THINK 7
CANADA 2025

G7 2025
KANANASKIS

Policy Brief

Task Force 4: Global Peace and Security

# A Coordinated Tier System for Autonomous Weapon Systems


Authors:

Harsh Sharma

Kevin Kasa

Chloé Currie

Julia Messina-Pacheco

Louis-Alexandre Fournier

Matthew Taylor

Pahul Singh


April 2025

# Key Points

- Ethical and legal questions regarding accountability, humanitarian law compliance, and the preservation of human judgment in lethal decisions arise with the incorporation of artificial intelligence (AI) into military weapons. Addressing these gaps is critical for responsible governance.
- A harmonized policy framework adopted by the G7 with shared values and oversight mechanisms can catalyze broader global adoption, reduce the likelihood of arms races, and guide innovation.
- Autonomous Weapon Systems (AWS) vary in levels of autonomy. Nations require a standardized tier system to classify these levels, enabling consistent policy and risk evaluation.
- Policymakers can promote safer technological development by implementing a multi-level autonomy classification, introducing transparent oversight structures, and offering clear recommendations for mitigating risks.x

# Introduction

The rapid development of AI has transformed the nature of modern warfare (ICRC 2021). These systems can reduce personnel risk and increase military efficiency, but they raise alarm to potential violations of humanitarian principles, weakened human oversight, and an unregulated arms race among technologically advanced nations (Swan and Hovaness 2021).

An integrated and transparent tier system for AWS autonomy levels is crucial, particularly among leading technological powers. Although many governments have started developing or deploying systems with varying levels of autonomy, the lack of consistent definitions and international standards causes difficulty in maintaining clarity, accountability, and compliance with established norms such as international humanitarian law (IHL) (Boulanin and Verbruggen 2017).

The G7's role is pivotal, as its member states collectively influence global defence spending, innovation pathways, and non-proliferation regimes. By championing a unified standard, G7 members can demonstrate leadership that encourages imitation from other nations, setting a coherent regulatory framework that can prevent future dilemmas regarding accountability, ethical compliance, and potential miscalculations with catastrophic human cost (UNODA 2018).

The issue centers on balancing technological advancement with ethical responsibility. A standardized classification system - ranging from Level 0 (fully human-operated) to Level 5 (fully autonomous) - would provide a robust means of evaluating each system's degree of risk while also guiding policy in licensing, export controls, conflict engagement rules, and transparency measures.

# Relevant Facts

Breakthroughs in AI algorithms have enabled weapon systems to operate with decreasing levels of direct human control (Levine et al. 2016). Semi-autonomous drones, for instance, can autonomously navigate to preprogrammed targets, while more advanced land-based or naval systems can analyze large volumes of sensor data to identify potential threats (Scharre 2018). While impressive, the emergent possibility of deploying fully autonomous systems amplifies concerns around reliability and accountability (ICRC 2020).

AWS can be deployed in complex battle spaces, ranging from crowded urban centers to remote maritime domains, where the distinction between combatants and civilians may be unclear (Asaro 2013). Accidental targeting of civilian populations remains a concern, especially if oversight mechanisms are weak or absent, raising critical questions regarding AI’s ability to adhere to the principles of distinction, proportionality, and precaution during combat; core tenets of IHL (Gill and Fleck 2015).

While IHL provides a foundation for regulating conduct in armed conflict, it offers few explicit directives concerning fully autonomous weapon systems. Current treaty provisions, like the Geneva Conventions, presuppose human capacity to make judgments regarding lethal force. Emerging technologies challenge these legal assumptions, requiring supplementary frameworks or amendments to existing laws (CCW 2021). When humanity is reduced or removed altogether, assignment of legal responsibility for unlawful acts becomes ambiguous (Asaro 2013), as traditional command responsibility doctrines assume meaningful human control and are not well-suited to the complexities of AI-driven decision-making.

Arms-exporting nations see autonomous weapons as both a strategic advantage and a competitive edge in global defense markets (Swan and Hovaness 2021). Multiple countries have attempted to use AI to gain geopolitical dominance, as exemplified by the 2019 white paper released by the Chinese government outlining the intent to use AI as weaponry for the People’s Liberation Army (Csernatoni 2024). Rapid leaps in AI-driven technologies attract large investments due to perceived strategic advantages, and can overshadow ethical and humanitarian considerations (Roff and Moyes 2016).

