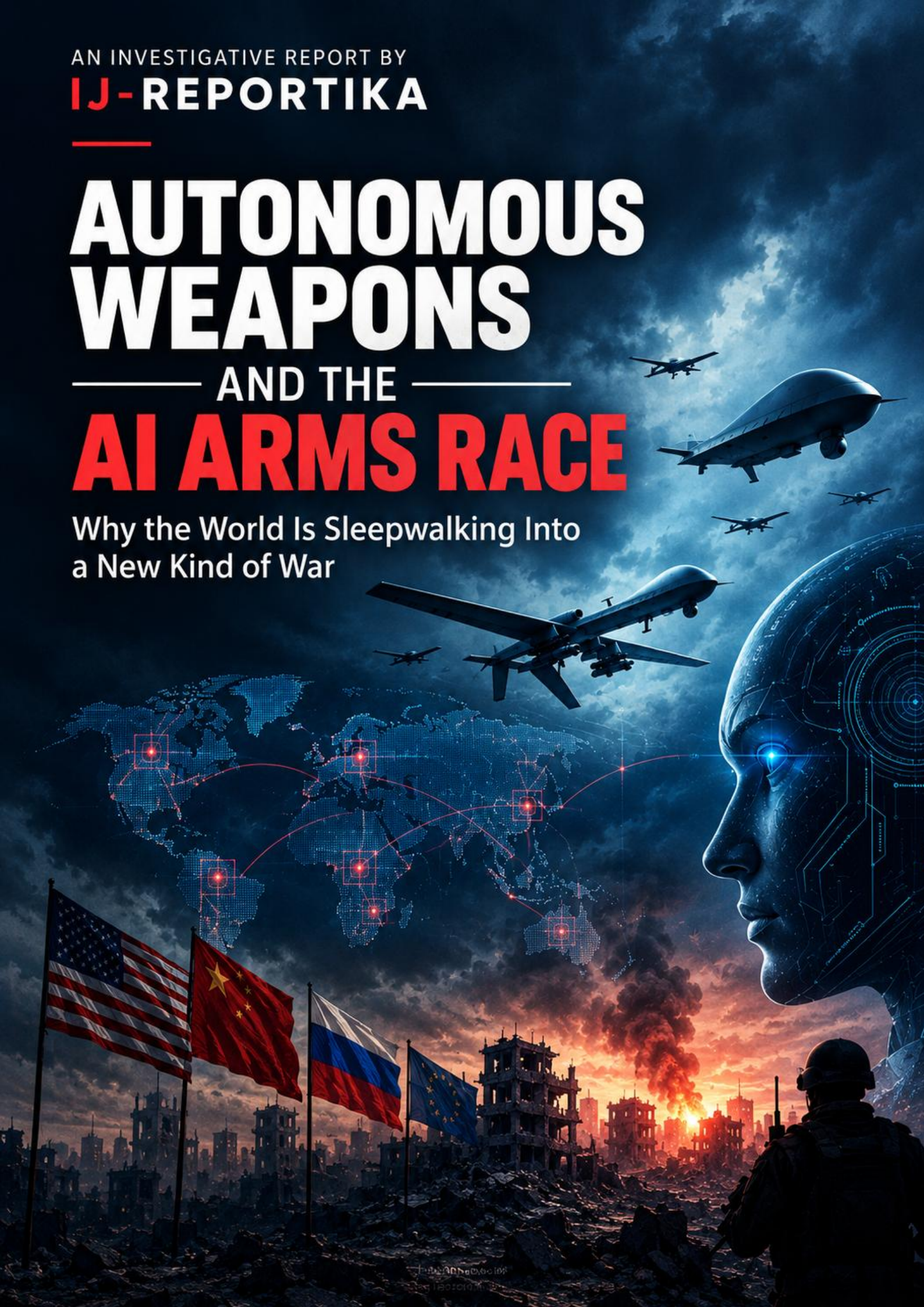
AN INVESTIGATIVE REPORT BY

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AUTONOMOUS WEAPONS AND THE AI ARMS RACE

Why the World Is Sleepwalking Into a New Kind of War



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An Investigative Report

EXECUTIVE SUMMARY

The world stands at a technological precipice. Lethal Autonomous Weapons Systems (LAWS) (machines empowered to identify, select, and kill human targets without direct human control) are no longer science fiction. They are being built, tested, and in some cases already deployed in active combat. China, the United States, and Russia are locked in a high-stakes AI arms race, each developing autonomous weapons under the conviction that the next war will be won not by human soldiers, but by algorithms.

