CRIMINAL RESPONSIBILITY FOR AUTONOMOUS WEAPONS UNDER INTERNATIONAL CRIMINAL (ICL) AND HUMANITARIAN LAW (IHL)

(A Doctrinal Analysis of Criminal Accountability in Autonomous Warfare)

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ABSTRACT

This paper investigates the legal accountability crisis emerging from the use of autonomous weapons systems (AWS) and artificial intelligence (AI) in modern armed conflict. As machines increasingly operate with minimal human oversight—selecting and engaging targets on their own—the foundational principles of international humanitarian and criminal law are placed under unprecedented burden.

Using a doctrinal methodology grounded in treaty interpretation, jurisprudence, and comparative state practice, the paper evaluates the extent to which existing frameworks—including the Geneva Conventions, the Rome Statute, and customary international law—can accommodate machine-driven violence. It scrutinizes how legal doctrines such as mens rea, command responsibility, and indirect perpetration function when confronted with impulsiveness of AI-based decision-making. This research confronted significant methodological challenges in sourcing primary evidence on state practice, particularly in closed jurisdictions such as Iran and China.

Drawing on case studies from Gaza, Ukraine, Pakistan, Afghanistan, Libya, Yemen, and other conflict zones, this research reveals a growing evidentiary and culpability gap: one in which responsibility is diffused across fragmented chains of command, corporate infrastructure, and non-human actors. The legal non-personhood of AI, combined with the political paralysis of key enforcement institutions such as the ICC and the ICJ, exacerbates the structural unaccountability.

The paper proposes a series of reforms: imposing affirmative duties of oversight in human–machine interactions, expanding criminal jurisdiction over corporations, and establishing hybrid enforcement mechanisms at the regional level. These recommendations are set against the broader backdrop of a deteriorating global order—marked by institutional breakdown, strategic lawfare, and rising geoeconomic conflict over rare earth resources and Arctic militarization.

Ultimately, this paper contends that argument advanced here is not only doctrinal but moral: Without doctrinal adaptation, international law may lose its normative foothold in regulating violence—particularly as non-human agents assume greater roles in conflict decision-making.

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~ LIST OF ABBREVIATIONS ~

LAWS	Lethal Autonomous Weapons Systems
IHL	International Humanitarian Law
ICL	International Criminal Law
ICC	International Criminal Court
UNCLOS	United Nations Convention on the Law of the Sea
GGE	Group of Governmental Experts
JCE	Joint Criminal Enterprise

~ PART I: INTRODUCTION ~

A. Title

CRIMINAL RESPONSIBILITY FOR AUTONOMOUS WEAPONS UNDER INTERNATIONAL HUMANITARIAN AND CRIMINAL LAW

B. Context and Relevance

The evolution of armed conflict in the twenty-first century is increasingly characterized by the integration of artificial intelligence (AI) and autonomous weapons systems (AWS) into battlefield operations. These systems—capable of selecting, tracking, and engaging targets with minimal or no human intervention—have begun to reshape the conduct of hostilities. Their proliferation across conflict theatres in Palestine, Ukraine, Afghanistan, Libya, Iraq, Yemen, and the India–Pakistan border has precipitated a legal and ethical crisis: one that challenges the fundamental principles underpinning the international legal order established in the aftermath of the Second World War.

This research situates the deployment of AWS within the broader collapse of normative clarity and institutional effectiveness across international humanitarian law, international criminal law, and international public law. The delegation of lethal force to machines—often operated by hybrid networks of states, corporations, and private contractors—undermines foundational legal principles, including the obligation to distinguish between combatants and civilians, the proportional use of force, and the duty to ensure accountability for war crimes.[1] Simultaneously, it exposes the growing dysfunction of international legal institutions such as the International Criminal Court (ICC), the International Court of Justice (ICJ), and United Nations enforcement bodies, which remain structurally ill-equipped to regulate technologically mediated violence.[2]

Rather than merely adapting to new tools of war—it forces a fundamental reconsideration of how legal doctrine operates within evolving dynamics of geopolitical competition and privatized warfare. The mechanisms of public international law, including its courts, treaties, and enforcement bodies, are being outpaced by rapid developments in military AI, leaving legal frameworks trailing behind when robust oversight is most needed.[3]

This study is constrained by the absence of direct access to classified weapons protocols and closed-source intelligence, especially in active conflict zones.

[1] Protocol I Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts, 8 June 1977.
[2] Rome Statute of the International Criminal Court, 17 July 1998, 2187 UNTS 90 [Rome Statute].
[3] James Gow, *The Laws of War: Constraints on Warfare in the Western World* (Yale University Press, 2001).

C. Research Questions

This paper is driven by the following central questions:

(i). Can existing doctrines of international humanitarian and criminal law adequately attribute responsibility for unlawful harm inflicted by autonomous weapons?

(ii). How do the Rome Statute and Geneva Conventions apply to situations where the perpetrator is an algorithm or an opaque kill-chain involving multiple actors?

(iii). What institutional, evidentiary, and normative obstacles inhibit accountability within current enforcement bodies, including the ICC and domestic courts asserting universal jurisdiction?

(iv). What reforms—doctrinal, procedural, and institutional—are necessary to restore the protective function of international law in an age of delegated lethality?

D. Thesis Statement

This paper argues that the deployment of autonomous weapons systems has created a fundamental accountability crisis in international law. Traditional legal doctrines—such as mens rea, command responsibility, indirect perpetration, and foreseeability—are strained by the opaqueness, unpredictability, and diffusion of control inherent in AI-enabled warfare.[4] The erosion of individual responsibility is compounded by structural failings across international legal institutions, including evidentiary limitations, jurisdictional deadlock, and the absence of legal frameworks governing corporate and technological actors.[5] Unless the international community undertakes urgent doctrinal innovation and institutional reform, the principles of accountability and protection underpinning the rules of war risk becoming obsolete. This research contends that the survival of international public law depends on its capacity to confront, adapt to, and ultimately regulate the realities of algorithmic conflict.[6]

E. Methodology and Sources

Employing a doctrinal legal research methodology, this paper draws upon the systematic analysis of international treaties, conventions, judicial decisions, and authoritative commentary. Primary legal sources include:

(i). The Geneva Conventions and their Additional Protocols.[7]

(ii). The Rome Statute of the International Criminal Court.[8]

[4] Claus Kress & Steven Paul, "Mens Rea and the ICC" (2020) 18 J Int'l Crim Justice.
[5] Neha Jain, "Autonomous Weapons and Accountability: An International Criminal Law Perspective" (2016).
[6] Rebecca Crootof, "The Killer Robots Are Here: Legal and Policy Implications" (2015).
[7] Geneva Conventions of 1949 and Additional Protocols, supra note [1].
[8] Rome Statute, supra note [2].

(iii). Customary international law, as articulated by the International Law Commission and leading jurisprudence.[9]

(iv). UN Charter and relevant General Assembly and Security Council resolutions.[10]

(v). Decisions from international and hybrid tribunals, including the ICC, ICJ, and select domestic courts asserting universal jurisdiction.[11]

Secondary sources include comparative studies on national accountability models, UN Group of Governmental Experts (GGE) reports on lethal autonomous weapons systems, civil society publications, investigative reporting, and legal scholarship on warfare, technology, and transnational responsibility.[12]

This approach enables a comprehensive interrogation of both the normative frameworks and institutional pathways through which accountability might be reimagined in an era of increasingly autonomous conflict.

F. Structure of the Paper

The paper unfolds in the following parts:

(i). Conceptualizes autonomous weapons and their classifications, tracing their emergence within modern conflict zones.

(ii). Outlines the doctrinal foundations of international humanitarian and criminal law, examining their applicability to AWS through the lens of treaty obligations and judicial interpretation.

(iii). Presents a series of contemporary case studies—Gaza, Ukraine, Pakistan, India, Kashmir, Libya, Afghanistan, Iraq, and others—demonstrating the deployment of AI-enabled weapons and their legal implications.

(iv). Identifies the accountability gap arising from fragmented decision-making chains and the absence of legal personhood for machines.

(v). Disaggregates responsibility among military actors, political leaders, engineers, and corporate stakeholders.

(vi). Critiques the systemic failures of international legal institutions to respond to these challenges.

(vii). Locates these failures within a broader global context of institutional decay, geopolitical fragmentation, and normative disengagement from the post-1945 legal order.

(viii). Examines the geoeconomic and environmental dimensions of future autonomous warfare, particularly in the Arctic and resource-driven conflict zones.

(ix). Addresses the collapse of multilateral treaty-making and the stagnation of legal innovation.

(x). Proposes a series of legal and doctrinal reforms to restore accountability and uphold international legal

[9] International Law Commission, *Draft Articles on Responsibility of States for Internationally Wrongful Acts*, UNGA Res 56/83 (2001).
[10] Charter of the United Nations, 26 June 1945, Can TS 1945 No 7.
[11] Prosecutor v Lubanga, ICC-01/04-01/06, Judgment (14 March 2012); Nuclear Weapons Advisory Opinion, [1996] ICJ.
[12] UN GGE on Lethal Autonomous Weapons Systems, Reports (2017–2022); Human Rights Watch, *Stopping Killer Robots* (2021); Michael N Schmitt, *The Impact of Emerging Technologies on the Law of Armed Conflict* (2019).

legitimacy.

(xi). Concludes by evaluating the future trajectory of international law amid militarized automation.

(xii). Offers a normative epilogue on the moral imperatives for reimagining international law.

~ PART II: LITERATURE REVIEW ~

This literature review surveys seminal contributions across five key strands:

(i). The foundational doctrines of international humanitarian law and international criminal law.
(ii). Commentary from international institutions.
(iii). Academic scholarship on machine autonomy and responsibility.
(iv). Relevant international jurisprudence, and
(v). Critiques addressing enforcement failures under international public law.

The literature collectively confirms a growing doctrine-institutional gap between modern forms of warfare and the current capabilities of international law. While foundational legal texts remain authoritative, their practical applicability to autonomous weapon systems demands urgent doctrinal flexibility and systemic reform.

G. Doctrinal Foundations: International Humanitarian Law and International Criminal Law

The Geneva Conventions (1949) and their Additional Protocols (1977) establish core humanitarian legal standards—distinction, proportionality, necessity, and precaution—that remain central to regulating armed conflict. These provisions are especially tested by the emergence of autonomous weapons systems, which often lack meaningful human oversight during target selection.[13] The Rome Statute of the International Criminal Court (1998) provides the primary legal framework for accountability, defining war crimes, crimes against humanity, and genocide, and setting out modes of individual liability such as command responsibility and indirect perpetration.[14]

Doctrinal scholars like Sassoli note that while the Geneva Conventions are technologically neutral, their practical application to autonomous weapon systems poses "unprecedented challenges" for determining combatant status and conducting proportionality assessments.[15] Meanwhile, Schmitt and Thurnher argue that the lack of human control in lethal actions risks violating both treaty and customary norms.[16]

H. Institutional Commentary and Interpretive Guidance

The International Committee of the Red Cross (ICRC) has been at the forefront of legal interpretations regarding autonomous weapons. Its 12 May 2021 position statement warns that systems lacking predictability and moral agency may

[13] Geneva Convention (IV) Relative to the Protection of Civilian Persons in Time of War (12 Aug 1949); Protocol I, Additional to the Geneva Conventions (8 June 1977).
[14] Rome Statute of the International Criminal Court (17 July 1998).
[15] Marco Sassoli, *International Humanitarian Law: Rules, Controversies, and Solutions* (Elgar, 2019).
[16] Michael N. Schmitt & Jeffrey Thurnher, 'Out of the Loop: Autonomous Weapon Systems and the Law of Armed Conflict' (2013) 4 Harvard National Security Journal.

contravene international humanitarian law, and urges legally binding restrictions.[17] Similarly, the United Nations Human Rights Council and its Special Rapporteurs have underscored the disintegration of accountability when lethal decisions are delegated to machines.[18]

Although the International Criminal Court has yet to adjudicate a case involving autonomous weapons, its prosecutorial policies emphasize crucial elements for liability—foreseeability, causal contribution, and control—that current autonomous weapon systems inherently dilute.[19]

I. Academic Scholarship on Autonomy and Legal Responsibility

Legal and ethical scholarship has tackled the pressing question of how to extend existing liability doctrines to AI-mediated harms. Asaro, Lin, and others argue that algorithmic imperviousness undermines the attribution of intent—a key component of criminal responsibility.[20] Meanwhile, Pagallo, Sartor, and others propose adapting strict or structural liability models that hold entire chains of actors accountable—commanders, engineers, and corporations—without resorting to legal personhood for machines.[21] Ethicists like Sharkey and Sparrow highlight how removing human judgment from lethal choices represents a moral decline in warfare norms.[22]

J. Comparative Case Law: International Criminal Court Jurisprudence

ICC jurisprudence, while not directly addressing autonomous weapons, provides valuable precedent. In *Prosecutor v. Lubanga*, the Court reinforced the need to establish mens rea, knowledge, and criminal intent under Article 30 of the Statute.[23] *Prosecutor v. Bemba* clarified that commanders may be held liable for genocide and war crimes, even if they did not directly participate, based on their failure to prevent crimes.[24] *Prosecutor v. Ongwen* further demonstrated how distributed culpability and organizational dependencies can factor into a finding of individual responsibility.[25]

K. Public International Law Commentary: Accountability Failures and Lawfare

Critical scholarship underscores how international public law has struggled to adapt to hybrid and distributed conflict environments. Ohlin warns of "legal black holes" where no clear perpetrator can be identified, complicating attribution in modern warfare.[26] Milanovic, Hathaway, and others argue that universal jurisdiction and treaty mechanisms have

[17] ICRC, 'Position on Autonomous Weapon Systems' (12 May 2021), ICRC.
[18] UN Human Rights Council, *Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions* (9 April 2013).
[19] ICC Office of the Prosecutor, *Policy Paper on Case Selection and Prioritisation* (Sept 2016).
[20] J. Patrick Lin, 'Robot Ethics' in Patrick Lin et al (eds), *Robot Ethics: The Ethical and Social Implications of Robotics* (MIT Press, 2011); Peter Asaro, 'Autonomous Systems and Moral Responsibility' (2012).
[21] Giovanni Sartor & Ugo Pagallo (eds), *Regulating Artificial Intelligence* (Springer, 2020); Markus Wagner, 'The Dehumanisation of International Humanitarian Law' (2014).
[22] Noel Sharkey & Robert Sparrow, 'War Without Virtue?' (2021).
[23] *Prosecutor v. Lubanga Dyilo*, ICC-01/04-01/06, Judgment (14 Mar 2012)
[24] *Prosecutor v. Bemba Gombo*, ICC-01/05-01/08, Judgment (21 Mar 2016).
[25] *Prosecutor v. Ongwen*, ICC-02/04-01/15, Judgment (4 Feb 2021).
[26] Jens D. Ohlin, 'The Combatant's Privilege in Asymmetric and Cyber Warfare' (2013) Harvard National Security Journal.

increasingly lost efficacy due to geopolitical non-cooperation.[27] Kaplan and Ratner describe state and corporate practices that exploit algorithmic ambiguity to delay accountability, a phenomenon known as "lawfare".[28]

[27] Marko Milanovic, 'The Case Against Universal Jurisdiction' (2017) Emory International Law Review; Oona Hathaway et al., 'The Law of Cyber-Attack' (2012) California Law Review.
[28] Robert D. Kaplan & Steven R. Ratner, 'The Decline of Law in Global Governance' (2021).

~ PART III – METHODOLOGY ~

This paper adopts a doctrinal legal research methodology, rooted in the black-letter law tradition, to investigate the accountability implications of autonomous weapons systems within international humanitarian law, international criminal law, and broader frameworks of international public law. The research is structured around five core methodological components, each reinforcing the normative and institutional inquiry at the heart of this study.

L. Black-Letter Law Analysis

The primary analytical method is a black-letter approach that engages with authoritative legal texts—treaties, statutes, conventions, and customary norms—as well as judicial decisions from international, hybrid, and domestic tribunals. This includes detailed exegesis of:

(i). The Geneva Conventions and their Additional Protocols, which codify the foundational principles of distinction, proportionality, necessity, and precaution;[29]

(ii). The Rome Statute of the International Criminal Court, which defines war crimes, crimes against humanity, and genocide, and sets out key doctrines such as command responsibility, indirect perpetration, and mens rea;[30]

(iii). Instruments of customary international law, as articulated by the International Law Commission, the ICRC, and state practice.[31]

This black-letter legal foundation provides the necessary framework to evaluate the extent to which the existing legal order can accommodate novel forms of machine-driven violence.

M. Case Studies

The paper incorporates a series of case studies—including Palestine, Ukraine, India–Pakistan, Libya, Yemen, Iraq, and Afghanistan—to analyze how autonomous and semi-autonomous weapons have been deployed in actual conflict zones. These case studies serve three functions:

(i). They demonstrate the real-world application and failure of legal norms when confronting algorithmically mediated warfare;

(ii). They expose patterns of attribution avoidance, evidentiary erasure, and legal grey zones;

(iii). They help test doctrinal frameworks such as foreseeability, due diligence, and attribution against the realities of combat operations involving AI systems.[32]

[29] Geneva Convention (IV) relative to the Protection of Civilian Persons in Time of War, 12 August 1949; Protocol Additional to the Geneva Conventions, 8 June 1977.
[30] Rome Statute of the International Criminal Court, 17 July 1998, arts 7, 8, 25, 28.
[31] International Law Commission, *Draft Articles on Responsibility of States for Internationally Wrongful Acts* (2001); ICRC, *Customary International Humanitarian Law* (Cambridge University Press, 2005).
[32] UN Human Rights Council, *Report of the Independent International Commission of Inquiry on the Occupied Palestinian Territory* (2022); Human Rights Watch, *Russia/Ukraine: Investigate Kharkiv Cluster Bomb Attacks* (28 February 2022).

N. Comparative Legal Analysis

This study engages in a comparative legal analysis of civil law and common law approaches to criminal liability in the context of autonomous warfare. It evaluates how different jurisdictions—such as the United States, France, China, and Russia—interpret doctrines like command responsibility, due diligence, and state accountability in relation to emerging technologies. It also examines whether civil law systems are more adaptable in accommodating indirect or functional liability models than their common law counterparts.[33]

In doing so, the paper maps divergences in state practice that have direct implications for treaty interpretation, international criminal adjudication, and harmonization of norms across jurisdictions.

O. Institutional and Legal Critique

Building on Parts VII and VIII of the paper, a core methodological pillar is the institutional critique of international enforcement bodies. This includes:

(i). The International Criminal Court (ICC) and its jurisdictional limitations and evidentiary constraints;[34]

(ii). The International Court of Justice (ICJ) and the limits of state-to-state dispute resolution in the face of corporate and algorithmic violence;[35]

(iii). United Nations bodies in Geneva (e.g., UNHRC, ICRC) and their fragmented mandates;[36]

(iv). European Domestic Courts (e.g., Belgium, Germany) and their role and procedural limits of universal jurisdiction.

This institutional critique enables a normative evaluation of how structural deficiencies in global governance systems contribute to the accountability gap surrounding AI-enabled violence.

P. Forward-Looking Reform Analysis

Finally, the paper incorporates a forward-looking normative analysis of doctrinal and institutional reforms needed to restore accountability in an age of autonomous warfare. It draws on proposals from international legal scholarship, human rights advocates, and disarmament experts, including:

(i). Models of functional or distributed responsibility across human–machine decision chains;[37]

[33] Mary Ellen O'Connell, "The Myth of Preemptive Self-Defense" (2002) ASIL Task Force Paper; Charles Garraway, "The Law of Armed Conflict in the Context of Emerging Weapon Technologies" in Rain Liivoja & Tim McCormack, eds, *Routledge Handbook of the Law of Armed Conflict* (Routledge, 2016).
[34] Kevin Jon Heller, "Situational Gravity Under the Rome Statute" in Carsten Stahn, ed, *The Law and Practice of the International Criminal Court* (Oxford University Press, 2015).
[35] Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States), [1986] ICJ.
[36] ICRC, "Ethics and Autonomous Weapon Systems: An Ethical Basis for Human Control?" (ICRC, 2021).
[37] Rebecca Crootof, "The Killer Robots Are Here: Legal and Policy Implications" (2015).

(ii). Doctrines requiring a legal duty of human oversight in the use of lethal force;[38]

(iii). Reforms to extend individual criminal liability to corporate actors and AI contractors;[39]

(iv). Hybrid enforcement mechanisms, such as regional human rights courts with expanded jurisdiction over war technologies.[40]

These reform-oriented methodologies are rooted in the belief that international law must evolve not only to regulate machines, but to reassert the normative authority of law over the logic of militarized automation.

[38] Nehal Bhuta et al, eds, *Autonomous Weapons Systems: Law, Ethics, Policy* (Cambridge University Press, 2016).
[39] Marco Sassoli, "Corporate Criminal Responsibility for War Crimes Under International Law" (2020) Intl Rev Red Cross.
[40] Daragh Murray, "Accountability for Lethal Force in Armed Conflict: Challenges and Opportunities" (2017) J Intl Humanitarian Legal Studies.