Overall, the use of AI in military systems is potentially limitless. Applications include target recognition, strategic decision making, warfare systems, threat monitoring, and healthcare on the ground. Therefore, it is important to consider whether the use of AI under the pretext of counter-terrorism poses a threat to civil liberties in various nations when discussing the implementation of AWS.

# Options for Consideration

As AWS evolve at an unprecedented pace, it is crucial to explore regulatory frameworks that balance security, ethical considerations, and technological advancements in relation to policy responses. There are four principal options to consider, each with its own set of costs, benefits, and implications for international security and humanitarian norms.

## Strict Prohibition of Fully Autonomous Systems

One proposed approach involves imposing a strict prohibition on the development, deployment, or use of fully autonomous weapon systems. In practice, this would ban systems classified as Level 4 and Level 5 under the proposed tier system. Proponents argue that an absolute prohibition offers an unambiguous safeguard for moral and humanitarian considerations, ensuring lethal decisions remain firmly under human control (Asaro 2013). However, critics of this approach caution that it may create strategic vulnerabilities if other nations advance their autonomous capabilities unilaterally, leaving prohibiting states at a technological disadvantage (Swan and Hovaness 2021). Enforcing such a ban poses significant challenges. Dual-use research and technologies obscure the distinction between civilian AI applications and military systems, making it difficult to detect and penalize violations (Boulanin and Verbruggen 2017).

## Regulation Through Incremental Legislation

A second strategy is grounded in incremental legislation, building upon existing international treaties and norms to address the emerging complexities of AWS (Roff 2014). In this approach, new regulations would be gradually introduced, clearly defining "meaningful human control" and other operational parameters for each tier of autonomy (Asaro 2013). Incremental legislation aims to ensure accountability without stifling beneficial innovations, through transparency measures, verification protocols, and detailed record-keeping requirements (Swan and Hovaness 2021). Critics of this model warn that the absence of universal standards or enforcement tools could result in technicalities that allow states to pursue near-fully autonomous systems under the guise of research or marginal autonomy enhancements (Lewis 2016). Nonetheless, many experts view this approach as a pragmatic middle ground, offering a structured pathway to manage AI advances without imposing blanket restrictions (Asaro 2013).

## Moratorium and Further Research

A third option involves instituting a temporary moratorium on the development and deployment of advanced AWS while further studies and negotiations occur (UNIDIR 2018). By decelerating the "arms race" dynamic, a moratorium could foster more deliberate, inclusive debate, inviting stakeholder input from militaries, industry leaders, humanitarian organizations, and the general public. Despite these advantages, a moratorium's effectiveness depends largely on major powers' willingness to reduce autonomous weapons research (Human Rights Watch  2021). If one or more technologically advanced states abstain, the incentive for others to follow the moratorium diminishes substantially, eroding its utility.

## Industry Self-Regulation

A fourth option centers on self-regulation by the private sector, wherein defence contractors and tech firms voluntarily implement ethical guidelines for the development of AWS (Google 2024). This approach may include setting internal standards for permissible autonomy levels, incorporating diverse advisory boards (including ethicists and legal experts), and establishing transparent accountability measures (Roff 2014). Skeptics argue that corporate profit motives may, in practice, supersede ethical concerns, particularly when lucrative defence contracts are at stake (Asaro 2013). Self-regulation lacks robust enforcement mechanisms, as noncompliance carries few, if any, legal consequences.