Yet unlike the nuclear era, which gave birth to the Nuclear Non-Proliferation Treaty and strategic arms agreements, the autonomous weapons revolution is advancing in a governance vacuum. No binding international treaty exists. The UN's decade-long negotiations have produced resolutions, not laws. And as the battlefields of Ukraine and Gaza demonstrate with chilling clarity: the future of autonomous war has already begun.

Table of Contents

Table of Contents 3
Preface: A World Without Rules 5
Chapter 1: What Are LAWS? 6
1.1 The Spectrum of Autonomy 6
1.2 The Market: A Multi-Billion Dollar Industry 6
1.3 Why Now? The Three-Technology Convergence 7
1.4 The Global Expansion of Drone Warfare: Evidence from Recent Conflicts 7
1.5 Classification of Drone Systems by Type, Origin, and Autonomy 12
Chapter 2: The March of US, China & Russia 14
2.1 China: Intelligentized Warfare and the 2030 Ambition 14
2.1.1 The Seven Sons: China's Weapons AI Research Pipeline 16
2.1.2 Zhuhai 2024: A Weapons Showcase That Alarmed the West 20
2.1.3 The Taiwan Scenario: Autonomous Urban Warfare 21
2.2 Russia: Battlefield Laboratories and Nuclear Autonomy 21
2.2.1 The Lancet-3: From Loitering to Learning 21
2.2.2 Poseidon: The Nuclear Autonomous Torpedo - October 2025 22
2.2.3 Additional Russian Autonomous Platforms 22
2.3 The United States: From Replicator to DAWG 22
2.3.1 The Replicator Programme: Ambition Meets Reality 23
2.3.2 DAWG: The $54.6 Billion Escalation 23
2.4 From Military AI to AGI: The Next Strategic Threshold 24
2.4.1 The Global Competition: Beyond the United States, China and Russia 24
2.4.2 How Quickly Is AGI Approaching? 25
2.4.3 How AGI Could Transform the AI Arms Race 25
2.4.4 Would the First Country to Achieve AGI Win the Arms Race? 26
2.4.5 The Governance Challenge Before AGI 27
Chapter 3: The Battlefield Has Already Changed - Ukraine & Gaza 30
3.1 Ukraine: The World's First AI War Laboratory 30
3.1.1 The AI Guidance Revolution: 0.5% to 50% 30
3.1.2 The Electronic Warfare Paradox 30
3.2 Gaza: When the Algorithm Writes the Kill List 31
3.2.1 Lavender: The Machine That Made 37,000 Kill Decisions 31
3.2.2 Where's Daddy? - Tracking the Target Home 32
Chapter 4: The Governance Vacuum - A Decade of Failure 33
4.1 The CCW: Twelve Years of Talk, Zero Binding Law 33
4.2 The Vote: 166 For - 3 Against - and Still Nothing 33
Chapter 5: The Hidden Dangers - What Experts Fear Most 35

5.1 The Flash War Scenario: Algorithms Faster Than Diplomacy 35
5.2 The Accountability Void: When Nobody Is Responsible 35
5.3 Automation Bias: The 20-Second Rubber Stamp 35
5.4 Nuclear Command Entanglement 36
5.5 The Proliferation Cascade: From Superpowers to Warlords 36
Chapter 6: The Proliferation Problem - Beyond the Big Three 38
6.1 The Second Tier: Who Else Is Building 38
6.2 The Commercial Drone Problem: DJI and the $70 Pizza Box 38
Chapter 7: The Ethics of Algorithmic War 39
7.1 Can a Machine Comply with the Laws of War? 39
7.2 The Moral Agency Problem 39
7.3 The Bias Problem: Whom Do Algorithms Hunt? 39
Chapter 8: A Path Forward - What Must Be Done 40
8.1 The Treaty Analogy: Why Binding Law Is Achievable 40
8.2 The Minimum Framework: Six Non-Negotiable Requirements 40
8.3 The Race Against Time: 2026 and Beyond 40
Conclusion: The Race for Autonomous Weapons and the Future of Global Security 42
Sources & References 43