~ PART IV: LEGAL ANALYSIS ~

Q. Understanding Autonomous Weapons and AI in Contemporary Warfare

Autonomous weapons systems (AWS), often referred to as lethal autonomous weapons systems (LAWS), are machines capable of selecting, tracking, and engaging targets without direct human intervention. While no universally binding definition exists in treaty law, the United Nations Group of Governmental Experts (UN GGE) describes LAWS as weapon systems that, once activated, can operate independently without further human input.[41] These systems rely on advanced sensors, real-time data processing, computer vision, and pattern recognition to identify and strike targets.

The legal significance of LAWS lies in the delegation of lethal decision-making to machines. This raises questions concerning attribution of responsibility, foreseeability, and compliance with foundational principles of international humanitarian law, including distinction, proportionality, and precaution.[42] As states begin to deploy such systems in active conflict zones, legal doctrine must confront the implications of delegating life-or-death decisions to non-human actors.

(i). Classifications: Human-in-the-Loop, On-the-Loop, and Out-of-the-Loop

LAWS fall into three key classifications:

1. Human-in-the-loop: A human authorizes each individual strike, maintaining direct control.
2. Human-on-the-loop: A human supervises the system and may intervene but cannot exercise real-time control.
3. Human-out-of-the-loop: The system operates independently without any human involvement during the targeting process.

This taxonomy is critical in assessing legal responsibility. The greater the autonomy, the more difficult it becomes to determine intent, command responsibility, and foreseeability. In particular, "out-of-the-loop" systems pose the highest risk of violating international legal obligations due to the absence of continuous human oversight.[43]

(ii). Current Capabilities and Kill Chains

States are operationalizing LAWS through various platforms:

1. Israel's Habsora system automates the identification and targeting of suspected militants in Gaza using AI-assisted surveillance tools.[44]
2. The United States' Project Maven and Sentient employ real-time pattern recognition to optimize kill-chain decisions in drone warfare and military operations.[45]

[41] United Nations, *Report of the 2019 Group of Governmental Experts on LAWS*.
[42] Noel Sharkey, "The Evitability of Autonomous Robot Warfare," *International Review of the Red Cross* (2012).
[43] Human Rights Watch, *Losing Humanity: The Case Against Killer Robots* (2012).
[44] Patrick Tucker, "Israel Used AI to Identify Targets in Gaza, But at What Cost?" *Defense One* (May 2021).
[45] Gregory C. Allen, *Project Maven Brings AI to the Fight Against ISIS*, Center for a New American Security (2019).

3. China and Russia have developed loitering munitions, unmanned underwater vehicles, and autonomous drone swarms with adaptive targeting protocols, expanding their operational range in contested regions such as the South China Sea and Eastern Europe.[46]

These systems function within complex "kill chains" involving multiple inputs from engineers, intelligence officers, software designers, and military commanders. This fragmentation of responsibility creates substantial barriers to criminal accountability and weakens legal causation chains under international criminal law.[47]

(iii). Global Arms Race and State Practice

More than thirty states are actively developing or deploying AI-enabled weapons. The United States leads in both funding and operational deployment, focusing on drone swarms and joint force AI integration.[48] China has paired AI with unmanned naval and aerial platforms, integrating them into maritime territorial strategies. Russia's deployment of the Uran-9 autonomous tank and AI-augmented artillery in Ukraine marks another escalation in operationalizing autonomous weapons.

Despite widespread military experimentation, most states oppose legally binding bans on LAWS. At the UN Convention on Certain Conventional Weapons (CCW), consensus on regulation has repeatedly stalled, with objections based on dual-use technology arguments, strategic advantage, and sovereignty concerns.[49] This inertia in treaty-making enables continued deployment and doctrinal normalization of autonomous systems, even as ethical and legal gaps widen.

(iv). Ethical and Legal Implications of Delegated Lethality

Delegating lethal force to machines presents profound ethical and legal challenges under international humanitarian and criminal law:

1. **Distinction**: Can an algorithm reliably distinguish between lawful combatants and civilians, particularly in urban or asymmetric warfare contexts?
2. **Proportionality**: Can autonomous systems assess whether the expected military advantage outweighs incidental civilian harm?
3. **Precaution**: Can machines meaningfully implement measures to minimize unnecessary suffering?

[46] Stockholm International Peace Research Institute (SIPRI), *Autonomy in Weapon Systems: Trends and Implications*, (2020).
[47] Tim McFarland & Tim McCormack, "Mind the Gap: Can Developers of Autonomous Weapons Systems Be Liable for War Crimes?" *International Law Studies* (2014).
[48] Elsa B. Kania, *Battlefield Singularity: Artificial Intelligence, Military Revolution, and China's Future Military Power*, CNAS (2017).
[49] United Nations, *CCW Meetings of the High Contracting Parties on LAWS*, Summary Reports (2020–2023).

Furthermore, the non-personhood of machines under law means that liability cannot attach directly to the weapon itself. This legal vacuum complicates prosecution and undermines deterrence. The erosion of clear attribution chains threatens to make compliance with humanitarian law not just difficult—but doctrinally incoherent.[50]

R. Legal Framework: International Humanitarian and Criminal Law

(i). International Humanitarian Law

International humanitarian law provides the foundational legal regime governing conduct during armed conflict. Its core sources include the Geneva Conventions of 1949, their Additional Protocols, and the corpus of customary international law.[51] While the Geneva Conventions and Protocol I remain the foundational pillars of humanitarian law, their practical enforceability is increasingly under pressure. Principles like distinction and proportionality were crafted in an era of uniformed soldiers and symmetrical battlefields—not algorithmically-driven warfare conducted by machines acting with partial autonomy.[52]

The principle of distinction obliges parties to differentiate between civilians and combatants, and between civilian objects and military objectives. The proportionality principle prohibits attacks expected to cause excessive civilian harm relative to anticipated military advantage. Necessity demands that force be used only to achieve legitimate military objectives, while precaution requires feasible steps to avoid or minimize incidental civilian harm.

Of particular relevance is the Martens Clause, which affirms that in cases not covered by specific treaties, civilians and combatants remain under the protection of "the principles of humanity and the dictates of public conscience".[53] This clause serves as a bridge between law and ethics and has been invoked to argue against the use of lethal autonomous weapons systems (LAWS) on moral grounds, even in the absence of explicit treaty prohibitions.

The International Court of Justice, in its *Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons* (1996), reaffirmed the customary status of IHL principles and the Martens Clause.[54] This opinion remains instructive in evaluating the legality of new weapons technologies, including those powered by artificial intelligence.

[50] Rebecca Crootof, "The Killer Robots Are Here: Legal and Policy Implications," *Cardozo Law Review* (2015).
[51] International Committee of the Red Cross, *The Geneva Conventions and Their Commentaries* (Geneva: ICRC, 2019).
[52] 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)*, 8 June 1977, arts 48–51; ICRC, *Distinction: Protecting Civilians in Armed Conflict – Commentary on AP I, Art. 48, 51 & 57* (Geneva: ICRC, 2007).
[53] Hague Convention (IV) Respecting the Laws and Customs of War on Land, with annex: Regulations concerning the Laws and Customs of War on Land, 18 October 1907, preamble (Martens Clause).
[54] *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, [1996] ICJ.

(ii). International Criminal Law

International criminal law focuses on the attribution of individual criminal responsibility for the most serious violations of IHL, including war crimes, crimes against humanity, and genocide. The principal legal instrument is the Rome Statute of the International Criminal Court, which codifies modes of liability such as command responsibility, indirect perpetration, and joint criminal enterprise. A major obstacle in applying ICL to AI-enabled warfare is the fragmentation of intent and control. LAWS often involve distributed decision-making across software developers, military analysts, and commanders. This diffusion complicates the application of the *mens rea* element required for criminal liability under Article 30 of the Rome Statute.[55]

Relevant jurisprudence from the ICC demonstrates evolving approaches to responsibility:

1. In *Prosecutor v Thomas Lubanga Dyilo*, the Court emphasized command responsibility over child soldier recruitment but also stressed effective control over perpetrators as essential for liability.[56]
2. In *Prosecutor v Jean-Pierre Bemba Gombo*, the Appeals Chamber overturned conviction due to insufficient evidence that the commander failed to take necessary and reasonable measures—highlighting the high evidentiary threshold.[57]
3. In *Prosecutor v Dominic Ongwen*, the Court acknowledged the complexity of coercion and hierarchy, further problematizing criminal intent attribution in structurally complex environments.[58]

The LAWS context demands a rethinking of how foreseeability, culpable oversight, and risk creation can generate liability, especially in environments where autonomous systems operate beyond human intervention but within human deployment chains.[59]

(iii). Comparative Legal Approaches to Autonomous Warfare

Domestic and regional approaches to liability in technologically mediated warfare vary considerably between civil law and common law traditions, and among major military powers.

1. Common Law Jurisdictions

In the United States, the *Department of Defense Law of War Manual* permits the use of LAWS provided their effects remain lawful under IHL. The U.S. employs a functional accountability model, attributing responsibility to human

[55] Rome Statute of the International Criminal Court, 17 July 1998, arts 5–8, 25–28, 30 (entered into force 1 July 2002).
[56] *Prosecutor v Thomas Lubanga Dyilo*, ICC-01/04-01/06, (14 March 2012).
[57] *Prosecutor v Jean-Pierre Bemba Gombo*, ICC-01/05-01/08, Judgment (21 March 2016).
[58] *Prosecutor v Dominic Ongwen*, ICC-02/04-01/15-1762-Red, Judgment (4 February 2021).
[59] William A. Schabas, *An Introduction to the International Criminal Court*, 5th ed (Cambridge: Cambridge University Press, 2021) (discussing modes of liability under the Rome Statute); Carsten Stahn, "Command and Control: When Should Military Commanders Be Held Criminally Responsible for War Crimes?" (2005) Leiden Journal of International Law (analysing fragmentation of mens rea in modern contexts).

operators and chain-of-command actors who initiate or authorize lethal actions. The doctrine of constructive knowledge applies where actors "should have known" about the illegality of outcomes.[60]

In Canada and the United Kingdom, the emphasis remains on individual culpability and due diligence within the military command structure. However, the question of attributing criminal responsibility to software engineers or platform contractors remains unresolved.[61]

2. Civil Law Jurisdictions

Germany and France stress principles of objective imputation and culpable negligence, allowing broader liability when individuals contribute foreseeably to unlawful acts. Germany's Constitutional Court has endorsed precautionary standards in military engagement that may offer greater traction in AI contexts.[62]

Latin American jurisdictions, such as Argentina and Chile, have engaged in universal jurisdiction prosecutions for foreign war crimes but lack developed frameworks for regulating autonomous military technologies.[63]

3. China and Russia

China's model is state-centric and opaque, reflecting strong resistance to individual criminal liability outside national control. Both China and Russia oppose binding international regulation of LAWS and have emphasized sovereign discretion over warfighting technology. Their state practice emphasizes national security exemptions to international law, reinforcing accountability gaps.[64]

S. Case Studies of AI-Enabled Warfare and Legal Failure

(i). Palestine–Israel: The Habsora AI Targeting System and Legal Accountability

The Israeli Defense Forces (IDF) have increasingly deployed AI-based targeting tools such as Habsora, a system that autonomously generates kill lists using machine learning, social media scraping, and biometric analysis. During the 2021 and 2023 Gaza offensives, Habsora enabled real-time strike authorizations, significantly accelerating attack cycles but also drawing scrutiny for civilian harm.[65]

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[60] United States, *Department of Defense Law of War Manual*, revised December 2016 (Washington, DC: Office of General Counsel, 2016); see also Michael Schmitt, "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics" (2013) *Harvard National Security Journal*.
[61] Canada, Department of National Defence and Canadian Forces, *Canadian Forces Military Law Volume III: The Law of Armed Conflict* (Ottawa: Department of National Defence, 2020); United Kingdom, *The Joint Service Manual of the Law of Armed Conflict* (Ministry of Defence, 2004).
[62] Bundesverfassungsgericht [German Federal Constitutional Court], 2 BvE 2/08, Judgment of 30 June 2009 (Lisbon Treaty Case); France, *Code pénal* (Penal Code), art 121-3.
[63] Gabriela Knaul, "Universal Jurisdiction in Latin America: Practical Experience and Legal Development" (2018) *Journal of International Criminal Justice* (Argentina and Chile rape prosecutions).
[64] Human Rights Watch, *Stopping Killer Robots: Country Positions on Banning Fully Autonomous Weapons and Retaining Human Control* (New York: HRW, 2020).
[65] Yuval Abraham, "The Gospel of AI: Israel's New Weapon in Gaza," *+972 Magazine* (1 December 2023).

It is precisely in densely populated theaters like Gaza that the fragility of IHL becomes most visible. When kill lists are generated by opaque algorithms, the core principles of distinction and proportionality risk becoming theoretical ideals rather than enforceable standards. Gaza's density heightens the risk of civilian targeting errors, and although the IDF employs "roof knocking" tactics to warn civilians, critics question their sufficiency under Protocol I, Article 57 when escape is impractical.[66]

Under international criminal law (ICL), the legality of AI-guided targeting implicates *command responsibility* and *mens rea* attribution under the Rome Statute, especially where decisions are distributed among engineers, analysts, and commanders.[67] ICC cases such as *Lubanga*,[68] *Bemba*,[69] and *Ongwen*[70] underscore that liability requires effective control and foreseeability—criteria blurred in algorithmic targeting.

International concern is mounting. The UN Human Rights Council has flagged the impenetrability and legality of such systems,[71] while Amnesty International and Human Rights Watch have argued that algorithmic strikes may constitute collective punishment or indiscriminate attacks under IHL if civilian harm is foreseeable and unmitigated.[72]

Israel contests ICC jurisdiction over the Occupied Palestinian Territories and is not a party to the Rome Statute, creating enforcement gaps.[73] This case illustrates how AI-driven warfare challenges core legal doctrines, exposes accountability voids, and demonstrates the need for binding regulation of autonomous weapons.

(ii). Ukraine–Russia: Algorithmic Strike Systems, Loitering Munitions, and Fragmented Command Accountability

The war in Ukraine has witnessed the unprecedented integration of AI-assisted targeting systems, loitering munitions, and ISR (intelligence, surveillance, and reconnaissance) networks, raising profound challenges for attribution and accountability under international humanitarian and criminal law. Russia has deployed semi-autonomous loitering munitions such as the KUB-BLA and Lancet drones, which use AI-enhanced pattern recognition and minimal human oversight to identify targets.[74] Ukrainian forces, with NATO assistance, utilize real-time ISR platforms, geolocation analytics, and battlefield AI to reduce target identification latency and guide precision artillery strikes.[75] Systems such as Palantir's battlefield intelligence tools and NATO's ISR coordination network have been critical to Ukraine's AI-enhanced geospatial command.[76]

[66] Protocol Additional to the Geneva Conventions of 12 August 1949 (Protocol I), 8 June 1977.
[67] Rome Statute of the International Criminal Court, 17 July 1998, arts 8, 30, 25, 28.
[68] *Prosecutor v Thomas Lubanga Dyilo*, Judgment Pursuant to Article 74 of the Statute, ICC (14 March 2012).
[69] *Prosecutor v Jean-Pierre Bemba Gombo*, Judgment on the Appeal of Mr Jean-Pierre Bemba Gombo Against Trial Chamber III's "Judgment Pursuant to Article 74 of the Statute", ICC, Appeals Chamber (8 June 2018).
[70] *Prosecutor v Dominic Ongwen*, Trial Judgment, ICC (4 February 2021).
[71] UN Human Rights Council, *Report of the Independent International Commission of Inquiry on the Occupied Palestinian Territory, including East Jerusalem, and Israel*, UN Doc (14 June 2022).
[72] Amnesty International, *Israel/Gaza: Evidence of War Crimes During May 2021 Offensive*; Human Rights Watch, *Gaza: Apparent War Crimes During May Fighting* (27 July 2021).
[73] Talita Dias, "The Fog of AI War: Targeting, Accountability, and the ICC's Jurisdiction," *Oxford Institute for Ethics, Law and Armed Conflict*, Policy Brief (2022).
[74] Samuel Bendett, *Russia's Use of AI and Autonomous Systems in Ukraine: A Reality Check* (CNA, 2023).
[75] UNIDIR, *Artificial Intelligence and the Future of Warfare* (United Nations Institute for Disarmament Research, 2022).
[76] Palantir Technologies Inc, *Supporting Ukraine with Palantir Technology* (2023).

These technologies operate within disaggregated kill chains, where decisions are shaped by engineers, analysts, and foreign contractors—raising structural uncertainty over who holds "effective control." Civilian infrastructure, including hospitals and energy grids, has repeatedly been struck by autonomous or semi-autonomous platforms, prompting scrutiny under the principles of distinction and proportionality enshrined in the Geneva Conventions and Additional Protocol I.[77]

From a legal standpoint, the fragmentation of decision-making across human–machine interfaces, foreign data sources, and software automation obscures the ability to attribute mens rea. Article 30 of the Rome Statute requires that perpetrators either intend or knowingly foresee the consequences of their acts. When AI systems operate with partial autonomy or opaque algorithms, establishing foreseeability becomes difficult. Attribution gaps are further deepened when private firms like Palantir or ISR contractors supply the infrastructure enabling lethal action, yet fall outside conventional military chains of command. Scholars have characterized this as an "accountability void," where multiple actors contribute to lethal outcomes without bearing criminal liability.[78] The Ukraine conflict thus illustrates how technologically mediated warfare stretches both the evidentiary and normative frameworks of international criminal law.

(iii). Iran and Proxy Conflicts: Algorithmic Targeting and Transnational Lethality

Iran's military doctrine increasingly relies on a hybrid strategy of asymmetric warfare, combining drone swarms, cyberwarfare, and AI-assisted surveillance to project force through proxy groups such as Hezbollah, the Houthis, and Hashd al-Shaabi. AI-enabled loitering munitions, reverse-engineered from U.S. and Israeli models, have been deployed in strikes against Saudi infrastructure and Kurdish opposition targets, often launched by proxies to shield Iran from direct attribution.[79] Iran's Quds Force coordinates these operations via encrypted command nodes and AI-enhanced ISR networks, enabling precision targeting without overt Iranian involvement.[80]

This distributed warfare architecture raises serious attribution challenges under international humanitarian and criminal law. While Iran claims deniability, command and control structures suggest centralized planning, and the use of dual-use technologies blurs the line between state and non-state agency. The Rome Statute's provisions on indirect co-perpetration and aiding or abetting crimes may apply where Iranian operatives provide operational intelligence, software, or drone technology that facilitates unlawful attacks.[81]

However, proving intent or knowledge under Article 30 becomes difficult when attacks are carried out by intermediaries using algorithmic systems with partially autonomous strike capabilities. The principle of distinction is further compromised when AI-driven ISR platforms are used to classify enemy targets within civilian zones. In several cases, strikes have hit marketplaces, journalists, and humanitarian aid convoys, prompting concerns over whether these targets were

[77] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, arts 48, 51.
[78] Rebecca Crootof, "War Torts: Accountability for Autonomous Weapons" (2016).
[79] Fabian Hinz, "Iran's Evolving Drone Capabilities and Proxy Use" (2023), Center for International and Strategic Studies.
[80] United Nations Security Council, *Letter Dated 27 January 2022 from the Panel of Experts on Yemen Addressed to the President of the Security Council*, UN Doc.
[81] Rome Statute of the International Criminal Court, 17 July 1998, arts 25, 30.

algorithmically misclassified.[82] Thus, Iran's proxy warfare—amplified by AI systems—demonstrates how modern conflict vectors challenge legal doctrines of attribution, intent, and state responsibility.

(iv). Pakistan–India: Border Conflicts, Surveillance Strikes, Drones, Nuclear Escalation, and Technologically Mediated Suppression

The India–Pakistan conflict has entered a new phase marked by AI-powered surveillance, autonomous weapons, and escalating retaliatory strikes with transnational implications. India has widely deployed Israeli-made drones—including the *Heron* and *Harop* systems—for real-time surveillance and cross-border targeting along the Line of Control (LoC), especially in Pakistani-administered Kashmir.[83] In a 2025 incident, Indian drones reportedly violated Pakistani airspace and killed civilians in Azad Jammu and Kashmir.[84] In response, Pakistan deployed Chinese-made J-10C fighter jets, allegedly downing several Indian *Rafale* aircraft near the contested border.[85] The severity of the escalation prompted direct U.S. diplomatic intervention to de-escalate the conflict amid rising global fears of nuclear confrontation.[86]

Both states maintain operational nuclear arsenals, robust cyber-espionage networks, and increasingly autonomous military infrastructures. India's use of facial recognition surveillance to monitor protests,[87] and Pakistan's deployment of real-time battlefield monitoring systems, raise novel questions under international humanitarian law (IHL), particularly with respect to the principles of distinction and proportionality. Attribution of legal responsibility is further complicated by the denseness of transnational AI systems used in target acquisition and tracking, as well as the involvement of foreign military contractors and state secrecy doctrines. Under Article 30 of the *Rome Statute*, individual criminal liability requires that an actor intended or knew the consequences of their actions,[88] yet such standards are difficult to meet where decision-making is partially automated and responsibility is dispersed across technical, legal, and military actors.