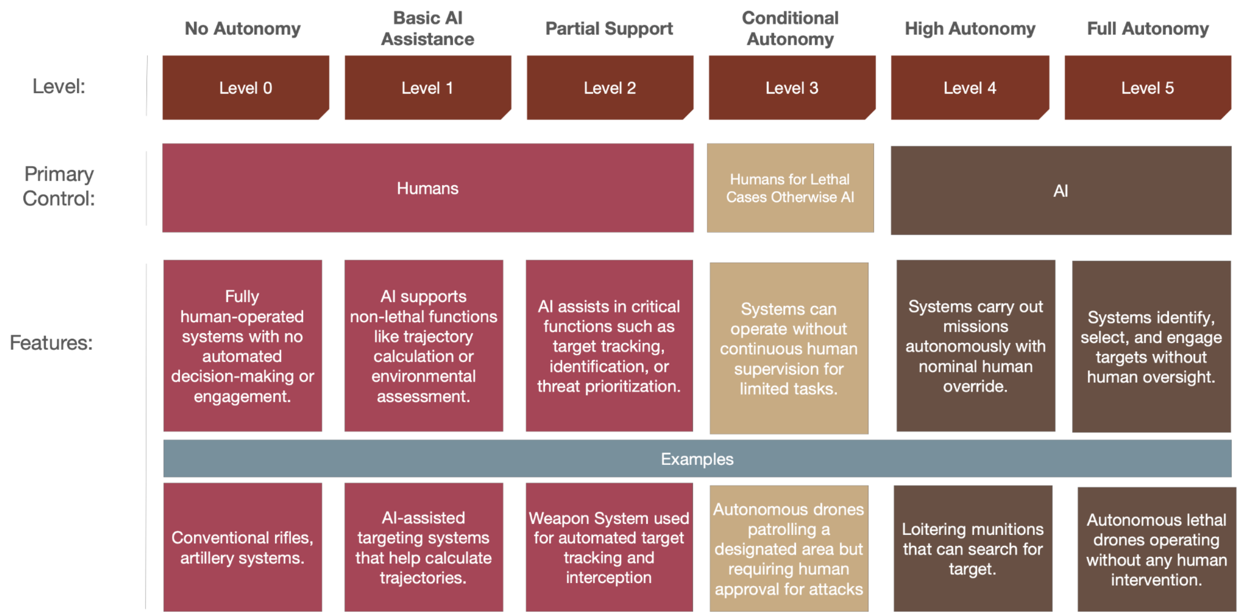
Overall, a coordinated strong-regulatory framework, with government-private sector collaboration, is the most promising path forward. Whether through national oversight, international treaties, tiered systems, or a complete ban, private industry compliance is essential for success. With its leadership in AI ethics, the G7 is well-positioned to guide AWS governance and shape its future.

# Recommendation

## Approach

A comprehensive strategy for governing AWS should begin with the adoption of a clearly defined tier system around which legislation, oversight mechanisms, and international agreements can be structured. *Figure 1* outlines six tiers - Levels 0 through 5 - along with corresponding features and examples for each. Tiers 0 - 3 require the majority of control to be in the hands of humans. This ensures that accountability remains clearly attributed to human operators, reducing the risk of unintended harm and aligning with established legal and ethical frameworks. By maintaining human oversight throughout the decision-making process, especially regarding lethal actions, these systems can provide a clear chain of responsibility.

Figure 1: Progression of military systems' autonomy from fully human-operated (Level 0) to fully autonomous AI systems (Level 5), highlighting the shift from human control to independent AI operation.




With Tiers 4 - 5, the level of human control is significantly reduced, raising concerns around ethics, legality, and safety. While some human oversight remains in Tier 4, it is mostly limited to override mechanisms or supervisory roles, which can be problematic if the system operates at speeds beyond human reaction time or if the override mechanisms prove ineffective. Tier 5, the highest level of autonomy, eliminates meaningful human control altogether, allowing AI systems to independently identify, select, and engage targets without direct human input.

By embedding these tiers within a framework, clear definitions and responsibilities across all stages of system design and operation can be set. This standardization would help governments, international bodies, and industry groups align on how to classify, regulate, and monitor these technologies. It also forms a shared foundation for any future agreements, ensuring the same reference to a scale of autonomy when determining acceptable levels of human oversight and machine decision-making as well as a shared vocabulary to categorize systems, helping nations discuss their military tools (Scharre 2018). Clarity of language makes it simpler to draft policies and laws that can keep pace with new AI-related developments and ensures greater cross-system collaboration.

A tiered framework can also guide research and development toward safer, more transparent designs. By labeling systems according to their level of autonomy, developers can focus on creating safeguards that match each tier.