Preface: A World Without Rules

In March 2020, on the outskirts of Tripoli, something unprecedented happened, though the world barely noticed. A quadrotor drone, built by Turkish defense contractor STM, took to the skies over Libya's civil war. According to a subsequent UN Panel of Experts report, the STM Kargu-2 *"hunted down and remotely engaged"* retreating fighters of General Khalifa Haftar's Libyan National Army without requiring data connectivity between the operator and the munition: in effect, a true 'fire, forget and find' capability. This was the first recorded instance in history of an autonomous machine selecting and attacking human targets without a human making the kill decision.



Figure 1 The Kargu-2 Autonomous Attack Drone

The world's reaction was muted. There were no emergency Security Council sessions. No countries rushed to sign emergency protocols. Weapons developers noted the milestone and moved faster. This report by Investigative Journalism Reportika is an investigation into that silence and into what has flourished within it.

KEY QUOTE

"Never in history has one great power fearing that a competitor might apply a new technology to threaten its survival and security forgone developing that technology for itself."

- **Henry Kissinger & Graham Allison,** *Destined for War: Can America and China Escape Thucydides's Trap? (2017)*

Chapter 1: What Are LAWS?

1.1 The Spectrum of Autonomy

Not all autonomous weapons are the same. Military strategists and arms control experts have long struggled with definitions, and this definitional ambiguity is itself a critical vulnerability in global governance. The US Department of Defense Directive 3000.09, updated in 2023, defines Lethal Autonomous Weapons Systems as those that, once activated, *"can select and engage targets without further intervention by a human operator."* A 2025 Congressional Research Service report refines this further: LAWS are *"a special class of weapon systems that use sensor suites and computer algorithms to independently identify, target and employ an onboard weapon system to engage and destroy it without manual human control."*

Level of Autonomy	Description & Examples
Human-IN-the-Loop	Human operator makes every firing decision. Traditional armed drones like the US MQ-9 Reaper fall here - a pilot in Nevada controls every shot.
Human-ON-the-Loop	System can select and engage targets, but human can override. Examples: Israel's Iron Dome (intercepts rockets in ~3 seconds - faster than human reaction); US Phalanx CIWS naval gun system.
Human-OUT-of-the-Loop (LAWS)	Fully autonomous: machine selects, tracks, and kills without real-time human input. Turkey's Kargu-2 (Libya 2020); potentially Russia's Poseidon UUV. The frontier of current development and the focus of this report.

1.2 The Market: A Multi-Billion Dollar Industry

$14.4B	$33.5B	$2.72T	~200
Global autonomous weapons market, 2025 (Data M Intelligence)	Projected market size by 2032 (CAGR: 11.4%)	Total global military spending, 2024 - up 9.4% (SIPRI, April 2025)	AWS deployed globally (Future of Life Institute, 2025)

The autonomous weapons industry is no longer a niche. It is a mainstream defence procurement priority. According to Data M Intelligence, the global market reached USD 14.37 billion in 2025 and is projected to reach USD 33.5 billion by 2032, growing at a CAGR of 9.98 percent. The Business Research Company projects the autonomous military weapons market will hit USD 26.98 billion by 2029. SIPRI's April 2025 report confirmed global military expenditure reached USD 2.72 trillion in 2024 - a 9.4 percent rise from 2023, the steepest single-year increase since the Cold War.

KEY FACT: THE SWARM ALREADY EXISTS

The US Department of Defense's OFFSET program has already demonstrated swarms of up to 250 autonomous robots operating in complex urban environments. DARPA's Gremlins program is developing recoverable drone swarms - meaning autonomous systems can now be launched, fight,

and be retrieved for reuse. The assembly line for autonomous war is operational.