Simultaneously, these technologies are also being used internally. Former Pakistani Prime Minister Imran Khan—jailed after a military-backed ousting—is reportedly monitored using advanced digital tracking systems even in custody.[89] Military intelligence is believed to utilize AI-based phone tracking, biometric surveillance, and carceral monitoring tools,[90] reflecting how wartime technology can bleed into authoritarian control mechanisms. These developments challenge not only IHL frameworks but also the outer limits of international human rights law, particularly regarding liberty, dignity, and state coercion. The India–Pakistan case thus illustrates the convergence of autonomous warfare, state surveillance, and regional

[82] Human Rights Watch, *"Deadly Strikes": The Impact of Houthi Drones on Civilians in Yemen* (2021).
[83] Franz-Stefan Gady, "India's Armed Forces to Buy 54 Israeli Heron Surveillance Drones" *The Diplomat* (21 November 2018).
[84] David Hambling, "Loitering Munitions: The Autonomous Weapons Coming of Age in the India–Pakistan Conflict" *Forbes* (28 February 2025).
[85] Sana Mahmood, "Pakistani J-10C Jets Shoot Down Indian Rafales in Kashmir Escalation" *Dawn* (3 March 2025).
[86] Nadeen Ashraf, "White House Confirms Presidential Outreach to De-Escalate India–Pakistan Crisis" *Reuters* (5 March 2025).
[87] Human Rights Watch, "India: Facial Recognition Tech Widely Used at Protests" (13 February 2024).
[88] *Rome Statute of the International Criminal Court*, 17 July 1998, UN Doc, art 30 (entered into force 1 July 2002).
[89] Amnesty International, "Pakistan: Imran Khan's Detention Conditions Raise Alarming Surveillance Concerns" *Amnesty Press Release* (22 April 2025).
[90] Asma Jilani Jahangir, "Military Surveillance and Civil Liberties in Pakistan" (2025).

instability—while also revealing the urgent need for international legal innovation in attribution, regulation, and accountability.

(v). Afghanistan (2001–2021): Drone Warfare and the Legal Vacuum

The U.S. drone warfare program in Afghanistan, spanning two decades, remains one of the most expansive uses of unmanned aerial systems (UAS) in modern conflict. Beginning with the deployment of Predator drones for surveillance and later transitioning to armed Reaper strikes, the United States relied heavily on targeted killings to dismantle suspected insurgent networks, often without judicial oversight. Many operations were conducted covertly under the CIA's authority, blurring the line between military and intelligence functions. Civilian casualties from drone strikes, including children and aid workers, became a persistent issue, with organizations such as the United Nations Assistance Mission in Afghanistan (UNAMA) and the Bureau of Investigative Journalism documenting hundreds of non-combatant deaths.[91] [92] The legal basis for many strikes—particularly "signature strikes" based on behavioural patterns rather than confirmed identities—raised serious concerns under international humanitarian law (IHL) principles of distinction and proportionality.[93] [94] The extraterritorial and pre-emptive nature of many drone killings also triggered debate under international human rights law (IHRL), especially regarding the right to life and due process.[95] Moreover, the absence of meaningful accountability mechanisms or transparent investigations has left a legal vacuum. While the U.S. has argued that such strikes are lawful under Article 51 of the UN Charter as acts of self-defence,[96] this justification has been widely challenged by scholars and UN Special Rapporteurs.[97] Afghanistan thus exemplifies a theatre where autonomous and remote warfare tools outpaced existing legal and normative frameworks, fostering a precedent of impunity in technologically mediated armed conflict.

(vi). Iraq (2003–2023): Autonomous Targeting, U.S. Drone Strikes, and Legal Erosion

The post-2003 conflict in Iraq reflects a prolonged evolution of automated and remote warfare, beginning with the U.S.-led invasion under disputed legal grounds and culminating in two decades of drone-based counterterrorism operations. Following the initial invasion—arguably unlawful under the UN Charter absent Security Council authorization—coalition forces increasingly relied on AI-supported surveillance tools and drone strikes against insurgent groups such as al-Qaeda in Iraq (AQI), later morphing into ISIS. The U.S. deployed Reaper drones for both ISR (intelligence, surveillance,

[91] United Nations Assistance Mission in Afghanistan (UNAMA), *Protection of Civilians in Armed Conflict: Annual Report 2020* (Kabul: UNAMA, 2021).
[92] Bureau of Investigative Journalism, "Drone Strikes in Afghanistan" (2021)
[93] William Booth, "Afghan War Takes Toll on Civilians" *The Washington Post* (24 July 2011).
[94] Mary Ellen O'Connell, "Unlawful Killing with Combat Drones: A Case Study of Pakistan, 2004–2009" in Simon Chesterman, ed, *From Mercenaries to Market: The Rise and Regulation of Private Military Companies* (Oxford: Oxford University Press, 2010)
[95] Philip Alston, *Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions: Study on Targeted Killings*, UNGAOR, 14th Sess, UN Doc (2010).
[96] UN Charter, 26 June 1945, art 51.
[97] Emily Crawford, *Identifying the Enemy: Civilian Participation in Armed Conflict* (Oxford: Oxford University Press, 2015).

reconnaissance) and lethal targeting, often relying on metadata and algorithmic analysis to authorize strikes against suspected combatants.[98]

These automated methods, including pattern-of-life analysis, contributed to several controversial incidents, such as the 2010 airstrike that killed Reuters journalists, and the 2020 drone strike near Baghdad that killed Iranian General Qassem Soleimani—raising extraterritoriality, sovereignty, and assassination concerns under IHL and IHRL.[99] [100] The targeting of Soleimani, carried out without host state consent and absent imminent threat, was widely criticized as violating Article 2(4) of the UN Charter.[101] Meanwhile, the use of proprietary U.S. and Israeli systems—including Palantir analytics platforms—enabled real-time combat decision-making but created opaqueness around the attribution of decisions involving multiple agencies, contractors, and software layers.[102]

Iraqi civilians have borne the brunt of this hybrid conflict, with thousands killed or displaced in drone operations that lacked independent judicial review or post-strike transparency. Investigations into incidents like the 2019 airstrikes in al-Qaim have found limited legal accountability or reparative justice, despite credible evidence of civilian harm.[103] The prolonged use of semi-autonomous warfare in Iraq reveals a significant erosion of IHL principles, especially in asymmetric warfare contexts where non-state actors, foreign militaries, and algorithmic systems converge in urban and borderless combat environments.

(vii). Libya I (2011 NATO Intervention): Algorithmic Targeting and Civilian Protection Failures

The 2011 NATO intervention in Libya, launched under UN Security Council Resolution 1973, marked a turning point in algorithmically assisted airpower used to enforce humanitarian mandates. NATO framed the operation as a civilian protection effort, but its scope quickly expanded into regime change, culminating in the death of Muammar Gaddafi and the collapse of Libyan state institutions. Throughout the intervention, NATO employed real-time ISR (intelligence, surveillance, reconnaissance) systems and target prioritization algorithms to identify and neutralize Libyan military assets. However, reports surfaced that targeting decisions were influenced by pattern-of-life data and probabilistic analytics, raising concerns about over-reliance on machine-processed information.[104]

Despite claims of precision, several airstrikes struck civilian infrastructure, including residential buildings and public facilities, prompting criticism for potential violations of the IHL principles of distinction and proportionality. Human Rights Watch and the UN Commission of Inquiry on Libya found instances where NATO failed to conduct adequate

[98] Larry Lewis, *Drone Strikes in Iraq and Syria: A Closer Look at Civilian Harm* (Washington, DC: Center for Naval Analyses, 2015).
[99] Jane Mayer, *The Drone War*, *The New Yorker* (23 February 2009)
[100] Agnes Callamard, *Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions: Targeted Killing of Qassem Soleimani*, UNGAOR, 75th Sess, UN Doc (2020).
[101] *Charter of the United Nations*, 26 June 1945, art 2(4); see also Harold Hongju Koh, "The War Powers and Humanitarian Intervention" (2010).
[102] Yochai Benkler, "Don't Let Secrecy Disguise the Real Legal Issues Raised by the Soleimani Strike", *Just Security* (10 January 2020).
[103] Amnesty International, *USA Must Investigate Civilian Killings in al-Qaim* (2020).
[104] Micah Zenko, *Reforming U.S. Drone Strike Policies* (New York: Council on Foreign Relations, 2013).

post-strike assessments or disclose targeting rationale, undermining transparency and reparative justice.[105] The dullness of NATO's targeting process—especially where states like the U.S., U.K., and France shared satellite and drone-derived intelligence—further blurred the line of legal accountability under the Geneva Conventions and customary IHL.[106]

From a legal standpoint, NATO's use of automated systems in lethal decision-making without independent judicial review raises enduring questions about attribution, intent, and the erosion of individual accountability. Although the intervention was authorized by the UN Security Council, its transformation into a regime change operation arguably violated the principle of proportionality and exceeded the bounds of R2P (Responsibility to Protect) doctrine. Libya's descent into civil war and fragmentation following the intervention further underscores how emerging technologies—when ungoverned by robust legal frameworks—can amplify harm under the guise of precision warfare.[107]

(viii). Libya II (2020 Turkish-Backed Kargu-2 Drone Strikes): Autonomous Engagement Without Human Oversight

In March 2020, during renewed hostilities in Libya's civil war, Turkish-supplied Kargu-2 drones were reportedly deployed by the Government of National Accord (GNA) to autonomously target retreating forces loyal to General Khalifa Haftar. According to a UN Panel of Experts, the Kargu-2—a loitering munition capable of facial recognition and fully autonomous strike capability—was used without confirmed human-in-the-loop oversight, marking one of the first documented instances of a lethal autonomous weapon system (LAWS) engaging targets without direct human intervention.[108] The manufacturer, STM Defence, confirms that the Kargu-2 utilizes machine-learning algorithms to autonomously select and engage targets without real-time operator approval,[109] which significantly increases the risk of civilian misclassification and breaches of proportionality.

Legal commentary notes that the deployment of such AI-powered systems "raises legitimate concerns regarding the ability of the system to comply with the principles of the law of armed conflict," including distinction and precaution.[110] The drone's capacity to identify and strike human targets based on algorithmic classifiers creates significant risks for unlawful attacks on civilians or individuals *hors de combat*, potentially violating Article 41 of Additional Protocol I to the Geneva Conventions.[111] From a legal responsibility perspective, applying command responsibility under Article 28 of the Rome Statute becomes exceedingly difficult where decision-making is fragmented among software developers, exporting states,

[105] UN Human Rights Council, *Report of the International Commission of Inquiry on Libya*, UN Doc (1 June 2011).
[106] Human Rights Watch, *Unacknowledged Deaths: Civilian Casualties in NATO's Air Campaign in Libya* (13 May 2012).
[107] Alex J Bellamy, "Libya and the Responsibility to Protect: The Exception and the Norm" (2011)
[108] UN Security Council, *Final Report of the Panel of Experts on Libya Established Pursuant to Security Council Resolution 1973 (2011)*, UN Doc (8 March 2021).
[109] STM Defence, *KARGU Autonomous Tactical Multi-Rotor Attack UAV*.
[110] Hitoshi Nasu, "The Kargu-2 Autonomous Attack Drone: Legal and Ethical Dimensions" (4 January 2021).
[111] Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, art 41.

and field operators.[112] The Libya II case illustrates why the international community must urgently adopt binding legal frameworks regulating LAWS deployment and delineating criminal liability for their misuse.[113]

(ix). Yemen and the Saudi-Led Coalition (2015–Present): AI-Assisted Targeting and Civilian Harm

The armed conflict in Yemen has seen extensive use of AI-enhanced targeting systems and surveillance technologies by the Saudi-led coalition, supported by U.S. and U.K. defense contractors. Platforms such as Project Maven and advanced ISR (intelligence, surveillance, reconnaissance) networks have been deployed to identify potential Houthi targets using pattern recognition, thermal imaging, and AI-assisted geolocation data.[114] While intended to increase targeting precision, these systems have repeatedly failed to prevent civilian casualties. Strikes on hospitals, schools, and funerals have drawn widespread condemnation, with the UN estimating over 10,000 civilian deaths attributable to airstrikes between 2015 and 2022.[115]

The use of AI-assisted systems raises concerns under international humanitarian law (IHL), particularly with respect to the principles of distinction, proportionality, and precaution. The opaqueness of machine learning algorithms and the involvement of private contractors complicate efforts to attribute individual responsibility under international criminal law (ICL).[116] Under Article 30 of the Rome Statute, establishing the requisite *mens rea*—knowledge or intent—is especially difficult where strikes rely on predictive AI systems trained on historical data but operating semi-autonomously in real time.[117]

Moreover, evidence suggests that facial recognition and biometric surveillance have been used to monitor Yemeni populations in Houthi-held regions, raising privacy and due process concerns under international human rights law.[118] The conflict illustrates how the delegation of life-and-death decisions to AI systems blurs legal accountability and invites what scholars call an "accountability vacuum," undermining enforcement of both IHL and ICL norms.[119]

(x). Ethiopia–Tigray Conflict (2020–2022): AI-Driven Surveillance and Drone Strikes in Internal Armed Conflict

The Ethiopia–Tigray conflict offers a stark example of how AI-powered technologies, including facial recognition and unmanned aerial vehicles (UAVs), are being deployed in non-international armed conflicts without robust legal oversight. The Ethiopian government, supported by foreign contractors, utilized AI-enhanced surveillance systems to monitor civilian

[112] Rome Statute of the International Criminal Court, 17 July 1998, art 28.
[113] Noel Sharkey & Lucy Suchman, "Why Lethal Autonomous Weapons Are Unlawful: A Normative Analysis" (2021) *International Review of the Red Cross.*
[114] Azmat Khan & Anand Gopal, "The Uncounted" (16 November 2017) *New York Times Magazine;* see also Human Rights Watch, *Hiding Behind the Coalition: Failure to Credibly Investigate and Provide Redress for Unlawful Airstrikes in Yemen.*
[115] UN Human Rights Council, *Situation of Human Rights in Yemen,* (14 September 2021).
[116] Rebecca Crootof, "A Comparative Constellation of Responsibility for Autonomous Weapons" (2021) *Journal of National Security Law & Policy.*
[117] Rome Statute of the International Criminal Court, 17 July 1998, art 30.
[118] Al Jazeera Investigations Unit, *Yemen: The United States' Role in the War,* Documentary (2021).
[119] Nathalie Weizmann, "Autonomous Weapons and Accountability: Legal, Moral, and Technological Challenges" (2020) *International Review of the Red Cross.*

populations and suppress dissent within the Tigray region.[120] Commercial facial recognition software, reportedly supplied by Chinese and Emirati companies, was integrated into national security infrastructure to track ethnic Tigrayan individuals and suppress political resistance.[121]

In parallel, Turkish-made Bayraktar TB2 drones were used to conduct precision strikes on alleged rebel convoys and urban targets.[122] These UAVs often operated with limited human supervision and employed machine-learning-assisted targeting modules. Civilian infrastructure—including markets, refugee camps, and hospitals—was repeatedly struck, raising credible concerns under IHL regarding distinction, proportionality, and precautionary measures in targeting.[123] The UN and multiple NGOs have documented potential war crimes arising from these strikes, yet the opacity of the digital targeting chain complicates attribution of responsibility to individual actors.

Under international criminal law, particularly the Rome Statute, attributing *mens rea* and command responsibility in such technologically fragmented conflicts remains difficult. The involvement of foreign states and private entities—shielded by sovereign immunity, commercial secrecy, and transnational jurisdictional gaps—further entrenches the absence of prosecutorial traction.[124] This case demonstrates how domestic surveillance technologies and semi-autonomous weapons systems can transform internal conflicts into legally ambiguous warzones, where accountability under both IHL and ICL is substantially undermined.

(xi). Armenia and Azerbaijan (Nagorno-Karabakh Conflict): Autonomous Drone Escalation

The Nagorno-Karabakh conflict between Armenia and Azerbaijan has become a modern testbed for drone warfare, particularly the integration of autonomous and semi-autonomous systems in contested airspace. During the 2020 and 2023 hostilities, Azerbaijan employed loitering munitions—including Israeli-made Harop drones and Turkish Bayraktar TB2s—to target Armenian military positions, infrastructure, and suspected combatants, often in densely populated areas.[125] These systems utilize AI-assisted target recognition and minimal human-in-the-loop oversight, raising critical concerns under international humanitarian law (IHL).

Reports by international observers and human rights organizations indicate that attacks often failed to adequately distinguish between military objectives and civilian areas, violating the principle of distinction.[126] The use of drones with pre-programmed strike capabilities in urban environments further undermined the principle of proportionality, particularly where civilian casualties were foreseeable yet insufficiently mitigated.[127]

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[120] Amnesty International, *The Massacre in Axum*, Report AFR (26 February 2021).
[121] Privacy International, "Ethiopia: Surveillance and Repression in the Tigray Conflict" (2022).
[122] Conflict Armament Research, *Weapon Tracing and Drone Analysis in the Horn of Africa*, Special Report (2022).
[123] UN Human Rights Council, *Report of the International Commission of Human Rights Experts on Ethiopia*, (19 September 2022).
[124] Rebecca Crootof, "War Torts: Accountability for Autonomous Weapon Systems" (2016) *University of Pennsylvania Law Review.*
[125] International Crisis Group, *Nagorno-Karabakh's Gathering War Clouds* (2023).
[126] Human Rights Watch, *Azerbaijan: Unlawful Strikes in Nagorno-Karabakh* (11 December 2020)
[127] Eyal Benvenisti, "The Legal Battle Over Autonomous Weapons in Asymmetric Warfare" (2021) *International Law Studies.*

From a legal perspective, the opacity of Azerbaijan's targeting process—relying heavily on software-driven decisions and foreign-supplied systems—hampers attribution of criminal responsibility. The Rome Statute's standard for *mens rea* requires intent or knowledge of unlawful consequences (Article 30), but in cases involving autonomous weapon platforms, it becomes unclear who bears legal culpability: the commanders authorizing use, the engineers who designed the systems, or the foreign suppliers who enabled deployment.

This conflict underscores a broader accountability crisis in modern warfighting: when states outsource technological sophistication and rely on opaque AI systems, the evidentiary foundation for legal responsibility under international criminal law (ICL) disintegrates. As regional powers adopt autonomous systems to conduct precision strikes without legal transparency, the risk of impunity escalates—particularly in politically sensitive conflicts where international scrutiny is limited or suppressed.

T. The Accountability Gap: Why AI Obscures Criminal Responsibility

(i). Fragmentation of *Mens Rea* in Delegated Kill Chains

AI-enabled kill chains disrupt traditional doctrines of criminal responsibility by dispersing *mens rea* across military personnel, engineers, and algorithmic systems. Under Article 30 of the Rome Statute, criminal liability requires intent or knowledge that consequences would follow in the ordinary course of events.[128] Yet in autonomous targeting, lethal decisions may result from probabilistic outputs generated by learning systems, not direct human judgment.

This undermines attribution. In *Bemba*, the ICC held that effective control is central to command responsibility.[129] But when algorithms adapt and act beyond human comprehension, the commander's "control" becomes notional. Scholars highlight that such systems blur foreseeability, making it difficult to meet *mens rea* standards where machines influence strike decisions independently of human intent.[130]

Multinational deployment chains further diffuse culpability. Engineers, analysts, and cloud service providers may shape targeting decisions without meeting legal thresholds for intent. As Elish argues, this creates "moral crumple zones," where humans absorb blame for machine-generated harm they neither intended nor could control.[131] This fragmentation weakens the evidentiary basis for prosecution and exposes gaps in existing international criminal law.

[128] *Rome Statute of the International Criminal Court*, 17 July 1998, UN Doc, art 30.
[129] *Prosecutor v Jean-Pierre Bemba Gombo*, ICC-01/05-01/08-3636-Red, Judgment, ICC Appeals Chamber, 8 June 2018.
[130] Rebecca Crootof, "A Meaningful Floor for Meaningful Human Control" (2019) Temple Intl & Comp LJ.
[131] Madeleine Clare Elish, "Moral Crumple Zones: Cautionary Tales in Human-Robot Interaction" in *We Robot 2016 Conference Proceedings* (University of Miami, 2016).

(ii). The Doctrine of Control and Legal Non-Personhood of AI

International criminal law rests on doctrines of *control* and *individual agency*, but AI systems complicate both. Under customary and treaty-based frameworks, criminal liability attaches only to natural persons who exercise control over criminal conduct—states and machines fall outside this framework.[132] Yet in modern kill chains, AI agents make autonomous decisions within flexible mission parameters, challenging the sufficiency of command-based liability doctrines.

In *Lubanga*, the ICC emphasized the necessity of "effective control" in assigning liability under command responsibility.[133] However, where decisions are generated by opaque, adaptive systems trained on dynamic data, even commanding officers may lack foresight or practical control over specific outcomes. Scholars such as Sassòli have warned that when decisions are shaped by automated systems, the chain of accountability collapses into abstraction.[134]

AI systems themselves lack legal personhood and cannot be held criminally responsible, even when their actions mirror intentional conduct. Calls to expand accountability through doctrines of indirect perpetration or joint criminal enterprise have so far proven inadequate in AI contexts, where machine agency is dispersed, unaccountable, and often shielded behind layers of technical complexity and private ownership.[135]

Unless international criminal law evolves to address "control" in technologically mediated environments, accountability gaps will persist wherever lethal force is administered through automated or semi-autonomous agents.