## Importance of G7

The G7, composed of the world's largest advanced economies and democracies, holds significant geopolitical, economic, and technological influence. Its members collectively account for over 50% of global defense spending and lead in AI innovation, positioning them to set the norms that shape markets and international law (McGerty and Dewey 2025). The G7's strength lies in its members' shared democratic values, economic interdependence, and dominance in global defense innovation. Unlike broader forums such as the United Nations (UN), where consensus is often stymied by geopolitical rivalries, the G7's institutional cohesion enables swift, decisive action (Dempsey 2023). This positions the bloc to set norms that shape both markets and international law. By adopting a unified stance on AWS governance, such as a standardized autonomy tier system, the G7 can create a "gold standard" for responsible development.

There is a risk that since the G7 does not include major AWS developers, like China, Russia, and South Korea, it may undermine the framework's effectiveness. These states are actively pursuing AI-driven military systems, often with minimal transparency. A G7-led initiative risks creating strategic imbalances if adversarial states operate outside its rules. To prevent these strategic disadvantages, the G7 must adopt a dual strategy: *lead by example* and *expand the coalition.*

The G7's control over critical defense supply chains provides leverage. By managing the flow of key technologies, they can influence behavior without direct confrontation. For example, limiting access to high-performance chips essential for fully autonomous systems would force non-compliant players to choose between isolation or adherence.

The G7 should partner with middle powers such as South Korea, India, and Australia, which possess significant AI and defense capabilities, in order to improve the scope of AWS initiatives. Integrating these states into a "G7+" framework would amplify normative pressure on holdouts, and offering technology-sharing agreements or sanctions relief could motivate adversarial states to participate.

To ensure continued compliance, the G7 can establish robust monitoring mechanisms while collaborating with existing institutions:

1. A joint G7 body to audit member states' AWS programs, using intelligence-sharing and third-party audits (e.g., partnering with the International Committee of the Red Cross for IHL compliance). Non-compliant states would face sanctions, such as export bans on critical AI hardware.
2. Mandatory certification for defense contractors (requiring adherence to autonomy tiers) would ensure private-sector alignment. Legal liability frameworks, akin to the EU's proposed AI Liability Directive, could hold developers financially responsible for unlawful AWS deployments.

3. Integrating the tier system into NATO’s Responsible AI Initiative would harmonize military interoperability among allies.

Even without universal agreement, a G7-led framework offers significant benefits. By tying AWS development to ethical standards and norms, the G7 makes it more difficult for countries like China or Russia to legitimize unethical uses of these systems. Global stigmatization campaigns, much like those used against landmines, can isolate non-compliant states (ICBL-CMC 2018). Additionally, by restricting G7 supply chains to AWS that meet specific standards, adversarial states are forced to either adapt or lose access to advanced technology. A unified G7 also helps reduce competition within the group, which discourages reckless AI militarization and helps prevent arms races.

## Collaboration Across Forums

While the G7 can act independently, making a lasting difference requires collaboration with broader international forums. One significant challenge is breaking the UN’s deadlock on defining Lethal Autonomous Weapon Systems (LAWS). The current inadequacy regarding the definition of LAWS highlights the presence of a geopolitical stalemate. The G7 can address this by introducing its tier system as a draft protocol for the Convention on Certain Conventional Weapons (CCW). Clearly distinguishing between different levels of autonomy (like Level 3 versus Level 4) could enable negotiations between countries pushing for bans and those opposed to restrictions. Furthermore, using Track 1.5 dialogues where officials and experts meet through neutral platforms like the Stockholm International Peace Research Institute (SIPRI) could encourage conversations with China and Russia. By focusing on shared risks, such as the chance of accidental escalation in contested areas, the G7 might encourage cooperation.

Ultimately, the goal of this framework is to offer a clear and practical way to manage the risks around autonomous weapons. The current geopolitical climate makes it hard to bring every country onto the same page, with deep mistrust and competition slowing down any real agreement. Even within the G7, where members share many values, there are still real struggles when it comes to reaching full agreement on AWS. This is because military technology is seen as critical to national security, and countries may have different views on how much autonomy is acceptable or necessary to keep an advantage. Still, as tensions shift and conversations about arms control slowly open up, this framework can be built into those talks. It gives both like-minded allies and other states a simple, shared way to think about autonomy, which can help improve trust, lower misunderstandings, and make real collaboration more possible over time.

