a hallmark of sound military legal scholarship. It explains not merely what the law provides, but why it matters to commanders, operational planners, legal advisers and policymakers entrusted with decisions of profound consequence.

As Commandant of the Institute of Military Law (IML), I observed that Col (Dr) DPK Pillay's lectures on IHL, Refugee Law and Human Rights Law were among the finest and most appreciated by student officers. His ability to translate complex legal principles into practical battlefield situations through relevant real-life operational examples was particularly noteworthy. That rare ability is reflected throughout this monograph. It demonstrates that law is not an abstract academic exercise but an operational necessity. This work reflects the finest traditions of the soldier-scholar. It embodies the spirit of the Geneva Conventions not merely as a body of legal instruments, but as enduring military values, while remaining firmly grounded in operational realities and the imperatives of national security.

The monograph will serve as a valuable reference for military officers, including law officers and legal practitioners, as well as diplomats, policymakers, scholars and students. It merits inclusion in the libraries of military establishments, particularly training academies, where it would be of considerable value to student officers, faculty and senior officers.

The delegation of decisions over life and death has long been one of warfare's most enduring ethical, legal, and strategic dilemmas. The emergence of Artificial Intelligence (AI) has transformed this debate from a theoretical concern into an immediate challenge through the development of Lethal Autonomous Weapon Systems (LAWS). This monograph examines how existing International Humanitarian Law (IHL) addresses autonomous weapons by analysing the historical evolution of the laws of armed conflict, deliberations within the Convention on Certain Conventional Weapons (CCW), international governance initiatives, state practice, military doctrine, and contemporary battlefield experience. It compares national approaches to regulating AI-enabled warfare, evaluates India's evolving position, and identifies the legal, ethical, and operational challenges posed by increasing autonomy. The monograph argues that preserving meaningful human judgement and accountability remains fundamental and offers recommendations to strengthen India's legal, policy, technological, and institutional preparedness for the age of AI-enabled warfare.

Colonel D.P.K. Pillay, SC, PhD (Retd.) is a Research Fellow at the Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA), New Delhi. A decorated Indian Army officer he was severely wounded in combat while leading counter-insurgency operations in Manipur. Following his operational service, he served in the Ministry of Defence and the National Security Council Secretariat, where he worked on international humanitarian law, arms control, defence reforms, defence diplomacy, environmental security, sustainable development, and emerging military technologies. He represented India at the United Nations General Assembly, the Convention on Certain Conventional Weapons in Geneva, the United Nations Environment Programme, and other international forums. He contributed to several national policy initiatives, including defence industrial reforms, the corporatisation of the Ordnance Factory Board, defence diplomacy, and the implementation of the Group of Ministers' recommendations following the Kargil Review Committee. He also served as a Military Adviser to the International Committee of the Red Cross, contributing to After Action Reviews of conflicts in Iraq, Syria, and Yemen. He trains military officers, UN peacekeepers, Judge Advocate General Branch officers, and security practitioners on International Humanitarian Law, refugee law, protection of civilians, and contemporary armed conflict. His research focusses on military history, human security, radicalisation, and emerging technologies.



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