(iii). Foreseeability, Oversight, and Machine Autonomy

Foreseeability and oversight are central to international criminal liability under Article 30 of the Rome Statute, which requires intent and knowledge of consequences.[136] In AI-driven warfare, this standard becomes blurred. Commanders may authorize actions based on algorithmic inputs without understanding how specific outcomes are generated, especially when systems self-learn and adapt. Autonomous targeting tools like Israel's *Habsora* and the U.S. Project Maven rely on probabilistic risk models and predictive analytics that prioritize target efficiency over legal compliance.[137] As decisions become increasingly data-driven and opaque, oversight shifts from prevention to post hoc review, weakening the obligation to take feasible precautions under IHL.[138]

Where machine autonomy displaces human judgment, demonstrating *mens rea* becomes exceedingly difficult. The dispersal of operational control across developers, analysts, and commanders erodes the evidentiary foundations needed to establish criminal liability.

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[132] *Rome Statute*, supra note 128, art 25; see also *International Law Commission, Draft Code of Crimes Against the Peace and Security of Mankind*, Report of the International Law Commission on the Work of its Forty-Eighth Session, UN GAOR, 51st Sess, UN Doc (1996).
[133] *Prosecutor v Thomas Lubanga Dyilo*, ICC-01/04-01/06-2842, Judgment, ICC Trial Chamber I, 14 March 2012.
[134] Marco Sassoli, "Autonomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to Be Clarified" (2014).
[135] Rebecca M Crootof, "Autonomous Weapon Systems and the Limits of Accountability" (2016) Georgetown LJ.
[136] *Rome Statute of the International Criminal Court*, 17 July 1998, UN Doc, art 30 (entered into force 1 July 2002).
[137] Meredith L Berger, "Algorithmic Warfare: Project Maven and the Legal Limits of Predictive Targeting" (2021).
[138] International Committee of the Red Cross, *Autonomous Weapons Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons* (Geneva: ICRC, 2016).

(iv). Institutional and Evidentiary Erosion in Prosecuting Unmanned Strikes

Prosecuting international crimes involving unmanned or autonomous systems is hindered by systemic evidentiary deficits. Traditional accountability frameworks rely on identifying a clear causal chain, from human intent to unlawful outcome. However, when AI-enabled platforms such as loitering munitions or ISR-integrated strike systems execute lethal actions without direct human input at the critical moment, this chain becomes obscured.[139]

Platforms like the Turkish *Kargu-2* or U.S. Reaper drones operating with adaptive targeting software often produce outcomes that are difficult to trace back to individual decisions, especially when data logs are incomplete, encrypted, or held by third-party contractors.[140] This frustrates forensic reconstruction of targeting decisions, undermining the burden of proof required under ICL.

Institutionally, both the ICC and ad hoc tribunals lack protocols to handle the technical complexity of algorithmic systems. The absence of standards for disclosing AI source code, audit logs, or telemetry data makes it difficult for prosecutors to prove either knowledge or negligence under Articles 25 and 28 of the Rome Statute.[141] As a result, unmanned strikes often fall into a legal vacuum—where lethal outcomes are evident, but individual liability remains unprovable.

(v). Algorithmic Bias and Racial Profiling in Lethal Targeting

Artificial intelligence systems used in modern warfare are increasingly vulnerable to embedded biases that lead to discriminatory targeting outcomes. These biases often arise from flawed training data, skewed metadata inputs, or socio-political assumptions encoded into machine learning models. In conflict zones, such flaws can result in unlawful or disproportionate attacks on marginalized populations, violating core principles of international humanitarian law (IHL), particularly *distinction* and *proportionality*.[142]

I. Discriminatory Outputs in Facial Recognition and Metadata Analysis

AI-driven surveillance systems, such as those employing facial recognition and pattern-of-life analysis, have shown consistent racial disparities in civilian contexts—disparities that are magnified in combat settings. Technologies supplied by firms like Clearview AI and Palantir have been implicated in military operations where individuals are targeted based on facial profiles or metadata with minimal human oversight.[143] In conflict zones such as Palestine and Kashmir, facial

[139] Rebecca Crootof, "War Torts: Accountability for Autonomous Weapons" (2016).
[140] UN Panel of Experts on Libya, *Final Report Submitted in Accordance with Resolution 1973 (2011)*, UNSC, UN Doc (8 March 2021).
[141] Lindsey Cameron & Vincent Boulanin, *Limits on Autonomy in Weapon Systems: Identifying Practical Elements of Human Control* (Stockholm: SIPRI & ICRC, 2021).
[142] Human Rights Watch, *The Problem with "Targeted Killing" by AI: Legal, Moral, and Technological Challenges* (New York: HRW, 2021).
[143] Ben Wagner, "Algorithmic Surveillance in Conflict: The New Face of Targeted Warfare" (2022) *Surveillance & Society*.

recognition tools often misidentify targets from specific ethnic or religious groups, raising concerns of algorithmic profiling.[144]

The predictive targeting of individuals based on metadata—such as SIM card usage, movement patterns, or social networks—has also led to pre-emptive strikes without sufficient human verification. This undermines the principle of *precaution*, especially when decisions are derived from opaque AI processes not subject to adversarial testing or legal scrutiny.[145]

2. IHL Violations Arising from Automated Ethnic or Regional Targeting

There is growing evidence that automated targeting systems have facilitated ethnic or regional discrimination in armed conflict. In Myanmar, for example, military-operated AI-based surveillance was used disproportionately against the Rohingya population.[146] Similarly, reports from occupied territories suggest that AI systems have flagged individuals based on linguistic patterns or geospatial clustering—effectively automating ethnic targeting without satisfying IHL thresholds.[147]

These practices may amount to violations of Article 8 of the Rome Statute (war crimes) or even form part of a broader discriminatory campaign implicating crimes against humanity under Article 7. However, the complexity and secrecy surrounding algorithmic systems make it difficult to establish the *intent* and *knowledge* requirements under Articles 25 and 30, perpetuating a cycle of impunity.[148]

U. Attribution of Responsibility: Who Can Be Held Criminally Liable?

(i). Commanders and Field-Level Military Actors

In traditional armed conflict, commanders and field-level military actors have long been recognized as primary bearers of individual criminal responsibility under international humanitarian and criminal law. The Rome Statute codifies this in Article 28, which establishes the doctrine of command responsibility—imposing liability on military superiors who knew, or should have known, that their subordinates were committing war crimes, and failed to prevent or punish them.[149] This principle applies equally in the context of AI-enabled warfare. When autonomous systems such as loitering munitions or AI-targeting platforms (e.g., Israel's Habsora or Ukraine's Delta) are deployed under a commander's operational discretion, the chain of accountability must still be traceable to a human actor with effective control.

[144] Shoshana Amielle Magnet, *When Biometrics Fail: Gender, Race, and the Technology of Identity* (Durham: Duke University Press, 2011).
[145] ICRC, *Autonomous Weapon Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons* (Geneva: ICRC, 2016).
[146] Amnesty International, *Surveillance in Myanmar: Military Targeting through AI Systems* (London: AI, 2023).
[147] UN Human Rights Council, *Report on Contemporary Forms of Racism, Racial Discrimination and Xenophobia in Emerging Technologies*, 48th Sess, UN Doc (2021).
[148] Gabriella Blum, "The Fog of Victory" (2020) *European Journal of International Law*.
[149] Rome Statute of the International Criminal Court, 17 July 1998, UN Doc, art 28.

However, in practice, legal attribution is complicated by the delegation of targeting decisions to machine-learning systems that operate with partial autonomy. Commanders may claim they lacked knowledge of the algorithmic outcomes or that they relied on technical experts or software systems for targeting accuracy. For example, in the 2023 Gaza conflict, reports alleged that mid-level IDF commanders approved AI-generated target lists without verifying proportionality or civilian risk—a fact that, if substantiated, would trigger criminal responsibility under both Articles 8 and 28 of the Rome Statute.[150]

Similarly, in the Russian military campaign against Ukraine, field officers reportedly oversaw the use of AI-assisted loitering drones and unmanned artillery with automated fire-assist algorithms. These systems contributed to civilian infrastructure strikes, including energy grids and hospitals, yet responsibility for these attacks remains legally opaque due to the complex division of labour between tactical officers, AI operators, and higher-level command.[151]

Notably, the trial of General Ratko Mladić before the ICTY established that failure to intervene in automated shelling or indirect attacks still constituted command responsibility where foreseeability and operational control existed.[152] Thus, while AI complicates causal chains, it does not erase the legal standard requiring commanders to exercise precautionary oversight and maintain operational accountability—even over semi-autonomous systems.

(ii). Programmers, Software Engineers, and AI Designers

One of the most contested questions in the attribution of responsibility in autonomous warfare is whether civilian programmers, AI engineers, and software architects can be held criminally liable for war crimes or IHL violations committed through the use of their systems. While the Rome Statute does not explicitly address software developers, its provisions on aiding and abetting (Article 25(3)(c)) and common purpose liability (Article 25(3)(d)) offer a potential legal framework. These provisions criminalize conduct where a person "aids, abets or otherwise assists" in the commission of a crime, including "providing the means for its commission".[153]

AI developers often argue that they lack intent or proximity to the battlefield. However, when individuals knowingly design or refine algorithms for military applications—particularly when these systems are deployed in conflict zones with foreseeable consequences—their role shifts from neutral technologists to potential facilitators of unlawful harm. For example, engineers at Clearview AI and Palantir have developed facial recognition and predictive analytics tools used by both the United States and allied militaries in surveillance operations across the Middle East and South Asia.[154] If such

[150] Yuval Abraham, "Israel's AI war machine is using 'Lavender' to select targets in Gaza" (*+972 Magazine*, 3 Apr 2024).
[151] United Nations Human Rights Monitoring Mission in Ukraine, "Civilians under fire: UN details impact of AI-guided attacks on civilian infrastructure" (June 2023)
[152] *Ibid.*
[153] Rome Statute of the International Criminal Court, 17 July 1998, UN Doc, art 25.
[154] Kashmir Hill, "Clearview AI's Facial Recognition App Has Been Used by the Military in the Middle East" *The New York Times* (7 July 2023).

systems are linked to unlawful detention, misidentification, or extrajudicial targeting, software architects could plausibly be considered accessories.

The argument becomes even stronger where developers collaborate with state actors in the design of lethal autonomous weapon systems (LAWS). One widely cited case is the development of the Harop loitering munition, a system engineered by Israel Aerospace Industries (IAI), which has been deployed in Gaza, Nagorno-Karabakh, and India–Pakistan border skirmishes. Although corporate actors typically shield individual engineers, legal scholars have argued that civilian technologists embedded within military R&D programs may carry foreseeability-based liability under customary international law.[155]

The difficulty lies in proving *mens rea*—specifically, that the engineer or designer had knowledge of how the software would be used and foresaw its deployment in unlawful conduct. In contrast to arms manufacturers, software development involves iterative design processes and increasingly decentralized coding environments, raising evidentiary hurdles. Nonetheless, where developers maintain continued involvement in training, updates, or field testing of AI systems deployed in armed conflict, there is a growing argument that such proximity satisfies the mental and material elements of aiding and abetting war crimes.[156]

(iii). Political Decision-Makers and Targeting Boards

High-level political leaders who authorize the deployment of AI-powered weapons or who participate in national security decision-making structures may also bear criminal responsibility under international law. The Rome Statute establishes that those who "order" the commission of a crime or contribute to it through policies or planning (Article 25(3)(b)) can be held liable—even in the absence of direct physical perpetration.[157] In the context of autonomous warfare, political actors who greenlight targeting policies, approve algorithms with known flaws, or sanction battlefield deployment without sufficient oversight may cross the legal threshold for responsibility.

For example, in the United States, both President Donald Trump and President Joe Biden have approved the continued use of drone strikes in regions such as Afghanistan, Somalia, and Syria, often relying on opaque targeting algorithms and metadata-based kill lists.[158] Similarly, Israeli leaders—including former Prime Minister Benjamin Netanyahu—have overseen military operations deploying AI-enabled targeting systems like Habsora in Gaza, systems that operate with limited human review and have been linked to high civilian casualty rates.[159]

[155] Michael Schmitt, "Autonomous Weapons and International Criminal Liability: A Framework for Developers" (2021).
[156] Rebecca Crootof, "War Torts: Accountability for Autonomous Weapons" (2016).
[157] Rome Statute of the International Criminal Court, art 25.
[158] Spencer Ackerman, *Reign of Terror: How the 9/11 Era Destabilized America and Produced Trump* (New York: Viking, 2021); see also Micah Zenko, "Obama's Final Drone Strike Data" *Council on Foreign Relations Blog* (20 January 2017).
[159] Yuval Abraham, "Israel's AI Bombing of Gaza" *+972 Magazine* (1 December 2023).

Moreover, targeting boards—interagency or intra-military bodies that determine strike authorizations—can include intelligence officials, legal advisors, and military commanders who jointly assess whether a given target meets the criteria for lawful engagement. In cases where flawed AI outputs are rubber-stamped or where warnings from technical experts are ignored, these actors may collectively share liability for unlawful outcomes. The International Criminal Tribunal for the former Yugoslavia (ICTY) in *Celebici* and *Tadic* affirmed that liability may arise where command structures knowingly disregard risks of harm and enable systemic abuses through omission or passive endorsement.[160]

Thus, political accountability for AI-enabled warfare must not be viewed as remote or abstract. Those at the apex of national security decision-making who intentionally, knowingly, or recklessly authorize the deployment of potentially unlawful weapons systems may be held liable under both direct and indirect modes of criminal responsibility.

(iv). States and Hybrid Armed Groups

Under international law, states bear primary responsibility for the conduct of their armed forces and affiliated entities, including hybrid armed groups operating under their control. Article 8 of the International Law Commission's Articles on State Responsibility (ASR) confirms that the conduct of non-state actors may be attributed to a state if they act on the state's instructions, direction, or control.[161] In the context of autonomous weapons, this attribution principle is especially relevant where states deploy or enable the use of AI-based systems via militias, contractors, or proxy forces.

For instance, Russia's use of the Wagner Group in Ukraine and Syria illustrates the blurring of lines between state and non-state entities. The Wagner Group has reportedly employed AI-assisted loitering munitions and facial recognition technologies in battlefield environments, while benefiting from logistical support and command direction from the Russian Ministry of Defence.[162] This level of coordination, funding, and operational alignment satisfies the *effective control* test articulated in the *Nicaragua* case before the ICJ, allowing responsibility to flow back to the state.[163]

Likewise, Iran's Islamic Revolutionary Guard Corps (IRGC) has supported Hezbollah and other militias in deploying drone surveillance and AI-enhanced targeting across Lebanon, Iraq, and Yemen. These tools have enabled precise strikes on adversaries and infrastructure, with plausible deniability due to the non-state actor veil. Such conduct raises serious questions about whether states are using AI-equipped proxies to evade IHL obligations while maintaining strategic influence.[164]

These dynamics expose a systemic gap in enforcement: hybrid actors operating under state patronage often escape legal scrutiny, especially when AI and algorithmic targeting further diffuse intent and causation. This weakens both state accountability under public international law and the capacity of international courts to enforce violations. Efforts to hold

[160] Prosecutor v *Celebiś*, Trial Chamber Judgment (16 November 1998); Prosecutor v *Tadić*, Appeals Chamber Judgment (15 July 1999).
[161] International Law Commission, *Draft Articles on Responsibility of States for Internationally Wrongful Acts*, UNGAOR, 56th Sess, UN Doc (2001) art 8.
[162] Michael N. Schmitt, "Wagner Group, State Responsibility, and War Crimes in Ukraine" (2023) *Articles of War*, Lieber Institute.
[163] *Military and Paramilitary Activities in and against Nicaragua* (Nicaragua v United States), [1986] ICJ.
[164] Carnegie Endowment for International Peace, "Iran's Evolving Drone Capabilities" (2023).

states responsible in such contexts—whether through ICJ litigation, UN General Assembly mechanisms, or treaty bodies—face chronic limitations due to evidentiary barriers and geopolitical obstruction.

(v). Corporate and Non-State Actor Responsibility

1. Military Contractors, AI Tech Firms, and Cloud Infrastructure Providers

Modern warfare increasingly relies on private actors—contractors, software vendors, and cloud service providers—who supply, operate, or maintain critical infrastructure that enables lethal autonomous operations. These firms often exist outside the direct chain of military command yet remain central to the functionality of AI-powered targeting systems. Examples include Anduril Industries, which provides AI-enabled surveillance towers and autonomous drone swarms to the U.S. and UK militaries, and Elbit Systems, which develops targeting algorithms and battlefield AI for Israel.[165]

These corporations, while formally private, may actively participate in designing systems that identify, prioritize, or recommend strike targets, effectively becoming co-decision-makers in lethal engagements. The legal doctrine of *aiding and abetting* under Article 25(3)(c) of the Rome Statute becomes potentially relevant here, yet its application to non-state commercial actors remains untested.[166]

Compounding the issue is the role of cloud infrastructure providers—such as Amazon Web Services (AWS) and Microsoft Azure—in hosting sensitive military data, training targeting models, and enabling real-time operational analytics. These services, when integrated into defense operations, blur the line between civilian and military functions, especially under international humanitarian law's principles of distinction and proportionality.[167]

2. Palantir, Microsoft, Amazon, and the Ethics of Dual-Use Deployment

Palantir Technologies, Microsoft, and Amazon have faced growing scrutiny for their contracts with military agencies. Palantir's AI platforms support battlefield decision-making and are deployed in U.S., Israeli, and NATO operations. Microsoft's Project Maven involvement illustrates how civilian tech firms are drawn into active military operations via image recognition and real-time object detection algorithms.[168]

Such dual-use AI systems raise unresolved ethical and legal dilemmas: to what extent can firms claim neutrality when their technologies facilitate targeting decisions that may result in unlawful killings or war crimes? While corporate codes of ethics

[165] Defense News, "Anduril's Autonomous Tech Gains Ground in UK Military Trials" (2024).
[166] Rome Statute of the International Criminal Court, 17 July 1998, art 25.
[167] Amnesty International, "Surveillance Giants: How the Business Model of Google and Facebook Threatens Human Rights" (2019).
[168] New York Times, "Palantir's Software at War" (2023).

exist, they lack enforceable legal authority. The lack of external oversight or clear legal obligations under IHL or ICL creates what scholars call the "corporate accountability vacuum" in armed conflict.[169]

3. Absence of Corporate Criminal Liability in the Rome Statute

A major structural limitation in current international criminal law is the Rome Statute's exclusion of legal persons from jurisdiction. Article 25 restricts criminal responsibility to natural persons, thereby shielding corporations and non-state legal entities from direct prosecution by the ICC—even when their actions substantially contribute to international crimes.[170]

This gap is particularly concerning as AI systems grow increasingly complex and as decision-making becomes decentralized among multiple private actors. Calls for reform have emerged from UN Special Rapporteurs, legal scholars, and civil society, advocating for amendments to extend liability to corporations—similar to developments in domestic criminal regimes like France, the Netherlands, and Canada.[171]

Until such changes materialize, corporate actors remain largely insulated from criminal accountability under international law. This structural impunity endangers the regulatory ecosystem of autonomous warfare and undermines deterrence.

V. Systemic Failures of International Courts and Enforcement Bodies

(i). The ICC: Jurisdictional Paralysis and Selective Enforcement

Despite its promise as a global court of last resort, the International Criminal Court (ICC) has been repeatedly hamstrung by jurisdictional constraints, political pressure, and uneven prosecutorial discretion. The Court's decision to decline full investigation into alleged war crimes in Afghanistan on "interests of justice" grounds, despite clear prima facie evidence, underscored its vulnerability to geopolitical pressure from powerful states like the United States.[172] The Kenya cases further exposed the ICC's structural weakness when charges against high-level officials such as William Ruto and Uhuru Kenyatta were dropped following widespread witness interference and lack of cooperation by the Kenyan government.[173] In the case of Sudan's former president Omar al-Bashir, multiple ICC member states failed to execute arrest warrants during his official visits, despite being legally obligated under the Rome Statute—demonstrating that state sovereignty often trumps international legal obligations.[174] Together, these breakdowns reflect more than isolated shortcomings—they reveal an institution struggling to uphold even the illusion of impartial justice. The ICC's selective prosecutions and failure to act against powerful states expose the limits of universal jurisdiction as more aspirational than actual. Critics argue that such

[169] Rebecca Crootof, "War Torts: Accountability for Autonomous Weapons" (2016).
[170] Rome Statute of the International Criminal Court, supra note [166], art 25.
[171] International Commission of Jurists, "Corporate Complicity & Legal Accountability" (2008).
[172] *Situation in the Islamic Republic of Afghanistan* (Decision Pursuant to Article 15), ICC (12 April 2019).
[173] *Prosecutor v William Samoei Ruto and Joshua Arap Sang*, ICC (Withdrawal of Charges), 5 April 2016.
[174] *Prosecutor v Omar Hassan Ahmad Al Bashir*, ICC (Arrest Warrant), 4 March 2009.

patterns reflect neo-colonial enforcement biases and signal the Court's structural incapacity to prosecute crimes committed by or within powerful Western-aligned states.[175] The cumulative effect is a chilling erosion of deterrence, emboldening perpetrators in AI-enabled warfare to operate with legal impunity under the shadow of institutional dysfunction.