# Conclusion

AWS represents one of the most significant technological inflection points in modern warfare. They increase efficiency and reduce risk to military personnel, but raise serious ethical, humanitarian, and strategic concerns. Without proper regulation, AWS development risks eroding international law, public trust, and stability.

A coordinated tier system, championed by the G7, provides a practical solution by classifying AWS by autonomy level, thus enabling clear risk assessment, accountability, and compliance with international law. Despite challenges, such as national interests and enforcement complexities, an evidence-informed, collaborative approach can foster responsible innovation. A G7-led alliance that integrates robust oversight, mandatory safeguards, and global treaty-making efforts is crucial to ensure the rise of autonomous weapons does not diminish humanity's capacity for ethical judgment or jeopardize international security.

# Author Biographies

**Harsh Sharma**, a Software Engineering student at the University of Calgary, has a strong interest in technology and policy. He has worked with LinkedIn, Dropbox, and Demonware on distributed systems and microservices, and as an Engineering Project Manager for the Canadian Space Agency on the CanadaArm3 project. At university, he helped create a for-credit programming course through the Competitive Programming Club. As a member of the Chief Science Advisor's Youth Council, he advocates for policies that empower Canadian youth in technical innovation.

**Kevin Kasa**, a graduate researcher at the University of Guelph and Vector Institute, focuses on enhancing AI safety for critical applications. With a background in Aerospace Engineering from Toronto Metropolitan University, he has worked on robotics, satellite systems, biomedical AI, and Geo-intelligence. A co-founder of a startup developing autonomous VTOL aircraft, he is committed to translating research into real-world impact and advancing opportunities for Canadian youth in research and entrepreneurship.

**Chloé Currie** holds a bachelor's degree in history from the University of Edinburgh and a Master of International Public Policy from the Balsillie School of International Affairs, specializing in human security and environmental policy with a focus on artificial intelligence ethics. As Director of Content for Encode Justice Canada, she researched AI's ethical implications. Now a Consultant at Santis Health, she combines her interests in government, health, and AI in healthcare and is a member of the Chief Science Advisor's Youth Council.

**Julia Messina-Pacheco**, a Ph.D. candidate in Pathology at McGill University, researches pancreatic cancer, focusing on cellular and molecular events leading to malignancy. She is a recipient of the Fonds de recherche de Québec – Santé doctoral scholarship. As a board member at Science & Policy Exchange, she bridges science, policy, and society. On the CSA-YC, she aims to amplify young researchers' voices and address issues affecting the next generation of scientists.

**Louis-Alexandre Fournier**, a cancer biologist and PhD candidate in Interdisciplinary Oncology at UBC, researching cancer cell vulnerabilities using CRISPR to advance treatment options. Originally from Quebec City, he earned a BSc in Microbiology and Immunology from McGill University, where his interest in DNA protection began. An active participant in student organizations and a skilled science communicator, he has received prestigious awards, including CIHR scholarships and the UBC Four Year Doctoral Fellowship.

**Matthew Taylor**, a PhD in Interdisciplinary Studies student at the University of Saskatchewan, shifted his area of focus from oil and gas to water and the environment after learning about water insecurity in Indigenous communities in Canada. As an engineer-in-training at Ensero Solutions, he tackles water treatment and environmental issues. His research examines decision-making for drinking water infrastructure, aiming to make processes more inclusive and culturally sensitive for First Nations.

**Pahul Singh**, an undergraduate Biomedical Sciences student at the University of Saskatchewan, has already published research on ATPase and lung inflammation and earned an NSERC Undergraduate Research Award to work at the Vaccine and Infectious Disease Organization. He volunteers to support food security through local initiatives and excels in competitive Rubik's cube solving, ranking among the top 100 globally in 6x6x6. A skilled debater, he has represented his province at Canadian Nationals multiple times.

# Works Cited

Asaro, Peter. 2013. "On banning autonomous weapon systems: human rights, automation, and the dehumanization of lethal decision-making." *International Review of the Red Cross* International Review of the Red Cross 94 (886): 687–709. DOI: 10.1017/S1816383112000768

Boulanin, Vincent, and Maaike Verbruggen. 2017. *Mapping the Development of Autonomy in Weapon Systems*. Stockholm: Stockholm International Peace Research Institute.