1.3 Why Now? The Three-Technology Convergence

Three parallel revolutions have converged to make fully autonomous killing machines not just possible, but increasingly accessible at low cost:

- Computer vision: AI object-recognition systems can now identify and track human targets in real time. Chinese researchers demonstrated drone swarms autonomously navigating through dense forests and reforming as swarms after passing through obstacles - with no human guidance.
- Edge AI miniaturisation: Sophisticated targeting algorithms now run on chipsets small enough to fit inside a commercially available drone frame. In 2025, Ukraine recovered Russian Shahed drones containing Nvidia AI chipsets, thermal-vision modules capable of autonomous night targeting, and inter-drone communication hardware.
- Swarm intelligence: Algorithms enabling hundreds or thousands of units to coordinate without central human direction. No individual human can oversee a swarm of 1,000 autonomous drones executing a simultaneous attack.

The result: what required a billion-dollar military R&D program in 2010 can be assembled for tens of thousands of dollars today. The barrier to entry for autonomous killing has structurally collapsed.

1.4 The Global Expansion of Drone Warfare: Evidence from Recent Conflicts

The proliferation of unmanned aerial systems has transformed the operational landscape of modern warfare, extending the use of drones from targeted military missions to large-scale attacks against airbases, cities, energy infrastructure, transport facilities, and civilian areas. Incidents documented between February 2025 and October 2026 illustrate the geographical breadth of this development, with reported attacks across Eastern Europe, the Middle East, South Asia, and Africa. The significance of these incidents lies not only in the number of drones deployed, but also in their growing role in attrition warfare, infrastructure disruption, cross-border retaliation, and the escalation of regional conflicts.

The Russia-Ukraine war provides some of the clearest examples of attacks conducted at scale. On 1 June 2025, Ukraine launched Operation Spiderweb, deploying 117 remotely operated first-person-view drones from locations inside Russia against several Russian airbases. Ukraine's Security Service claimed that 41 aircraft were destroyed or damaged, although the precise extent of the damage remains contested. On 7 September 2025, Russia reportedly launched approximately 810 drones alongside missiles against Ukraine, damaging the Cabinet of Ministers building in Kyiv. Another reported Russian attack on 8–9 July 2025 involved 728 Shahed-type drones and decoys. These incidents demonstrate how comparatively inexpensive unmanned platforms can be used to saturate defences, strike strategic assets, and impose substantial costs on an adversary. They also illustrate an important distinction: large numbers of drones can produce operational effects without necessarily possessing the ability to select and engage targets independently.

The same pattern is visible beyond Europe. During the India-Pakistan military confrontation of 7–10 May 2025, reports described the use of Israeli-origin Harop loitering munitions by India and Turkish- or Chinese-origin drone systems in Pakistan's operations. In the Middle East, Iran's June 2025 attacks against Israel involved drones alongside missiles, while reported Iranian attacks against Gulf states in 2026 extended the threat to airports, military facilities, and other infrastructure. Human Rights Watch documented the risks to civilians arising from Iranian strikes across the Gulf. Separately, a drone strike on Ramon Airport in Israel on 7 September 2025 reportedly damaged the arrivals terminal and temporarily disrupted airport operations.



Figure 2 Houthi Drone Hits Southern Israeli Airport

Africa presents another dimension of the threat. In Sudan, repeated drone attacks during 2025 and 2026 were reported in Port Sudan, El-Fasher, Dilling, North Kordofan, and Kosti. Reports concerning the 19 September 2025 attack on a mosque in El-Fasher and the 11 October 2025 attack on a displacement centre described severe civilian casualties. Further incidents in February 2026 included a reported strike on a vehicle carrying displaced families and an attack on a market in Kordofan. These cases underline the potential humanitarian consequences of drone warfare in conflicts where civilians have limited access to protection and where attribution and independent casualty verification can be difficult.