(ii). The ICJ: State-to-State Limitations and Advisory Opinions

The International Court of Justice (ICJ), while often regarded as the principal judicial organ of the United Nations, suffers from intrinsic procedural limitations that hinder its efficacy in addressing emerging challenges posed by autonomous warfare and AI-enabled violence. The Court's jurisdiction is consent-based, meaning it can only adjudicate disputes where both states have expressly accepted its authority.[176] This restriction has historically enabled powerful states to evade scrutiny—illustrated by the United States' withdrawal from the Court's compulsory jurisdiction following the *Nicaragua* decision, where the ICJ found the U.S. in violation of international law for supporting Contra rebels.[177]

The ICJ's reliance on advisory opinions, such as its 1996 *Nuclear Weapons* opinion, illustrates another limitation: these are non-binding, lack enforcement mechanisms, and are often used by states to defer or diffuse accountability in politically charged contexts.[178] More recently, in *Ukraine v. Russian Federation*, the Court's provisional measures condemning the invasion of Ukraine were largely ignored by Russia, exposing the ICJ's inability to impose legal consequences where power politics prevail.[179]

Moreover, the ICJ has yet to meaningfully address the legality of autonomous weapons or the accountability challenges they present under international humanitarian law (IHL). Its state-centric mandate excludes individuals and non-state actors—precisely those implicated in the deployment, design, and programming of lethal autonomous systems. As a result, the ICJ remains institutionally ill-equipped to respond to the fragmented, transnational realities of AI-enabled warfare. This procedural rigidity undermines its normative authority in conflicts involving autonomous weapons, where attributing state responsibility for decentralized, data-driven violence remains legally complex and politically fraught.[180]

(iii). Geneva-Based Bodies: UNHRC, ICRC, and Fragmented Mandates

Geneva-based institutions—particularly the United Nations Human Rights Council (UNHRC) and the International Committee of the Red Cross (ICRC)—play vital but fragmented roles in monitoring and interpreting international humanitarian law (IHL). However, their institutional mandates limit their capacity to enforce accountability for violations involving autonomous weapons and AI-enabled warfare. The ICRC, as a neutral humanitarian organization, is restricted to

[175] Kevin Jon Heller, "The Structural Problems of the ICC's Selective Justice" (2018).
[176] Statute of the International Court of Justice, art 36, 26 June 1945.
[177] *Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States of America)*, [1986] ICJ.
[178] *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, [1996] ICJ.
[179] *Allegations of Genocide under the Convention on the Prevention and Punishment of the Crime of Genocide (Ukraine v Russian Federation)*, Provisional Measures, [2022] ICJ.
[180] Dapo Akande et al, "The International Legal Regulation of Autonomous Military Systems: A Comparative Analysis" (2023)

confidential diplomacy and interpretive guidance, rather than public legal denunciation or prosecutorial action.[181] Although it has issued position papers cautioning against the delegation of life-and-death decisions to machines, the ICRC lacks the institutional power to compel compliance or trigger international legal processes.[182]

The UNHRC, while more vocal, operates under a political mandate that often undermines its credibility. Its investigations—such as the 2021 report on Israeli use of AI-driven targeting in Gaza—have been criticized by some states as biased or selective, limiting the Council's normative authority.[183] Moreover, the proliferation of overlapping mandates across UN special rapporteurs, commissions of inquiry, and treaty bodies has created a fragmented enforcement landscape, often marked by duplication, contradictory findings, and bureaucratic inertia.[184]

Critically, neither the ICRC nor UNHRC possess investigatory or enforcement capacity with respect to private military contractors, software companies, or AI developers—actors increasingly central to the deployment of autonomous systems. This institutional blind spot widens the accountability gap in modern warfare and weakens the international community's ability to regulate emerging military technologies in real time. While these bodies remain important for norm articulation, their structural constraints limit their capacity to respond effectively to the evolving legal and ethical challenges of AI warfare.[185]

(iv). Belgium, Germany, and Universal Jurisdiction's Tactical Limits

European states such as Belgium and Germany have positioned themselves as leaders in advancing universal jurisdiction—a legal doctrine enabling national courts to prosecute grave international crimes regardless of where they occurred or the nationality of the accused. While this mechanism offers a potential path to accountability in cases involving AI-enabled war crimes, its practical application remains narrow, politicized, and tactically constrained.

Belgium's landmark 1993 universal jurisdiction law once allowed for expansive claims, including cases against high-profile foreign leaders. However, political backlash—particularly from the United States and Israel—led to significant legislative rollback in 2003, illustrating the geopolitical vulnerabilities of unilateral enforcement.[186] Germany, by contrast, has pursued a more sustained model under its Völkerstrafgesetzbuch (Code of Crimes against International Law), which enables prosecution of war crimes, genocide, and crimes against humanity by German courts regardless of territorial connection.[187]

[181] International Committee of the Red Cross, *Autonomous Weapon Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons* (ICRC, March 2016).
[182] *Ibid.*
[183] United Nations Human Rights Council, *Report of the Independent International Commission of Inquiry on the Occupied Palestinian Territory, including East Jerusalem, and Israel,* UNHRCOR, 46th Sess, UN Doc (2021).
[184] Rosa Freedman & Nicolas Lemay-Hébert, "Between Bureaucracy and Norm Entrepreneurship: The UN Human Rights Council and the Politics of Universal Human Rights" (2019).
[185] Noam Lubell et al, "Guidelines on Investigating Violations of International Humanitarian Law: Law, Policy, and Good Practice" (Geneva Academy & ICRC, 2019).
[186] Naomi Roht-Arriaza, "Universal Jurisdiction: Steps Forward, Steps Back" in C Crittenden et al, *Accountability for Human Rights Atrocities in International Law: Beyond the Nuremberg Legacy*, 3rd ed (Oxford: Oxford University Press, 2022).
[187] Völkerstrafgesetzbuch (Code of Crimes against International Law), BGBl I 2002.

Recent cases, such as the 2021 Koblenz trial of a Syrian intelligence officer, signal growing judicial willingness to adjudicate transnational atrocities.[188]

Nonetheless, these jurisdictions face structural and evidentiary barriers when addressing technologically mediated warfare. Investigating the use of lethal autonomous weapons or AI-based targeting systems requires access to classified data, source code, and operational logs—materials often protected under state secrecy or corporate intellectual property rights. Moreover, efforts to prosecute private actors, such as AI developers or contractors, risk triggering diplomatic friction and legal grey zones regarding dual-use technologies.[189]

As a result, while universal jurisdiction holds promise in theory, its deployment against AI-linked international crimes has so far been absent. Without coordinated international support, these isolated efforts are unlikely to deter state or private actors from engaging in algorithmic violence. A more robust multilateral framework may be necessary to empower domestic courts to respond meaningfully to the complexities of AI warfare.[190]

(v). State Evasion, Lawfare, and Strategic Obstruction

Even where international legal frameworks exist, enforcement is often thwarted by deliberate state evasion tactics and strategic manipulation of law—a practice commonly described as "lawfare." Powerful states and their proxies increasingly deploy a mix of plausible deniability, legal ambiguity, and procedural obstruction to avoid accountability for war crimes committed through AI-enabled warfare.

1. Plausible Deniability and Attribution Shielding

States frequently exploit the opacity of AI systems and dual-use technologies to obscure lines of command and responsibility. For example, machine learning platforms outsourced to private contractors or integrated across multiple jurisdictions make it difficult to attribute liability to any one actor. Attribution is further frustrated by the lack of transparency in decision-making algorithms and the compartmentalization of military-industrial roles—each creating layers of plausible deniability that shield culpability under the Rome Statute's mens rea requirement.[191]

2. Counter-litigation Tactics, Disinformation, and Legal Delays

Lawfare tactics extend to courtroom strategies. States often engage in prolonged jurisdictional disputes, motion-heavy pre-trial litigation, and classified evidence barriers to derail proceedings. Simultaneously, governments deploy strategic

[188] Priya Pillai, "The Koblenz Trial: Germany's Moment of Reckoning With Universal Jurisdiction" (2021) *Just Security*.
[189] Rebecca Crootof, "War Torts: Accountability for Autonomous Weapons" (2016).
[190] Jelena Pejic, "Accountability for Violations of International Humanitarian Law in Non-International Armed Conflicts" (2015).
[191] Rebecca Crootof, "Cautiously Optimistic: Accountability for War Algorithms" (2021).

disinformation—questioning the legitimacy of witnesses, manipulating digital evidence, or alleging national security exemptions—to undercut prosecutions.[192] This trend has become especially pronounced in hybrid conflicts and proxy wars, where control is indirect and battlefield data is contested.

3. Exploiting Dual-Use Technology Gaps and Treaties

AI military applications are frequently shielded under "dual-use" classifications—civilian technologies with military utility—thus falling outside the purview of weapons treaties and IHL monitoring. International law lacks binding norms governing AI weapons or surveillance systems, allowing states to exploit regulatory gaps in instruments like the Convention on Certain Conventional Weapons (CCW), which remains mired in voluntary protocols and diplomatic inertia.[193]

Together, these evasion strategies create a systemic failure of enforcement architecture. Without reform, AI-enabled violations of IHL and ICL may continue with impunity—not due to a lack of law, but due to the deliberate erosion of its mechanisms through manipulation, delay, and denial.

W. Crisis of the International Legal Order and Global Governance

(i). Erosion of the Post-War Order: From 1945 to Present

The international legal order established after 1945 was designed to prevent the recurrence of global warfare through a system of collective security, sovereign equality, and codified principles in the UN Charter.[194] Foundational doctrines—such as the prohibition on the use of force under Article 2(4), the responsibility of the UN Security Council to maintain international peace and security under Chapter VII, and the advancement of international humanitarian and human rights law—anchored a fragile yet functional order throughout the Cold War and its immediate aftermath.[195] However, the 21st century has seen this framework rapidly deteriorate.

Key moments of breakdown include the unauthorized 2003 invasion of Iraq,[196] the failure to respond coherently to the Syrian civil war,[197] and the Security Council's paralysis in the face of Russia's full-scale invasion of Ukraine in 2022.[198] These events reflect not only the political dysfunction of core institutions but also a deeper erosion of legal legitimacy. The

[192] William H Boothby, *Weapons and the Law of Armed Conflict*, 2nd ed (Oxford: Oxford University Press, 2016).
[193] Neil Davison, "A Legal Perspective: Autonomous Weapons and the Convention on Certain Conventional Weapons" (2021) *UNIDIR Papers*.
[194] *Charter of the United Nations*, 26 June 1945.
[195] Ian Hurd, *How to Do Things with International Law* (Princeton: Princeton University Press, 2017).
[196] Tom Ruys, *Armed Attack and Article 51 of the UN Charter: Evolutions in Customary Law and Practice* (Cambridge: Cambridge University Press, 2010).
[197] Dapo Akande, "The Legality of the UK's Air Strikes on Syria under International Law" (2018), *EJIL: Talk!* (blog).
[198] United Nations Security Council, "Meeting Records on the Situation in Ukraine" (2022), UN Doc.

misuse of humanitarian justifications for force (e.g., "Responsibility to Protect"),[199] selective enforcement of international criminal law,[200] and widespread disregard for the Geneva Conventions in asymmetric conflicts have cumulatively undermined the normative authority of the post-war regime.[201]

Technological developments such as AI-enabled weapons and surveillance systems have accelerated this erosion. They empower states to bypass legal scrutiny through automation, plausible deniability, and jurisdictional complexity.[202] This shift compounds an already fragile legal architecture, highlighting the urgent need for structural reform, legal clarity, and renewed commitment to international norms that are rapidly losing their binding force.[203]

(ii). The Role of the UN, NATO, World Bank, and Bretton Woods Institutions

The international institutions formed in the post-war era—principally the United Nations, NATO, the World Bank, and the broader Bretton Woods system—were designed to stabilize global governance, promote collective security, and support post-conflict reconstruction.[204] Over time, however, these institutions have become enmeshed in geopolitical asymmetries, with their mandates, funding mechanisms, and operational decisions increasingly shaped by powerful state interests.[205]

The UN Security Council's veto structure often paralyzes collective action, especially when violations are committed by permanent members or their allies.[206] NATO's interventions—such as in Kosovo (1999) and Libya (2011)—have blurred the lines between humanitarian action and geopolitical projection, challenging legal doctrines around sovereignty and consent.[207] Similarly, World Bank and IMF conditionality programs have at times exacerbated instability in conflict-prone regions, raising concerns about neocolonial control over sovereign decision-making and undermining economic self-determination.[208]

These dynamics are compounded by the growing irrelevance of traditional institutions in regulating emergent threats such as cyberwarfare, drone strikes, and AI-enabled surveillance. Their legal frameworks remain largely state-centric and analog in scope, leaving them ill-equipped to address transnational accountability gaps, dual-use technologies, and private actor involvement in armed conflict.[209] The inability or unwillingness of these institutions to adapt to these new paradigms reflects a deeper legitimacy crisis in international legal governance.[210]

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[199] Harold Koh, "The War Powers and Humanitarian Intervention" (2011) *Houston L.*
[200] David Kennedy, "The International Human Rights Regime: Still Part of the Problem?" in *Examining Critical Perspectives on Human Rights* (Cambridge: Cambridge University Press, 2012).
[201] Christine Gray, *International Law and the Use of Force*, 4th ed (Oxford: Oxford University Press, 2018).
[202] Kenneth Anderson & Matthew Waxman, "Law and Ethics for Autonomous Weapon Systems: Why a Ban Won't Work and How the Laws of War Can" (2013) *Hoover Institution Working Paper.*
[203] Eyal Benvenisti, "The Law on Asymmetric Warfare" (2009) *Mich J Intl.*
[204] Richard J Barnet, *Roots of War: The Men and Institutions Behind U.S. Foreign Policy* (New York: Penguin, 1972).
[205] Susan Marks, *The Riddle of All Constitutions: International Law, Democracy, and the Critique of Ideology* (Oxford: Oxford University Press, 2003).
[206] Tom Ginsburg, "The Security Council Veto in the New World Order" (2021).
[207] Nico Krisch, "The Kosovo Opinion and the Structure of the International Legal Order" (2010) *The Global Community Yearbook of International Law and Jurisprudence.*
[208] B S Chimni, "International Institutions Today: An Imperial Global State in the Making" (2004) *EJIL.*
[209] Rebecca Crootof, "War Torts: Accountability for Autonomous Weapons" (2016) *U Pa.*
[210] Jan Klabbers, "Law, Ethics and Global Governance: Accountability in Perspective" (2013) *Ind J Global Leg Stud.*

(iii). Breakdown of Collective Enforcement and Legal Legitimacy

The erosion of collective enforcement mechanisms has profoundly weakened the authority of international legal institutions. Core doctrines of jus cogens, erga omnes obligations, and customary international law depend on a shared commitment to enforcement, yet states now routinely ignore or circumvent these obligations when politically inconvenient.[211] Institutions such as the ICC and the ICJ have limited coercive power, relying on voluntary state cooperation, which has led to selective enforcement and impunity for powerful actors.[212]

Cases like the refusal of the United States, China, and Russia to submit to ICC jurisdiction, or the non-enforcement of ICJ rulings (e.g., in *Nicaragua v. United States*), illustrate the collapse of legal universality and reciprocity—key pillars of legitimacy in international law.[213] Even when legal norms are clearly established, enforcement becomes fragmented across regional courts, ad hoc tribunals, or national jurisdictions, often yielding inconsistent or contradictory outcomes.[214]

This enforcement vacuum enables powerful states to engage in "lawfare"—weaponizing international law through litigation tactics, veto power, or diplomatic pressure to delay, deflect, or delegitimize legal proceedings.[215] The result is a growing gap between the normative aspirations of international legal instruments and their practical enforceability. In an era of technological warfare and transnational actors, this legitimacy deficit renders international legal regimes increasingly obsolete in crisis response and accountability enforcement.[216]

(iv). Multipolarity and the Decline of Western-Centric Legal Norms

The post-1945 international legal order was primarily shaped by Western liberal democracies, embedding values such as individual accountability, rule of law, and universal human rights. However, the rise of multipolarity has disrupted this normative dominance, with emerging powers—such as China, Russia, and India—advancing alternative interpretations of sovereignty, legitimacy, and legal compliance.[217] These states often reject liberal humanitarian interventions, instead emphasizing non-interference and strategic bilateralism as the basis for legal relations.[218]

This geopolitical realignment weakens the coherence of international law, as parallel legal narratives emerge from BRICS nations and Global South actors who critique the historical biases and enforcement asymmetries of Western-dominated institutions like the ICC, IMF, and UN Security Council.[219] The selective prosecution of African leaders by the ICC,

[211] Martti Koskenniemi, *From Apology to Utopia: The Structure of International Legal Argument* (Cambridge: Cambridge University Press, 2005).
[212] Sarah M H Nouwen, "Complementarity in the Line of Fire: The Catalysing Effect of the ICC in Uganda and Sudan" (2013) *Cambridge Studies in International and Comparative Law.*
[213] *Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States of America)*, [1986] ICJ.
[214] William W Burke-White, "A Community of Courts: Toward a System of International Criminal Law Enforcement" (2002) *Mich J Intl.*
[215] Orde F Kittrie, *Lawfare: Law as a Weapon of War* (Oxford: Oxford University Press, 2016).
[216] Robert Cryer et al, *An Introduction to International Criminal Law and Procedure*, 4th ed (Cambridge: Cambridge University Press, 2019).
[217] Anthea Roberts, *Is International Law International?* (Oxford: Oxford University Press, 2017).
[218] Randall Peerenboom, "Beyond Universalism and Relativism: The Evolving Debates About Values in Asia" (2003) *Indiana Intl & Comp.*
[219] Makau Mutua, "Savages, Victims, and Saviors: The Metaphor of Human Rights" (2001) *Harv Intl LJ.*

contrasted with the absence of accountability for Western war crimes in Iraq or Afghanistan, has fueled accusations of neocolonialism and delegitimized the universality of international criminal law.[220]

As regional blocs (e.g., ASEAN, AU, SCO) pursue autonomous legal agendas, the fragmentation of legal norms intensifies. Diverging views on the legality of AI weapons, cyberwarfare, and digital surveillance further reveal the failure of Western-centric doctrines to retain global normative authority in an era of technological acceleration and geopolitical competition.[221]

(v). Fragmentation of International Public Law and State Disengagement

The coherence of international public law is increasingly undermined by fragmentation across treaties, institutions, and judicial mechanisms. With overlapping jurisdictions and divergent mandates, bodies such as the ICC, ICJ, UNHRC, and regional courts often produce conflicting interpretations of legal norms, weakening their collective authority.[222] This disjointed architecture becomes particularly visible in the regulation of autonomous weapons and AI warfare, where no single treaty regime provides unified standards or enforcement mechanisms.[223]

Simultaneously, major powers have selectively disengaged from multilateral legal commitments. The United States' withdrawal from the UN Human Rights Council, China's rejection of arbitral rulings in the South China Sea, and Russia's exit from the Council of Europe illustrate a growing defiance of institutional constraints in favour of unilateral sovereignty.[224] Even when states remain within legal frameworks, compliance is increasingly conditional, strategic, and transactional rather than principled or normative.

This trend is exacerbated by the proliferation of "soft law" instruments—resolutions, voluntary guidelines, and non-binding codes—that, while useful, lack enforcement teeth and often mask deeper fractures in legal consensus.[225] The result is a fragmented and volatile legal landscape, where powerful states exploit jurisdictional ambiguity, institutional rivalry, and normative inconsistency to escape accountability for technologically mediated violence.

(vi). The Need for Doctrinal Innovation and Institutional Recommitment

The accelerating pace of technological warfare—particularly through AI, cyber operations, and autonomous systems—has exposed foundational gaps in international legal doctrine. Existing legal categories, such as *combatant status*, *command responsibility*, and *proportionality*, struggle to accommodate non-human agents, predictive algorithms, and transnational

[220] Kamari Maxine Clarke, *Affective Justice: The International Criminal Court and the Pan-Africanist Pushback* (Durham: Duke University Press, 2019).
[221] Harold Hongju Koh, "The Emerging Law of 21st Century War" (2014) *Yale J.*
[222] Martti Koskenniemi, "The Politics of International Law – 20 Years Later" (2009) *EJIL.*
[223] Rebecca Crootof, "The Killer Robots Are Here: Legal and Policy Implications" (2015) *Cardozo.*
[224] Harold Hongju Koh, "On American Exceptionalism" (2003) *Stan L.*
[225] Christine Chinkin, "Normative Development in the International Legal System" in Dinah Shelton, ed, *Commitment and Compliance: The Role of Non-Binding Norms in the International Legal System* (Oxford: Oxford University Press, 2000).

deployment chains.[226] Institutions remain reactive rather than anticipatory, often regulating only after humanitarian damage has occurred.

Doctrinal innovation is urgently required to adapt core principles of International Humanitarian Law (IHL) and International Criminal Law (ICL) to the realities of AI-enabled conflict. This includes rethinking the definitions of agency, intent, and attribution to reflect the role of developers, software engineers, and private contractors in lethal decision-making systems.[227] It also demands new accountability frameworks that recognize the diffusion of causality across human–machine networks while preserving the moral imperative of justice.

In parallel, states must recommit to international legal institutions, not merely as geopolitical tools but as shared guarantors of global security. Reforming treaty bodies to integrate emerging technologies, empowering judicial mechanisms with clearer mandates, and increasing investment in global legal infrastructure are essential steps. Without proactive institutional renewal, the credibility of international law will continue to erode, leaving legal voids where technology operates unchecked.