Convention on Certain Conventional Weapons. 2021. "Report of the 2021 Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems." Report, February. https://documents.un.org/doc/undoc/gen/g22/264/50/pdf/g2226450.pdf.

Csernatoni, Raluca. 2024. "Governing Military AI amid a Geopolitical Minefield." *Carnegie Endowment for International Peace* (blog). July 17. https://carnegieendowment.org/research/2024/07/governing-military-ai-amid-a-geopolitical-minefield.

Dempsey, Judy. 2023. "Judy Asks: Is the United Nations Still Fit for Purpose?" *Carnegie Endowment for International Peace* (blog). September 21. https://carnegieendowment.org/europe/strategic-europe/2023/09/judy-asks-is-the-united-nations-still-fit-for-purpose.

Gill, Terry, and Dieter Fleck. 2015. *The Handbook of the International Law of Military Operations*. Oxford: Oxford University Press.

Google. 2024. "Artificial Intelligence at Google: Our Principles." Website. https://ai.google/responsibility/principles/.

Human Rights Watch. 2021. *Killer Robots: Military Powers Stymie Ban But Momentum for New Treaty on Autonomous Weapons is Growing*. Geneva, CH: Human Rights Watch. https://www.hrw.org/news/2021/12/19/killer-robots-military-powers-stymie-ban.

ICRC. 2020. "Autonomous Weapon Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons." Geneva, CH: International Committee of the Red Cross. https://www.icrc.org/en/publication/4283-autonomous-weapons-systems.

ICRC. 2021. "ICRC commentary on the 'Guiding Principles' of the CCW GGE on 'Lethal Autonomous Weapons Systems'." Geneva, CH: International Committee of the Red Cross. https://documents.unoda.org/wp-content/uploads/2020/07/20200716-ICRC.pdf.

ICBL-CMC. 2018. "International Campaign to Ban Landmines-Cluster Munition Coalition Annual Report 2018." Global Conventional Weapons Destruction Repository. 1501. https://commons.lib.jmu.edu/cisr-globalcwd/1501.

Levine, Sergey, Chelsea Finn, Trevor Darrell, and Pieter Abbeel. 2016. "End-to-End Training of Deep Visuomotor Policies." *Journal of Machine Learning Research* 17 (39): 1–40. DOI: 10.48550/arXiv.1504.00702.

Lewis, Dustin. 2016. "War-Algorithm Accountability." *Harvard Law School Program on International Law and Armed Conflict*.

McGerty, Fenella and Karl Dewey. 2025. "Global defence spending soars to new high." International Institute for Strategic Studies (blog). February 12. https://www.iiss.org/online-analysis/military-balance/2025/02/global-defence-spending-soars-to-new-high.

Roff, Heather M. 2014. "The Strategic Robot Problem: Lethal Autonomous Weapons in War." *Journal of Military Ethics* 13 (3): 211-227. DOI:10.1080/15027570.2014.975010.

Roff, Heather, and Richard Moyes. 2016. "Meaningful Human Control, Artificial Intelligence and Autonomous Weapons." Article 36 Briefing Paper, Article 36. https://article36.org/wp-content/uploads/2016/04/MHC-AI-and-AWS-FINAL.pdf.

Scharre, Paul. 2018. *Army of None: Autonomous Weapons and the Future of War*. New York: W. W. Norton.

Swan, Ryan R. and Haig Hovaness. 2021. "The arms race in emerging technologies: A critical perspective". London: European Leadership Network. https://europeanleadershipnetwork.org/commentary/the-arms-race-in-emerging-technologies-a-critical-perspective/.

UNIDIR. 2018. "The Weaponization of Increasingly Autonomous Technologies." Geneva, CH: United Nations. https://unidir.org/publication/the-weaponization-of-increasingly-autonomous-technologies-artificial-intelligence/.

UNODA. 2018. Securing Our Common Future: An Agenda for Disarmament. Geneva, CH: United Nations. https://disarmament.unoda.org/publications/more/securing-our-common-future/

US DOD. 2023. "Directive 3000.09: Autonomy in Weapon Systems." Washington, DC: U.S. Department of Defense. https://www.esd.whs.mil/portals/54/documents/dd/issuances/dodd/300009p.pdf.