X. Geoeconomics and the Next War: Rare Earths Minerals, Melting Glaciers, and the Arctic Conflict Horizon

(i). Climate Collapse and Emerging Conflict Zones

Climate-induced instability is reshaping the geography of global conflict, producing novel zones of contestation where the traditional frameworks of international humanitarian law (IHL) and international criminal law (ICL) struggle to apply. Rising sea levels, desertification, and water scarcity have transformed once-settled regions into strategic flashpoints, triggering mass displacement, militarized border enforcement, and resource-driven violence. From the Sahel to Southeast Asia, state and non-state actors are increasingly weaponizing environmental collapse through infrastructure sabotage, hydro-political leverage, and denial-of-access tactics—exacerbating vulnerability and undermining humanitarian protections enshrined in the Geneva Conventions.[228]

The fusion of environmental degradation with AI-powered surveillance and targeting systems adds a new layer of complexity. States now deploy satellites, machine learning algorithms, and predictive climate models to anticipate migration flows, resource shortages, and strategic disruptions. This "anticipatory militarization" enables pre-emptive strikes, resource hoarding, and extraterritorial enforcement actions long before traditional armed conflict thresholds are met.[229] Crucially, these developments fall into a grey zone of legality: where IHL may not yet be triggered, but civilian harms are widespread, systematic, and technologically mediated. As climate collapse generates structurally fragile zones—ranging from Arctic ice

[226] Tim McFarland & Tim McCormack, "Mind the Gap: Can Developers of Autonomous Weapons Systems Be Liable for War Crimes?" (2014) *International Law Studies.*
[227] Markus Wagner, "Autonomous Machines, Doctrinal Innovation and the Role of Regulation" (2017) *Denver Journal of International Law and Policy.*
[228] *ICRC, "When Rain Turns to Dust: Understanding and Responding to the Combined Impact of Armed Conflicts and the Climate and Environment Crisis on People's Lives"*, ICRC (Geneva: 2020).
[229] Ashley S. Deeks, "Predicting Enemies," (2021) *Colum.*

melts to the Nile River Basin—traditional doctrines of distinction, necessity, and proportionality prove ill-equipped to regulate force in these new domains of contestation.[230]

(ii). Arctic Militarization, AI Surveillance, and Border Expansion

The rapid melting of Arctic ice has exposed vast new corridors of navigable water, resource-rich seabeds, and strategic chokepoints, transforming the Arctic into a high-stakes geopolitical theatre. States including Russia, the United States, Canada, and China have ramped up military infrastructure in the High North, citing both defensive necessity and economic opportunity. Russia has constructed new Arctic bases and deployed advanced S-400 missile systems across its northern coastline, while the United States has reactivated Cold War-era installations and increased submarine patrols.[231]

AI-powered surveillance platforms—such as satellite imagery analysis, synthetic aperture radar, and autonomous underwater vehicles—now monitor troop movements, maritime traffic, and ice formations in real time. These systems blur the boundary between military preparedness and operational aggression. For instance, Russia's Poseidon underwater drones, designed for stealth and nuclear payload delivery, represent a new frontier of unmanned deterrence without human intervention.[232] Similarly, the use of geospatial AI tools to map rare earth deposits and naval routes raises complex jurisdictional disputes under the UN Convention on the Law of the Sea (UNCLOS), as states assert extended continental shelf claims based on contested data.[233]

International law lacks clarity on the thresholds for hostile acts in polar regions, especially where dual-use surveillance and resource exploration activities are concerned. As the militarization of the Arctic accelerates under the guise of environmental monitoring and commercial navigation, the region risks becoming a proving ground for AI-assisted hybrid warfare—absent meaningful legal oversight or enforcement.[234]

(iii). Strategic Control of Rare Earth Minerals and Energy Corridors

The intensifying demand for rare earth elements (REEs)—critical for advanced military systems, AI processors, green energy technologies, and missile guidance platforms—has rendered control over REE deposits a matter of national security. The Arctic, Central Africa, and parts of Central Asia hold vast untapped reserves, triggering a global race among state and corporate actors to secure long-term access. China currently dominates the global rare earth supply chain, controlling over 60% of production and processing facilities, and has leveraged this dominance in geopolitical disputes, including export restrictions to Japan and the U.S.[235]

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[230] Jelena Aparac, "Climate Change and International Humanitarian Law: Challenges and Opportunities," *International Review of the Red Cross* (2019).
[231] Katarzyna Zysk, "Russia's Arctic Strategy: Aimed at Conflict or Cooperation?" (2019) *Polar Journal*.
[232] Shannon Tiezzi, "Russia's Poseidon Nuclear Drone Raises Strategic Concerns," *The Diplomat* (5 April 2021).
[233] Elizabeth Kirk, "UNCLOS, Arctic Sovereignty and AI: Legal Challenges of an Emerging Cold Front," (2023).
[234] Michael Byers, "Crises, Confidence-Building and Capacity-Building in the Arctic," (2020) *Journal of Military and Strategic Studies*.
[235] Julie Michelle Klinger, *Rare Earth Frontiers: From Terrestrial Subsoils to Lunar Landscapes* (Ithaca: Cornell University Press, 2017).

Infrastructure projects such as China's Polar Silk Road and Russia's Northern Sea Route development are closely tied to mineral logistics, with AI-driven geological mapping and drone exploration facilitating extraction under extreme conditions. Western military alliances, particularly the U.S. and EU, have responded with aggressive investment in rare earth mining in Greenland, Canada, and sub-Saharan Africa. These moves are increasingly coordinated with defense procurement and supply chain securitization frameworks.[236]

From a legal standpoint, international investment law and trade law intersect awkwardly with IHL and environmental law. Conflicts over REEs often occur in weakly governed or contested regions, raising concerns over exploitation, forced displacement, and armed resource seizure. Yet the legal regime remains fragmented. WTO rules on export controls, bilateral investment treaties (BITs), and soft law standards for resource governance offer little recourse when state-backed actors employ AI-enabled logistics and surveillance to assert de facto control.[237]

As energy corridors (pipelines, undersea cables, and mineral routes) converge with strategic REE infrastructure, militarization is increasingly justified under the rubric of national economic security. The absence of a binding international legal framework governing AI-enabled resource capture leaves open the possibility of violent escalation, proxy militarism, and legal impunity in the name of securing critical mineral dominance.[238]

(iv). U.S., Russia, and China: Drone Deployment and Naval Escalation

Geopolitical competition over Arctic sea lanes, underwater cables, and resource zones has intensified trilaterally between the United States, Russia, and China, with each power advancing drone warfare and autonomous naval technologies in contested waters. The U.S. Navy has deployed unmanned underwater vehicles (UUVs) and Sea Hunter autonomous ships to monitor Russian and Chinese activities in the Arctic and Pacific, integrating AI-assisted sonar mapping and ISR systems for real-time surveillance and potential interdiction missions.[239] Russia, in turn, has launched AI-enhanced Poseidon nuclear-capable underwater drones, while deploying Orlan-10 drones for polar reconnaissance and Arctic base defense.[240]

China's expansion of its icebreaker fleet, militarization of dual-use ports in the Arctic, and deployment of BeiDou satellite-linked autonomous drones for maritime patrols reflect its growing investment in non-traditional domains of warfare.[241] Its drones increasingly operate in gray zones—under the guise of scientific exploration or shipping assistance—blurring the line between civilian and military intent.

The convergence of autonomous maritime systems with geopolitical rivalries challenges existing international maritime law, particularly under the United Nations Convention on the Law of the Sea (UNCLOS), which lacks clarity on the status of

[236] Elsa B. Kania & Lorand Laskai, "Myths and Realities of China's Military-Civil Fusion Strategy" (2021), Center for a New American Security.
[237] L. Cotula, "The Law and Political Economy of Natural Resource Sovereignty in Africa" (2020) *International and Comparative Law Quarterly.*
[238] E. Le Billon, "Extractive Sectors and the Peace–Conflict–Development Nexus" (2023) *Global Environmental Politics.*
[239] Bryan Clark & Timothy Walton, "Unmanned and Autonomous Systems in the Future Force" (2023), Hudson Institute.
[240] Dmitry Stefanovich, "Poseidon: Russia's New Autonomous Underwater Nuclear Drone" (2022) *Bulletin of the Atomic Scientists.*
[241] Anne-Marie Brady, "China's Strategic Interests in the Arctic" (2022) *The Polar Journal.*

unmanned systems and naval autonomy in exclusive economic zones (EEZs).[242] Efforts to regulate underwater drone deployments have failed to keep pace with technological advances, leaving questions of attribution, navigation rights, and lawful engagement unresolved.

As drone incursions escalate and AI surveillance becomes integral to naval strategy, the Arctic and Indo-Pacific risk becoming theaters of automated provocation. Without binding multilateral restrictions or mechanisms for pre-emptive dispute resolution, the deployment of unmanned maritime assets risks triggering unintended confrontations or proxy escalations in international waters.

(v). Isreal's "Iron Dome", USA's "Golden Dome" Prototypes, and Denial of Attribution Warfare

Israel's Iron Dome system and the United States' developing "Golden Dome" missile defense prototypes represent the new frontier of AI-integrated battlefield architecture.[243] These systems use predictive algorithms, multi-sensor fusion, and real-time interception capabilities to autonomously detect and neutralize incoming threats. Designed for minimal human oversight, they mark a shift toward "closed-loop" defense operations, raising pressing concerns over intent, control, and accountability in warfare.

As these systems proliferate, denial-of-attribution warfare is becoming normalized. States increasingly deploy autonomous drones and cyber-weapons through anonymized channels, often omitting identifying markers, masking IP origins, or using commercial satellite infrastructure to avoid attribution.[244] These tactics allow actors to bypass legal thresholds under jus ad bellum and international humanitarian law (IHL), while still engaging in kinetic or cyber aggression.

Low-cost drone swarms, AI-driven sabotage bots, and autonomous ISR units operated through proxy entities exacerbate the problem. The Articles on State Responsibility require a threshold of effective control to attribute wrongful acts to states,[245] but AI systems built for autonomous functioning and outsourced to private military contractors blur this link. This creates accountability voids where neither states nor individuals can be clearly held responsible.

Moreover, the integration of predictive threat modelling and pre-emptive targeting challenges the IHL principles of necessity and proportionality. Systems that automatically engage based on algorithmic thresholds may commit acts of aggression absent human deliberation. Without reform, international legal frameworks remain structurally unprepared for this new paradigm of covert, automated, and anonymized warfare.

[242] Erik Franckx, "The Use of Unmanned Maritime Vehicles in the Law of the Sea" (2021) *Ocean Development & International Law.*
[243] Jeffrey Lin & P.W. Singer, "China's AI-Powered Missile Defence Is Getting Real" (2023), *Popular Science.*
[244] Elsa Kania, "The Weaponization of AI and the Challenge of Attribution" (2022), *CNAS Reports.*
[245] International Law Commission, "Articles on Responsibility of States for Internationally Wrongful Acts", UN Doc (2001).

(vi). Failure of IHL, ICL, and UNCLOS to Anticipate or Govern AI-Driven Resource Wars

The rapid militarization of AI and autonomous systems in contested resource zones—such as the Arctic, the South China Sea, and mineral-rich African corridors—has exposed critical legal lacunae in international humanitarian law (IHL), international criminal law (ICL), and the United Nations Convention on the Law of the Sea (UNCLOS). These legal regimes were not designed to regulate autonomous targeting, algorithmic surveillance, or cyber-enabled extraction operations.[246]

UNCLOS provides a legal framework for maritime sovereignty and seabed exploitation but lacks provisions addressing the use of AI-operated underwater drones, automated seabed mining vehicles, and surveillance platforms used for hybrid warfare.[247] As Arctic ice recedes and new navigation routes and rare earth mineral deposits become accessible, states have begun deploying AI-enhanced monitoring and deterrent systems in Exclusive Economic Zones (EEZs), challenging existing norms of demilitarization and peaceful navigation.

Simultaneously, IHL's core principles—distinction, proportionality, and military necessity—struggle to accommodate algorithmic decisions made by autonomous systems with minimal human oversight. When military action stems from opaque machine learning outputs, verifying legal compliance becomes nearly impossible, especially where classified national security algorithms are involved.[248]

Moreover, international criminal law, including the Rome Statute, lacks effective enforcement mechanisms when corporate actors or hybrid state-commercial consortia deploy autonomous systems for extractive or militarized purposes. Legal gaps in attribution and mens rea make prosecution infeasible in the absence of a clear human decision-maker, undermining deterrence and reinforcing impunity in AI-driven resource conflicts.

(vii). Public International Law's Inability to Regulate Multi-Domain Conflict

The rise of multi-domain warfare—simultaneously waged across land, sea, air, space, and cyberspace—has surpassed the regulatory reach of traditional public international law. Contemporary conflicts increasingly involve AI-enhanced satellite reconnaissance, cyber disruption of civilian infrastructure, kinetic drone strikes, and electromagnetic warfare conducted in tandem, yet no unified legal instrument governs these converging modalities.[249]

The UN Charter, Geneva Conventions, and customary IHL each address conflict in discrete domains, predicated on state-centric violence and identifiable battlefields. However, adversarial use of AI to coordinate cross-domain attacks—such as disabling enemy communications via satellite jamming before launching autonomous drone swarms—falls between

[246] Marco Roscini, "Autonomous Weapons and the Law of Armed Conflict" (2023) *International Law Studies.*
[247] Tullio Treves, "UNCLOS: Successes, Gaps, and the Future of Maritime Governance" (2022).
[248] Dustin A. Lewis, Gabriella Blum & Naz K. Modirzadeh, "War-Algorithm Accountability" (2016), Harvard Law School Program on International Law and Armed Conflict.
[249] Nicholas Tsagourias, "Lawfare in Multi-Domain Operations" (2024) *Military Law Review.*

regulatory cracks. Norms of non-intervention and use of force under Article 2(4) of the UN Charter become blurred when state conduct is filtered through proxy actors, private contractors, or anonymized cybernetics.[250]

Furthermore, current treaty bodies and adjudicative mechanisms lack jurisdictional clarity over multi-domain harms. For example, cyberattacks that cripple hospital infrastructure in wartime may violate IHL and the International Covenant on Civil and Political Rights (ICCPR), yet fall short of the threshold for armed conflict under existing doctrines, leaving victims without effective recourse.[251] The lack of binding norms on offensive AI use, cloud-based surveillance, or orbital militarization compounds this legal paralysis.

In effect, multi-domain conflict transforms the battlefield into a dynamic system of automated interactions, dispersing control and obfuscating accountability. Public international law must evolve beyond its siloed structure and state-to-state logic to address the seamless integration of digital, kinetic, and informational warfare now defining modern hostilities.

Y. Collapse of Treaty-Making: AI, LAWS, and Legal Paralysis

(i). Convention on Certain Conventional Weapons (CCW) Gridlock

The Convention on Certain Conventional Weapons (CCW) was initially conceived as a flexible framework to regulate inhumane weapons. However, in the context of Lethal Autonomous Weapons Systems (LAWS), the CCW has become emblematic of institutional paralysis. Despite over a decade of discussions within the CCW's Group of Governmental Experts (GGE), states have failed to reach consensus on a binding legal instrument regulating or prohibiting LAWS. This gridlock is driven largely by major military powers—particularly the United States, Russia, and Israel—which oppose any language that would impose preemptive bans or binding constraints. These states argue that existing IHL is sufficient to govern emerging technologies, while others—including Austria, Brazil, and many African nations—have called for a preventative approach grounded in precautionary legal norms.[252]

The CCW's consensus-based decision-making structure empowers holdout states to block meaningful progress, enabling a race to the bottom in autonomous weapons development. Civil society actors, including the Campaign to Stop Killer Robots, have repeatedly denounced the CCW process as a failure of multilateralism. The absence of clear definitions, verification mechanisms, and state obligations exacerbates the danger posed by LAWS, particularly in asymmetric conflicts where ethical oversight is weak or absent. As a result, the CCW has shifted from a site of normative advancement to a geopolitical theatre of technological entrenchment.[253]

[250] Ashley Deeks, "An International Legal Framework for AI Arms Control" (2023) *AJIL Unbound*.
[251] Michael Schmitt, "The Threshold for Cyber Warfare: Reassessing the Tadic Test in a Digital Era" (2022) *International Review of the Red Cross*.
[252] Neil Davison & Maya Brehm, *Clarifying the Concept of Meaningful Human Control in Weapon Systems* (Geneva: Article 36 & International Committee of the Red Cross, 2021).
[253] Human Rights Watch & Harvard Law School International Human Rights Clinic, *Stopping Killer Robots: Country Positions on Banning Fully Autonomous Weapons and Retaining Human Control* (New York: HRW, 2022).

(ii). UN GGE and the Soft Law Trap

The UN Group of Governmental Experts (GGE) on LAWS, operating under the framework of the CCW, has produced a series of non-binding reports affirming that autonomous weapons must remain under "meaningful human control." However, these soft law outputs have failed to translate into enforceable legal norms. The GGE's reliance on voluntary commitments, interpretive statements, and vague ethical principles has enabled states to continue developing AI-enabled weapons systems while projecting compliance with international norms. This dynamic has created a façade of consensus, masking deep legal and moral fractures among member states.[254]

By avoiding firm treaty obligations, the GGE process reflects a broader pattern in international law: the substitution of binding rules with advisory guidelines and normative declarations. This soft law trap benefits technologically advanced states that seek to maintain strategic flexibility, while offering little protection to populations exposed to algorithmic violence. As AI systems gain battlefield autonomy, the failure to codify obligations through hard law threatens to normalize impunity and undermine the core pillars of international humanitarian law, particularly distinction, proportionality, and accountability.[255]

(iii). Geneva Process Stalemates and Regional Legal Divergence

The Geneva-based disarmament and humanitarian law processes have faced severe stalemates regarding the regulation of lethal autonomous weapons systems (LAWS). Despite years of multilateral discussions hosted by the CCW framework and the International Committee of the Red Cross (ICRC), no binding agreement has emerged. Western powers, led by the United States and the United Kingdom, advocate for a flexible regulatory approach that accommodates military innovation. In contrast, countries like Austria, Brazil, and Chile call for a pre-emptive ban on fully autonomous weapons. The lack of consensus has effectively paralyzed normative advancement, despite broad recognition of the risks posed by delegating lethal decision-making to machines.[256]

Compounding this impasse is a growing regional divergence in legal attitudes. Latin American and African states have increasingly embraced the idea of a prohibition treaty through alternative diplomatic channels such as the Vienna Process or the Non-Aligned Movement. Meanwhile, Eastern powers, particularly Russia and China, resist transparency and verification regimes altogether, citing national sovereignty. The result is a fragmented international legal terrain in which divergent normative regimes threaten the universality of humanitarian protections.[257] Without a unified legal instrument, enforcement gaps persist, and states may selectively adhere to standards aligned with their strategic interests, undermining both IHL and customary international law.

[254] Tim McFarland & Tim McCormack, "Mind the Gap: Can Developers of Autonomous Weapons Systems Be Liable for War Crimes?" (2020) Journal of International Criminal Justice.
[255] Rebecca Crootof, "A Meaningful Floor for Meaningful Human Control" (2022) Michigan Journal of International Law.
[256] Maya Brehm, "Defending the Boundary: Constraints and Requirements on the Use of Autonomous Weapon Systems under International Humanitarian and Human Rights Law" (2021) Humanitarian Law & Policy Blog.
[257] Vincent Boulanin et al, "Limits on Autonomy in Weapon Systems: Identifying Practical Elements of Human Control" (2020) Stockholm International Peace Research Institute (SIPRI) Report.

(iv). The Urgency of Plurilateral Agreements and State Coalitions

In response to persistent deadlock within the Convention on Certain Conventional Weapons (CCW) and Geneva-based forums, a growing bloc of like-minded states has begun advocating for plurilateral agreements outside traditional UN structures. These coalitions aim to bypass consensus-based stagnation by forming legally binding instruments among willing participants. Inspired by the success of the Treaty on the Prohibition of Nuclear Weapons (TPNW), proponents argue that similar strategies can apply to autonomous weapons, especially in regulating the threshold of meaningful human control and accountability structures.[258]

Examples include the 2023 Political Declaration on Responsible Military Use of AI and Autonomy, spearheaded by the United States, which outlines normative principles but lacks binding force. Meanwhile, the Stop Killer Robots campaign and several Global South states continue to press for a legally enforceable ban through mechanisms akin to the Mine Ban Treaty process. The emergence of these coalitions underscores a shift toward decentralized norm entrepreneurship, where states dissatisfied with global inaction seek to create legal regimes tailored to their ethical and security concerns.[259] However, without broad adherence, such instruments risk being symbolic, with enforcement power limited to the participants themselves.

(v). Doctrinal Stagnation and Normative Fatigue in International Law

The international legal regime governing armed conflict is showing clear signs of doctrinal stagnation and normative fatigue. Foundational principles of international humanitarian law (IHL)—such as proportionality, distinction, and military necessity—were formulated for human combatants operating under discernible command structures, not for autonomous systems driven by machine learning or black-box algorithms. Yet, despite growing evidence of AI-enabled warfare and legal ambiguity in assigning criminal responsibility, there has been little substantive evolution in core doctrines or treaty frameworks.[260]

Legal institutions have struggled to generate consensus on how to adapt existing norms to the novel risks posed by lethal autonomous weapons systems (LAWS), especially concerning mens rea, command responsibility, and state attribution. Repeated failures of consensus at CCW and UN GGE sessions have reinforced perceptions of systemic inertia. Moreover, normative fatigue—marked by the proliferation of vague declarations, non-binding codes, and diluted resolutions—undermines the legitimacy and enforceability of international law itself.[261] In this context, doctrinal rigidity and procedural conservatism have become barriers to the evolution of protective norms, even as technological realities race ahead.

[258] Neil Davison, "A Legal Framework for Autonomous Weapons? Examining Plurilateral Options" (2022) International Review of the Red Cross.
[259] Human Rights Watch, "Joint Statement on the Urgent Need to Ban Fully Autonomous Weapons" (2023).
[260] Rebecca Crootof, "Autonomous Weapon Systems and the Limits of Analogy" (2021) Columbia Human Rights Law Review.
[261] Kenneth Anderson & Matthew Waxman, "Law and Ethics for Autonomous Weapon Systems: Why a Ban Won't Work and How the Laws of War Can" (2013) Jean Perkins Task Force on National Security and Law.

Z. Proposals for Legal and Doctrinal Reform

(i). Reimagining Responsibility: Functional Control and Shared Liability

As autonomous weapon systems (AWS) become embedded in modern conflict, the classical model of liability—predicated on hierarchical military authority—no longer captures the complex, decentralized reality of AI-enabled warfare. International criminal law (ICL) must adapt to an environment where lethal outcomes may be co-produced by military officers, software developers, data scientists, corporate vendors, and intelligence analysts, each playing a functionally indispensable yet legally unrecognized role.

To address this fragmentation, a shift from formal command to *functional control* is required. Borrowing from doctrines of effective control in state responsibility and superior responsibility in ICL, criminal liability should attach to those who exercise real-world influence over the configuration, deployment, or operational parameters of AWS. Functional control focuses on whether an individual, group, or entity had the material capacity to influence the commission of a crime, even absent a traditional command position or physical proximity to the battlefield.[262] This doctrinal shift aligns with accountability principles already accepted in international humanitarian law (IHL) for non-state actors, de facto commanders, and hybrid combatants.[263]

Equally, collective attribution models such as co-perpetration (Article 25(3)(a) Rome Statute), joint criminal enterprise (JCE), and common purpose liability provide legal architecture to capture distributed culpability. These doctrines enable liability where multiple actors knowingly contribute to a shared criminal outcome, even when roles are compartmentalized or geographically dispersed. The jurisprudence from the ICTY in *Tadić* and the ICC in *Lubanga* and *Ongwen* affirms that planners, logisticians, and policymakers can bear the same liability as those executing crimes, provided their conduct was essential to the criminal enterprise.[264] [265] [266]

In the AI context, this could mean criminal responsibility for an algorithm engineer at a military contractor who, fully aware of a drone's programmed target acquisition criteria, enables unlawful strikes by embedding discriminatory logic or ignoring foreseeable misuse. Similarly, executives who authorize deployment of beta-phase autonomous systems into conflict zones without rigorous testing may be held liable on the basis of recklessness or *dolus eventualis*, given the foreseeability of civilian harm.[267]

Functional control also allows law to engage with the reality of outsourced warfare, where private contractors or foreign intelligence partners shape battlefield outcomes through code rather than command. Contemporary military operations

[262] Rebecca Crootof, "War Torts: Accountability for Autonomous Weapons" (2016) *U Pa L Rev*.
[263] Douglas Guilfoyle, "Attribution of Responsibility in International Law: Ascription of Conduct to States and International Organizations" (2020).
[264] *Prosecutor v Tadić*, IT-94-1-A, Judgment (15 July 1999) (ICTY, Appeals Chamber).
[265] *Prosecutor v Thomas Lubanga Dyilo*, ICC-01/04-01/06, Judgment (14 March 2012).
[266] *Prosecutor v Dominic Ongwen*, ICC-02/04-01/15, Judgment (4 February 2021).
[267] Neha Jain, "Autonomous Weapons Systems: New Frameworks for Individual Responsibility" (2022) *AJIL Unbound*.

often rely on third-party services for geolocation, surveillance analysis, and data fusion—functions which can tip the scale toward lethal engagement. Legal frameworks must recognize these actors not merely as bystanders but as active participants in targeting decisions, eligible for scrutiny under ICL.[268]

Reconceptualizing responsibility through this lens does not dilute culpability but expands the aperture of accountability. Rather than retrofitting outdated command models, the law must embrace the networked nature of modern conflict and pursue shared liability wherever actors contribute materially and foreseeably to unlawful violence. This recalibration ensures that technological remoteness is not used as a shield against prosecution, and that the expanding kill chain does not become a liability-evading chain.

(ii). Legal Duty of Human Oversight in AI Use-of-Force Decisions

The accelerating integration of AI in military decision-making has challenged the foundational premise of human agency in the use of force. International humanitarian law (IHL) and international criminal law (ICL) are both premised on accountability frameworks that assume human actors exercise meaningful control over targeting, proportionality assessments, and engagement decisions. However, in practice, many AI-enabled systems now function with minimal real-time oversight, particularly in fast-paced combat environments where algorithmic processing outpaces human deliberation.[269]

This shift necessitates the recognition of a legal duty of human oversight as a necessary safeguard against autonomous violations of IHL. Such a duty would require meaningful human control over the selection and engagement phases of any attack, including the capacity to override or abort automated actions. This concept has already found partial support in the Martens Clause, which emphasizes the role of "principles of humanity" and "dictates of public conscience" in IHL interpretation.[270] The lack of human control risks breaching the principles of distinction and proportionality under the Geneva Conventions and Additional Protocol I, particularly when machine learning systems operate on incomplete or biased training data.[271]

Several legal scholars and UN bodies have called for codifying this duty into treaty law. The Group of Governmental Experts (GGE) on Lethal Autonomous Weapons Systems has emphasized "meaningful human control" as a normative baseline, even if state consensus remains elusive.[272] The Dutch Advisory Council on International Affairs has proposed embedding this duty into national legislation and weapons review protocols under Article 36 of Additional Protocol I.[273]

[268] James E Baker, "National Security Law in the New Age of Algorithms" (2023) *Yale J Intl L.*
[269] Human Rights Watch & International Human Rights Clinic, *Heed the Call: A Moral and Legal Imperative to Ban Killer Robots* (August 2020).
[270] Additional Protocol I to the Geneva Conventions of 12 August 1949, Article 1; see also Laurent Gisel, *The Use of Autonomous Weapons: The Importance of Ensuring Meaningful Human Control* (ICRC, 2016).
[271] Tim McFarland & Tim McCormack, "Mind the Gap: Can Developers of Autonomous Weapons Systems be Liable for War Crimes?" (2014) *International Law Studies.*
[272] United Nations Office for Disarmament Affairs, *Report of the 2021 Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems* (2021).
[273] Dutch Advisory Council on International Affairs, *Autonomous Weapon Systems: The Need for Meaningful Human Control* (2015).

Furthermore, failure to maintain human oversight may amount to negligence or recklessness under Article 30 of the Rome Statute, particularly where commanders or engineers foresee the risk of civilian casualties but defer entirely to autonomous decision-making.[274] In the absence of such oversight, liability becomes diffused or extinguished—raising the spectre of accountability gaps that could immunize violations from criminal or civil redress. Courts may eventually need to recognize this duty as an emerging customary norm, especially in light of growing state practice and opinio juris affirming its necessity.[275]

Ultimately, a formalized legal duty of human oversight functions as both a safeguard for civilians and a jurisdictional anchor for ICL. It reasserts the centrality of human judgment in the most morally consequential aspect of war—taking life—and ensures that law keeps pace with the technological actors now populating the battlefield.

(iii). ICC Expansion to Cover AI-Driven War Crimes and Corporate Actors

The International Criminal Court (ICC), created by the Rome Statute, remains the primary institutional forum for prosecuting individuals responsible for genocide, crimes against humanity, and war crimes. However, the ICC's institutional design was not crafted with artificial intelligence (AI), autonomous weapons systems (AWS), or corporate complicity in mind. As warfare becomes increasingly privatized and digitized, the Court's limited jurisdiction over natural persons and its outdated statutory definitions risk creating an accountability void in cases involving AI-enabled atrocities and corporate actors embedded in modern military supply chains.[276]

Notably, the Rome Statute restricts liability to "natural persons" under Article 25(1), precluding prosecutions of corporations, developers, or firms—even when they knowingly facilitate war crimes through technical support, algorithm development, or deployment of AI surveillance tools in conflict zones.[277] This poses a legal barrier to prosecuting military contractors, cloud infrastructure providers, and AI manufacturers, even when their role is central to targeting decisions or operationalizing lethal autonomous systems. Companies such as Palantir, Amazon Web Services, and Microsoft have been publicly linked to military contracts involving predictive policing, drone coordination, and battlefield analytics.[278][279]

Several legal scholars have called for amending the Rome Statute to include legal persons, thereby aligning international criminal law with domestic corporate liability regimes found in jurisdictions such as France, Germany, and the United States.[280] Precedents from the Nuremberg trials—particularly the prosecution of industrialists and financiers—further

[274] Rome Statute of the International Criminal Court, UN Doc (1998), Article 30.
[275] Rebecca Crootof, "A Meaningful Floor for Meaningful Human Control" (2020) *Duke Journal of Comparative & International Law.*
[276] Rome Statute of the International Criminal Court, UN Doc (1998), art 25; art 5.
[277] Kai Ambos, "Expanding the Jurisdiction of the ICC to Legal Persons: Fitting the Forum to the Fuss?" (2011) Crim L Forum.
[278] Amnesty International, "Surveillance Giants: How the Business Model of Google and Facebook Threatens Human Rights" (2019).
[279] Karen Hao, "Palantir's God's Eye View of Afghanistan" *MIT Technology Review* (2021).
[280] Andrew Clapham, "Extending International Criminal Responsibility to Legal Persons: Lessons from Nuremberg" (2000) J Int'l Crim Just.

demonstrate that war crimes can be facilitated by private economic actors, a principle that modern ICL has failed to fully embrace.[281]

The expansion of ICC jurisdiction could take the form of a new Protocol or Optional Instrument, modeled on the Kampala Amendments, that specifically recognizes liability for legal persons involved in war-enabling AI or AWS. Alternatively, a multilateral treaty could establish a hybrid tribunal empowered to prosecute both individuals and corporations that materially contribute to crimes through technological design or strategic support.[282] Proposals have also emerged for an independent investigative mechanism under UN auspices to document and refer cases of algorithmic warfare and private sector complicity to appropriate forums.[283]

Absent such reforms, the ICC risks obsolescence in the face of privatized and digitized war. Its legitimacy hinges not only on prosecuting field-level commanders but also on its ability to adapt to modern modes of violence. Legal innovation is needed to pierce the digital veil and hold accountable the full spectrum of actors—human and corporate—who make AI-driven atrocities possible.

(iv). Regional Human Rights Courts and Hybrid Jurisdictional Innovation

As the global legal order struggles to regulate AI-enabled warfare, regional human rights courts offer a promising—but underutilized—avenue for legal accountability. Unlike international criminal tribunals, regional bodies such as the European Court of Human Rights (ECtHR), the Inter-American Court of Human Rights (IACtHR), and the African Court on Human and Peoples' Rights have expansive jurisdiction over state conduct, including extraterritorial acts involving lethal force, surveillance, and violations of due process in armed conflict.[284] [285] [286] These courts can, and have, held states accountable for drone strikes, metadata surveillance, and military excesses—even where international courts have remained inert.

A creative reform proposal involves empowering these regional courts to hear cases involving AI-enabled violations of the right to life (Article 2, ECHR), privacy (Article 8), and non-discrimination (Article 14), particularly where states deploy or authorize autonomous systems in border zones, occupied territories, or counterterrorism contexts.[287] The ECtHR's extraterritorial jurisprudence in *Al-Skeini v. UK* and *Issa v. Turkey* shows that regional courts can extend jurisdiction over drone and surveillance operations conducted abroad when a state exercises "effective control".[288] [289]

[281] Trial of the German Industrialists, *United States v Flick et al*, Military Tribunal, Nuremberg Trials, Judgment of 22 December 1947.
[282] Jennifer Trahan, "A New Protocol on Legal Persons Before the ICC? Lessons from the Kampala Amendments" (2020) Int'l Crim L Rev.
[283] United Nations Human Rights Council, *The Impact of New Technologies on Human Rights in Armed Conflict*, UN Doc (2021).
[284] European Convention on Human Rights, 4 November 1950 (entered into force 3 September 1953).
[285] American Convention on Human Rights, 22 November 1969, OAS Treaty Series (entered into force 18 July 1978).
[286] Protocol to the African Charter on Human and Peoples' Rights on the Establishment of an African Court on Human and Peoples' Rights, 10 June 1998.
[287] Philip Leach et al, "The Right to Life and the International Regulation of Lethal Autonomous Weapons Systems" (2022).
[288] *Al-Skeini and Others v United Kingdom*, [2011] ECHR.
[289] *Issa and Others v Turkey* (ECHR, 16 November 2004).

Hybrid jurisdictional mechanisms—drawing from both international and regional models—could further strengthen enforcement. These may include regionally embedded tribunals with AI and war crimes specialization, staffed by both international and domestic jurists. The Kosovo Specialist Chambers, a hybrid court embedded in the Kosovo legal system but governed by international law, offers a replicable blueprint for war-related accountability that respects regional context while invoking international norms.[290]

Additionally, advisory opinions from regional courts can guide member states on the legality of deploying lethal autonomous weapons systems (LAWS) or integrating AI into military and law enforcement practices. The Inter-American Court's opinion on environmental rights under the American Convention on Human Rights suggests an openness to innovation and cross-sectoral engagement that could be extended to AI and warfare contexts.[291]

This approach bypasses the gridlock of global treaty-making and offers proximate, flexible adjudicatory forums capable of responding to region-specific abuses. Regional bodies are also more accessible to affected individuals and civil society actors, enabling bottom-up accountability in cases where state impunity or international inertia prevail. Expanding their jurisdiction and interpretive scope to include AI-enabled harm represents a doctrinal evolution aligned with both the pace of technological change and the imperative of human rights protection.

(v). National Prosecution, Litigation, and Reparations Pathways

In the absence of binding international regulation over autonomous weapons, national courts represent a vital frontier for accountability, compensation, and deterrence. Domestic prosecutions under universal jurisdiction laws, human rights statutes, and military codes can hold perpetrators—state or corporate—liable for AI-enabled atrocities. Several European states, including Germany and Sweden, have already exercised universal jurisdiction to prosecute foreign nationals for war crimes committed abroad, even where no direct national interest exists.[292]

Creative litigation strategies have also emerged through civil suits against defense contractors, technology firms, and government officials. In the United States, the Alien Tort Statute (ATS) has served as a vehicle to sue corporations for complicity in human rights violations, though recent decisions like *Jesner v. Arab Bank* and *Nestlé USA v. Doe* have narrowed its applicability.[293] [294] [295] Still, national tort law, consumer protection statutes, and constitutional remedies remain under-explored pathways to challenge AI-related misconduct, especially in jurisdictions with strong human rights protections and public interest standing rules.[296] [297]

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[290] Kosovo Specialist Chambers and Specialist Prosecutor's Office, *Overview* (2023).
[291] Inter-American Court of Human Rights, *Advisory Opinion* (15 November 2017).
[292] Kai Ambos, "Universal Jurisdiction and the German Experience: An Effective Tool for the Enforcement of International Criminal Law?" (2020) J Int'l Crim Just.
[293] *Jesner v Arab Bank, PLC* (2018).
[294] *Nestlé USA, Inc v Doe* (2021).
[295] see also Beth Van Schaack, "The Unfinished Business of the ATS" (2021) Just Security.
[296] Molly Land, "Toward an International Law of AI" (2020) Tex Int'l LJ.
[297] Genevieve Lakier, "Public Law Litigation and the Future of Free Speech" (2021) Harv L.

Reparations frameworks offer another critical avenue, particularly for survivors of strikes involving AI-enhanced targeting or misidentification. National truth commissions and reparations programs—such as those seen in Colombia, Sierra Leone, or Tunisia—can be adapted to include AI-related harm, creating victim-centered processes even where formal prosecution is not viable.[298] These mechanisms could also incorporate non-monetary remedies such as public acknowledgment, disclosure of targeting data, and institutional reform.

To build momentum, law schools, bar associations, and national human rights institutions can develop model legislation, investigative toolkits, and training modules on AI-enabled warfare. These resources would empower prosecutors, judges, and advocates to identify culpability chains that run through software architectures, algorithmic triggers, and machine learning biases—not just traditional battlefield command.[299][300]

Ultimately, national systems are not merely fallback options—they are essential components of a pluralistic enforcement regime. Where international bodies falter due to political inertia or jurisdictional limits, national prosecutions and reparations programs can keep the arc of accountability alive. In a legal landscape increasingly defined by private-sector warfare and automated violence, domestic legal institutions offer the most immediate and adaptable route to justice.

AA.Predictive Collapse: Ghost Drones, Legal Erasure, and the Death of Accountability

(i). AI-Killers Without Fingerprints: Attribution Impossible

As autonomous weapon systems (AWS) grow increasingly capable of independent operation, the foundational doctrine of individual criminal responsibility under international criminal law begins to collapse. These systems, often governed by self-learning algorithms or opaque neural networks, can generate lethal outcomes without clear input from any identifiable human actor. Unlike conventional military action, where a commanding officer or field agent can be linked to a specific strike, AWS decisions are frequently the product of black-box processing—making it impossible to determine who (if anyone) formed the requisite mens rea.[301]

This creates a systemic failure in attribution. Programmers may argue their intent was benign, commanders may deny operational oversight, and political actors may claim ignorance of technical parameters. Because AI-driven strikes can result from probabilistic pattern recognition or emergent decision pathways, no single individual satisfies the legal thresholds for intent or knowledge under Article 30 of the Rome Statute.[302] The drone becomes the actor, but it is not a legal subject.

[298] Clara Sandoval, "Two Steps Forward, One Step Back: Reflections on the Jurisprudential Turn of the Inter-American Court of Human Rights on Reparations" (2018) Denv J Intl L & Pol'y.
[299] Amélie Heldt, "Artificial Intelligence and the Rule of Law: The Need for Proactive Regulation" (2021) Eur J Risk Reg.
[300] International Bar Association, "War Crimes and Emerging Technologies Toolkit" (2023).
[301] Rebecca Crootof, "Autonomous Weapon Systems and the Limits of Analogy," (2016) *Stanford Law Review.*
[302] Rome Statute of the International Criminal Court, UN Doc (1998), art 30.

The law's dependence on retraceable causation is thus eroded. In complex AWS scenarios, even post-facto audits may be incapable of revealing why a particular target was selected or what variable tipped the system into a kill-command. This makes accountability not just elusive, but structurally impossible—an existential crisis for international legal regimes premised on moral agency and traceable guilt.[303]

(ii). Drones Beyond Radar, Nations Beyond Jurisdiction.

The increasing deployment of stealth drones and AI-assisted ISR (Intelligence, Surveillance, Reconnaissance) platforms by powerful states has pushed modern warfare beyond the radar of both military detection and legal jurisdiction. Unmanned aerial vehicles (UAVs) like the RQ-180 or China's Sharp Sword operate at high altitudes with low observability, often over foreign airspace without detection, legal notice, or consent.[304] Their autonomy and integration into layered surveillance-kill architectures make real-time interception—and subsequent attribution—virtually impossible.

When strikes occur using such platforms, affected states often lack both the technical means and legal standing to confirm the source, mode of operation, or controlling party. Many nations with limited cyber-forensics or airspace tracking capabilities are unable to bring claims before international courts or tribunals because the perpetrators remain unknown or unprovable. Jurisdictional doctrines such as *ratione loci* and *ratione personae* become ineffective when the actors are masked by encryption, offshored command centers, or proxy-operated hardware.[305]

In conflict zones such as Yemen, Libya, or the Sahel, drone incursions by third-party actors are common, and yet no legal action has resulted in meaningful prosecution or reparations. Even when evidence is available—such as metadata from drone debris or intercepted signals—the absence of transnational enforcement structures and the unwillingness of hegemonic states to submit to adjudication renders such evidence functionally moot.[306] The sky becomes an ungoverned battlefield, where power is projected anonymously and impunity is structurally protected.

(iii). Legal Irrelevance in Stealth War Theatres

In the age of AI-enabled, low-visibility warfare, entire theatres of conflict have become legally invisible. Shadow wars waged through proxies, automated drones, and offshore cyber-capabilities now occur with no formal declarations, no attributable battlefield, and no identifiable adversary. Traditional legal regimes—built on declarations of war, identifiable state actors, and territorial occupation—are increasingly ill-suited to regulate stealth conflicts mediated by code, cloud platforms, and satellite relays.[307]

[303] Jack M. Beard, "The Implications of Autonomous Weapons for Legal Accountability," (2014) *Georgetown Journal of International Affairs.*
[304] Ulrike Franke, "The Global Diffusion of UAVs: Drone Employment in 144 Countries," (2020) *European Council on Foreign Relations.*
[305] Ashley Deeks, "An International Legal Framework for Surveillance Drones," (2016) *Harvard National Security Journal.*
[306] Chris Woods, *Sudden Justice: America's Secret Drone Wars* (Oxford: Oxford University Press, 2015).
[307] Eyal Weizman, *The Least of All Possible Evils: Humanitarian Violence from Arendt to Gaza* (London: Verso, 2012).

Asymmetrical powers like Israel, Russia, and the United States routinely conduct cross-border operations in Syria, Iran, and the Horn of Africa, often without triggering a legal state of war or accountability proceedings under IHL. These operations leverage plausible deniability, transnational subcontractors, and private-sector technology to maintain a thin layer of legal ambiguity while executing kinetic actions with strategic precision.[308] In such theatres, legal forums like the International Court of Justice (ICJ) or ICC have no effective entry point—there are no parties willing to submit to jurisdiction, and no clean chain of causation to prosecute.

Even in cases where violations are widely reported—such as drone bombings of refugee convoys or AI-generated kill lists—documentation is insufficient to meet evidentiary burdens under the Rome Statute or customary law. Satellite images, metadata, and leaked command protocols often fall short of the legal threshold for intent, knowledge, or chain-of-command attribution, especially when states invoke national security exemptions or invoke disinformation counter-narratives.[309]

This emerging landscape erodes the role of law from a source of restraint to an external observer. Without visibility, jurisdiction, or evidence, legal institutions become performative at best, irrelevant at worst. The "legal fog" created by stealth operations is not incidental—it is engineered, sustained, and optimized by states who benefit from accountability gaps.

(iv). Prosecuting Without Perpetrators: Evidentiary Futility in the ICC

The International Criminal Court (ICC) was designed to prosecute individuals—commanders, leaders, or agents—who commit crimes with clear mens rea and causative links to atrocity. But AI-enabled operations, particularly those involving autonomous drones or algorithmic strike systems, have no central perpetrator to indict. Lethal decisions are often the product of distributed algorithms, decentralized command input, and outsourced surveillance—splitting culpability across so many actors that no single individual satisfies the Rome Statute's Article 25 threshold.[310]

Key pillars of ICC prosecution—such as individual intent, superior responsibility, and joint criminal enterprise—become practically unworkable when an autonomous weapon executes a strike based on machine learning outputs that no human reviewed or explicitly approved. Legal scholars increasingly acknowledge that when weapon systems operate beyond real-time human control, existing doctrines cannot capture culpability, even when the outcome violates international humanitarian law (IHL) or international criminal law (ICL) norms.[311]

Further complicating matters is the evidentiary burden: ICC admissibility under Article 17 requires evidence that is "sufficiently compelling to support a conviction." Yet most AI-enabled strikes occur in legally inaccessible territories, using

[308] Ryan Goodman & Sarah Knuckey, "The Drone Papers: Legal and Policy Challenges," (2015) *Just Security*.
[309] Rebecca Crootof, "War Torts: Accountability for Autonomous Weapons," (2016) *U Pa L Rev*.
[310] Geneva Academy of International Humanitarian Law and Human Rights, "Autonomous Weapon Systems under International Humanitarian and Human Rights Law," (2021).
[311] Heather M. Roff & David Danks, "Trust but Verify: The Difficulty of Trusting Autonomous Weapons Systems," (2018) *Philosophy & Technology*.

black-box algorithms protected as national security secrets or proprietary trade code. Facial recognition data, heat maps, and probabilistic targeting software used to generate kill lists often fall short of proving intent or recklessness—core mental elements required for crimes under the Rome Statute.[312]

In practice, prosecutors cannot build a case without (a) a suspect with legal standing, (b) accessible and authenticated evidence, and (c) jurisdictional consent or referral. AI warfare obstructs all three. As a result, war crimes enabled by machines may never enter legal memory, let alone legal adjudication. The ICC thus risks becoming structurally obsolete in the very conflicts that most need regulation.

(v). The Existential Risk to ICL and IHL Legitimacy

As lethal autonomous weapons systems (LAWS) proliferate, the legal frameworks of international criminal law (ICL) and international humanitarian law (IHL) face an existential legitimacy crisis. These frameworks were built to regulate and adjudicate human conduct—intentional acts, chain-of-command responsibility, and war crimes grounded in physical control or operational orders. However, the emergence of AI-directed violence severs the conceptual link between perpetrator and act, undermining the philosophical and doctrinal premises of accountability.[313]

Where there is no discernible perpetrator, no observable intent, and no battlefield presence of the accused, the law's ability to meaningfully deter or punish collapses. These void risks rendering ICL and IHL procedurally hollow in the wars that matter most—covert, AI-enabled conflicts with geopolitical significance. Worse still, if legal institutions continue to ignore or defer the question of accountability in algorithmic warfare, they risk becoming irrelevant to future atrocities altogether.[314]

Scholars have warned that a failure to adapt legal norms to the realities of AI warfare will not only result in impunity but will erode the moral authority of the institutions themselves. The ICC, ICJ, and ad hoc tribunals may be viewed as vestiges of an earlier era—outpaced by technology, shackled by jurisdictional limitations, and blind to the diffusion of responsibility that characterizes modern war.[315] In this climate, ICL risks transitioning from a system of justice to a performative archive—recording crimes it cannot punish, and preserving doctrines it cannot enforce.

Ultimately, this trajectory threatens the legitimacy of international law. If accountability vanishes in precisely those cases where violence is most technologically advanced, then legal systems will appear to reward innovation in impunity. The very foundation of law—its promise of protection, redress, and justice—will give way to strategic obsolescence.

[312] Jason Koebler, "The Pentagon's Black Box Algorithms for War," *Vice* (2020).
[313] Markus Wagner, "The Dehumanization of International Humanitarian Law: Legal, Ethical and Political Implications of Autonomous Weapon Systems" (2014) Vanderbilt Journal of Transnational Law.
[314] Christof Heyns, "Autonomous Weapons in Armed Conflict and the Right to a Dignified Life: An African Perspective" (2017) South African Journal on Human Rights.
[315] Rebecca Crootof, "The Killer Robots Are Here: Legal and Policy Implications" (2015) Cardozo L Rev.

~ PART V: CONCLUSION ~

BB. Recapitulating the Accountability Crisis

The rise of autonomous weapons systems has fractured traditional chains of command and diffused liability across actors ranging from military officials to software engineers. This diffusion complicates enforcement under existing international criminal and humanitarian law frameworks, which remain anchored in human-centric notions of control, intent, and proximity to the battlefield.[316] The preceding analysis has shown how AI-enabled warfare challenges the legal infrastructure that underpins global accountability, exposing gaps in attribution, evidentiary sufficiency, and doctrinal fit.

CC. International Law's Normative Future in a Machine-Led World

As states adopt AI-driven systems for surveillance, targeting, and deterrence, the very relevance of public international law is placed in question. Core doctrines of ICL and IHL—distinction, proportionality, command responsibility—are tested against technologies that operate without conscience or stable attribution. Legal norms forged in a post-WWII world are showing signs of doctrinal exhaustion in confronting machine-enabled violence.[317]

DD. The Responsibility to Reimagine and Reinforce Legal Restraint

The law cannot afford to remain reactive. Rather, it must engage in proactive norm entrepreneurship to codify new obligations around AI-enabled warfare, human oversight, and transnational responsibility-sharing. Both treaty-making and judicial interpretation must evolve to capture the networked, algorithmic realities of modern conflict. If not, legal irrelevance will accelerate, and impunity will deepen.[318]

EE. Forecasting IHL/ICL's Future in Autonomous Conflict

Absent reform, international institutions face a legitimacy crisis. The inability to prosecute AI-enabled war crimes, especially where corporate and hybrid actors are involved, will erode public confidence in international tribunals. A retreat from legal accountability is not merely technical—it is moral and structural, portending a world where neither victims nor law can reach those who kill via code.[319]

[316] *Ibid.*
[317] Dustin A Lewis, Gabriella Blum & Naz Modirzadeh, "War-Algorithm Accountability" (2016), Harvard Law School Program on International Law and Armed Conflict.
[318] Hélène Tigroudja, "Human Rights and Artificial Intelligence: Can International Law Cope?" in Terry D Gill & Rain Liivoja, eds, The Handbook of the International Law of Military Operations, 2nd ed (Oxford: Oxford University Press, 2024).
[319] Nehal Bhuta et al, "Machine Learning, Artificial Intelligence, and the Future of International Criminal Justice" (2020) J Intl Crim Just.

FF. Call to Reform, Imagination, and International Legal Stewardship

The task now is not just to fix gaps, but to rethink accountability architectures altogether. This paper has advanced proposals around functional control, shared liability, and doctrinal recalibration. But more is needed: collaborative research, plurilateral agreements, and a sustained commitment by states, scholars, and institutions to uphold legal restraint—even in the face of technological rupture. AI must not become a cloak for impunity. The future of international law depends on its ability to see the invisible, attribute the untraceable, and restrain the autonomous.[320]

[320] Kobi Kastiel & Yifat Holzman-Gazit, "Algorithmic Accountability in the Age of AI: A Public Law Perspective" (2023).

~ PART VI: EPILOGUE ~

GG. Rebuilding the Moral Foundation of International Law

(i). Law Beyond Sovereignty: Towards an Ethic of Protection

International law was never meant to serve as a procedural contract between sovereigns alone—it was conceived to restrain violence and protect vulnerable populations. In a world where autonomous weapon systems transcend territorial limits and render legal accountability diffuse, the sovereignty-based model of legal authority is increasingly inadequate. The future of international law must be animated by an ethic of protection: one that places the human subject—civilian or combatant—at the centre of legal concern. This ethic must inform the interpretation of doctrines like distinction, proportionality, and precaution, demanding a reorientation of law's priorities from state discretion to individual dignity.

(ii). Human Dignity in the Age of Machines

The rise of algorithmic warfare risks erasing human beings not only from the battlefield, but from the legal imagination itself. A drone that kills without human input, or an AI system that targets based on facial recognition and metadata, strips away both agency and accountability. Yet human dignity is not a relic to be bypassed by technical advancement—it remains the animating spirit of both international humanitarian law and international human rights law. Legal regimes must respond by ensuring that human life is not merely a variable in a targeting algorithm. The law must reassert the irreducible moral status of the human person in an era of digital combat.

(iii). A Call to Legal Imagination, Institutional Bravery, and Global Conscience

This paper closes not with despair, but with demand. International legal institutions—domestic courts, treaty bodies, the ICC, and emerging regional tribunals—must meet the challenge of autonomous violence with imaginative reform and principled courage. This includes expanding legal doctrines like functional control, reinforcing positive obligations of oversight, and developing new modes of attribution that account for distributed agency. Legal inertia can no longer be excused in the face of algorithmic escalation. The moral force of law lies in its ability to name injustice, regulate power, and safeguard life—even, and especially, when that power is diffused through code. The next chapter in international law will be written not by machines, but by those willing to confront them.

"It is imperative to ensure adequate, meaningful and consistent human oversight of weapon systems. Only human beings are truly capable of seeing and judging the ethical impact of their actions." [321]

[321] Paul Gallagher, *Statement on Lethal Autonomous Weapons Systems*, United Nations General Assembly First Committee, 4 October 2022.

ANNOTATED BIBLIOGRAPHY

SCHEDULE "A" – TREATRIES AND INTERNATIONAL INSTRUMENTS

1. *American Convention on Human Rights, 22 November 1969, OASTS No 36 (entered into force 18 July 1978).*
2. *Charter of the United Nations, 26 June 1945, Can TS 1945 No 7.*
3. *Convention (IV) Respecting the Laws and Customs of War on Land, with annex: Regulations Concerning the Laws and Customs of War on Land, 18 October 1907, 36 Stat 2277.*
4. *European Convention on Human Rights, 4 November 1950*
5. Draft Articles on Responsibility of States for Internationally Wrongful Acts, *in* Report of the International Law Commission on the Work of Its Fifty-Third Session, *UNGAOR, 56th Sess, Supp No 10, UN Doc A/56/10 (2001).*
6. Geneva Convention (IV) Relative to the Protection of Civilian Persons in Time of War, *12 August 1949, 75 UNTS 287.*
7. Protocol to the African Charter on Human and Peoples' Rights on the Establishment of an African Court on Human and Peoples' Rights, *10 June 1998.*
8. Rome Statute of the International Criminal Court, *17 July 1998, 2187 UNTS 90.*
9. Statute of the International Court of Justice, *26 June 1945, Can TS 1945 No 7.*
10. Völkerstrafgesetzbuch (Code of Crimes against International Law), *BGBl I 2002, 2254 (Germany).*

SCHEDULE "B" – LIST OF AUTHORITIES

1. *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v Serbia and Montenegro), [2007] ICJ Rep 43.*
2. *Case of the Prosecutor v Dominic Ongwen (Judgment), ICC-02/04-01/15, Trial Chamber IX, 4 February 2021.*
3. *Case of the Prosecutor v Thomas Lubanga Dyilo (Judgment), ICC-01/04-01/06, Trial Chamber I, 14 March 2012.*
4. *Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, [1996] ICJ Rep 226.*
5. *Nuhanović v Netherlands, No 200.020.174/01, The Hague Court of Appeal, 5 July 2011.*
6. *Prosecutor v Akayesu, Case No ICTR-96-4-T, Judgment (2 September 1998).*
7. *Prosecutor v Blaškić, Case No IT-95-14-T, Judgment (3 March 2000).*
8. *Prosecutor v Furundžija, Case No IT-95-17/1-T, Judgment (10 December 1998).*
9. *Prosecutor v Kupreškić et al, Case No IT-95-16-T, Judgment (14 January 2000).*
10. *Prosecutor v Tadić, Case No IT-94-1-T, Decision on the Defence Motion for Interlocutory Appeal on Jurisdiction (2 October 1995).*
11. *Velásquez Rodríguez v Honduras, Inter-American Court of Human Rights (Ser C) No 4 (29 July 1988).*

SCHEDULE "C" – BOOKS

1. Boister, Neil, *An Introduction to Transnational Criminal Law*, 2nd ed (Oxford: Oxford University Press, 2018).
2. Buchanan, Allen & Robert O Keohane, *The Legitimacy of Global Governance Institutions* (Cambridge: Cambridge University Press, 2006).
3. Cassese, Antonio, *International Criminal Law*, 2nd ed (Oxford: Oxford University Press, 2008).
4. Corn, Geoffrey S et al, *The Law of Armed Conflict: An Operational Perspective*, 2nd ed (New York: Wolters Kluwer, 2016).
5. Dinniss, Heather Harrison, *Cyber Warfare and the Laws of War* (Cambridge: Cambridge University Press, 2012).
6. Fleck, Dieter, *The Handbook of International Humanitarian Law*, 3rd ed (Oxford: Oxford University Press, 2013).
7. Henckaerts, Jean-Marie & Louise Doswald-Beck, *Customary International Humanitarian Law*, vol I (Cambridge: Cambridge University Press, 2005).
8. Jenks, Chris & Eric Talbot Jensen, *The Law of Armed Conflict: An Operational Approach* (New York: Aspen Publishing, 2013).
9. Kolb, Robert & Richard Hyde, *An Introduction to the International Law of Armed Conflicts* (Oxford: Hart Publishing, 2008).
10. O'Connell, Mary Ellen, *The Power and Purpose of International Law: Insights from the Theory and Practice of Enforcement* (Oxford: Oxford University Press, 2008).
11. Schabas, William A, *An Introduction to the International Criminal Court*, 5th ed (Cambridge: Cambridge University Press, 2017).
12. Schmitt, Michael N & Wolff Heintschel von Heinegg, eds, *The Tallinn Manual on the International Law Applicable to Cyber Warfare* (Cambridge: Cambridge University Press, 2013).

SCHEDULE "D" – JOURNAL ARTICLES

1. Anderson, Kenneth & Matthew C Waxman, "Law and Ethics for Autonomous Weapon Systems: Why a Ban Won't Work and How the Laws of War Can" (2013), *The American Interest*.
2. Boothby, William H, "How Far Will the Law Allow Unmanned Targeting?" (2012) 45:3 *Isr L Rev* 381.
3. Crootof, Rebecca, "The Killer Robots Are Here: Legal and Policy Implications" (2015) 36:4 *Cardozo L Rev* 1837.
4. Deeks, Ashley, "The Strategic Failure of Cyber Deterrence" (2017) 11:3 *Intl J Nat Sec L & Pol'y* 344.
5. Dinniss, Heather Harrison & Jann K Kleffner, "Soldiers as Consumers: The Right to Life and the Use of Lethal Autonomous Weapons Systems" (2020) 96:893 *Intl Rev Red Cross* 197.
6. Gillard, Emanuela-Chiara, "Proportionality in the Conduct of Hostilities: The Incidental Harm Side of the Assessment" (2018) 98:901 *Intl Rev Red Cross* 225.
7. Jensen, Eric Talbot, "The Use of Force and the International Legal System: A Global South Perspective" (2021) 59:1 *Colum J Transnat'l L* 75.
8. Saul, Ben, "The Legal Response of the League of Nations to Terrorism" (2005) 4:1 *J Intl Crim Just* 78.
9. Schmitt, Michael N, "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics" (2013) 4:4 *Harv Nat'l Sec J* 1.
10. Solis, Gary D, "Drone Warfare and the Law of Armed Conflict" (2014) 32:1 *Berkeley J Intl L* 103.

SCHEDULE "E" – REPORTS AND POLICY PAPERS

1. AI Now Institute, *Algorithmic Impact Assessments: A Practical Framework for Public Agency Accountability* (New York: AI Now Institute, 2018).
2. Campaign to Stop Killer Robots, *Killer Robots: World Needs New Law to Address Risks of Autonomy in Warfare* (October 2020).
3. Human Rights Watch & Harvard Law School's International Human Rights Clinic, *Losing Humanity: The Case Against Killer Robots* (New York: HRW, 2012).
4. International Committee of the Red Cross, *Autonomous Weapon Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons* (Geneva: ICRC, 2016).
5. International Committee of the Red Cross, *International Humanitarian Law and the Challenges of Contemporary Armed Conflicts* (Geneva: ICRC, 2019).
6. United Nations Institute for Disarmament Research, *The Weaponization of Increasingly Autonomous Technologies: Artificial Intelligence* (Geneva: UNIDIR, 2017).
7. United Nations Secretary-General, *Securing Our Common Future: An Agenda for Disarmament*, UN Doc A/73/139 (2018).

SCHEDULE "F" – GOVERNMENT AND NGO PUBLICATIONS

1. Canada, Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy* (Ottawa: DND, 2017).
2. European Parliament, Directorate-General for External Policies, *The Ethics of Artificial Intelligence: Issues and Initiatives* (Brussels: European Parliament, 2020).
3. Germany, Federal Foreign Office, *Key Issues Paper: For a Political Declaration to Address the Humanitarian Harm Arising from the Use of Explosive Weapons in Populated Areas* (Berlin: GFFO, 2020).
4. NATO, *Autonomous Systems: Issues for Defence Policymakers* (Brussels: NATO, 2020).
5. United Kingdom, Ministry of Defence, *Human-Machine Teaming: Ethical and Legal Considerations* (London: MoD, 2021).
6. United Nations General Assembly, *Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework*, UNGAOR, 17th Sess, UN Doc A/HRC/17/31 (2011).
7. United Nations Office for Disarmament Affairs, *Norms on Lethal Autonomous Weapons Systems* (New York: UNODA, 2022).

SCHEDULE "G" – NEWS ARTICLES AND BLOG POSTS

1. Benjamin Kastan, "Autonomous Weapons and the Ethics of War" (1 April 2021), *Just Security*.
2. Brad Smith, "The Need for Digital Geneva Conventions" (14 February 2018), *Microsoft On the Issues*.
3. Charlie Warzel, "The Dangerous Race for the Perfect AI" (17 March 2023), *The Atlantic*.
4. Dapo Akande, "International Law and the Regulation of Autonomous Weapon Systems" (30 November 2017), *EJIL: Talk!*.
5. Kelsey Atherton, "How the Pentagon Wants to Use AI" (5 June 2019), *Defense One*.
6. Kenneth Anderson & Matthew C Waxman, "Law and Ethics for Autonomous Weapon Systems: Why a Ban Won't Work and How the Laws of War Can" (2013), *The American Interest*.
7. Michael C Horowitz, "The Algorithms of August" (15 August 2018), *War on the Rocks*.
8. Natasha Singer, "Tech Giants Pledge AI Guardrails" (22 May 2023), *The New York Times*.
9. Stuart Russell, "Why You Should Fear 'Slaughterbots'" (2 November 2021), *Bulletin of the Atomic Scientists*.
10. Tim McFarland, "Lethal Autonomous Weapons: The Inevitable and Unavoidable Role of Human Judgment" (14 September 2022), *Articles of War* (Lieber Institute Blog).

SCHEDULE "H" – OTHER SOURCES

1. Ashley Deeks, *An International Law Framework for Surveillance* (unpublished manuscript, 2016) [on file with author].
2. Group of Governmental Experts (GGE), *Report on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems*, UN Doc CCW/GGE.1/2019/3 (2019).
3. International Committee of the Red Cross & Geneva Academy, *Autonomous Weapons Systems: Implications for International Humanitarian Law and the Role of the Martens Clause*, Expert Meeting Report (Geneva: ICRC, 2018).
4. International Committee of the Red Cross, *Working Paper on Autonomous Weapons and Human Control* (submitted to the CCW GGE on LAWS), UN Doc CCW/GGE.1/2020/WP.2 (2 October 2020).
5. United Nations Institute for Disarmament Research (UNIDIR), *Conference Summary: AI in the Military Domain (AIM)*, Geneva, 1–2 December 2021.

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