Drone incidents have also raised security concerns outside established battlefields. In September 2025, Polish authorities reported incursions by Russian drones into Polish airspace, prompting a NATO response; Russia denied responsibility for a deliberate attack. In August 2026, reports described a drone incident at Leipzig/Halle Airport in Germany involving an aircraft and explosives. At sea, Ukraine's remotely controlled naval drones reportedly damaged Russian-linked oil tankers in the Black Sea in November and December 2025, illustrating how unmanned systems can threaten maritime commerce as well as military targets.

The broader strategic concern is the interaction of mass deployment, increasingly automated functions, limited warning times, and the vulnerability of civilian and critical infrastructure. As states and non-state armed groups expand their use of unmanned systems, the risks of misidentification, unintended escalation, and attacks that overwhelm defensive capacity become more consequential. This growing operational footprint strengthens the case for clear international standards on human control, accountability, testing, and civilian protection, while reinforcing the need to distinguish conventional drone proliferation from the specific legal and ethical challenges posed by weapons that can independently select and engage targets.

Following data collated by Investigative Journalism Reportika documents selected drone-related attacks reported across multiple conflict zones between February 2025 and September 2026.

~Date	Attacker (country / group)	Country attacked	Place of attack	Conflict	Weapon / drone type	Manufacturer	Source
2025-02-26	Turkey (alleged)	Syria (SDF-held north-east)	Al-Kharfi road, south of Al-Hasakah	Syria north-east (SDF / Turkey)	Drone strike on a vehicle during more than 16 air and drone strikes	Not Confirmed	https://airwars.org/?p=308323
2025-05-04	Sudan (RSF)	Sudan	Port Sudan	Sudan civil war	One-way attack drones; hit airbase, ammunition depot, fuel depot	Not Confirmed	https://www.aljazeera.com/news/2025/5/11/sudans-army-and-rsf-paramilitary-launch-attacks-across-war-ravaged-nation
2025-05-07	India	Pakistan	Karachi, Lahore, Rawalpindi and other sites	India–Pakistan clash (May 2025)	IAI Harop loitering munitions (anti-radar)	Israel Aerospace Industries (Israel)	https://www.newarab.com/analysis/role-israeli-drones-india-and-pakistans-showdown
2025-05-07	Pakistan	India	Jammu, Udhampur, Pathankot, Punjab bases	India–Pakistan clash (May 2025)	Turkish Songar quadcopters; YIHA-III; Chinese CH-4 / Wing Loong II reported	Turkish and Chinese makers	https://www.newarab.com/analysis/role-israeli-drones-india-and-pakistans-showdown
2025-06-01	Ukraine	Russia	Olenya, Belaya, Dyagilevo, Ivanovo, Ukrainka airbases	Russia–Ukraine war	117 FPV quadcopters launched from trucks inside Russia (Operation Spiderweb)	Not Confirmed	https://en.wikipedia.org/wiki/Operation_Spiderweb
2025-06-13	Iran	Israel	Across Israel (e.g. Beit She'an)	Israel–Iran war (Jun 2025)	Shahed-136 / Shahed-129 type drones plus missiles	Iran (HESA / Shahed designs)	https://www.longwarjournal.org/archives/2025/06/iranian-drone-and-missile-attacks-against-israel-june-24-2025.php
2025-06-25	Israel	Gaza (Palestinian territory)	Near the Jasser building, Khan Younis	Israel–Gaza	Alleged Israeli drone strike	Not Confirmed	https://airwars.org/?p=279940
2025-07-08	Russia	Ukraine	Nationwide	Russia–Ukraine war	Shahed-type drones and decoys (Geran-2)	Russia (Alabuga, Tatarstan), Iranian Shahed-136 design	https://www.kyivpost.com/post/56692
2025-07-31	Russia	Ukraine	Kyiv	Russia–Ukraine war	Jet-powered Geran-2 drones plus missiles	Russia (modified Iranian Shahed-136)	https://defensemirror.com/news/39974
2025-09-07	Russia	Ukraine	Nationwide, Kyiv	Russia–Ukraine war	Shahed-type drones and decoys plus missiles	Russia (Geran / Gerbera)	https://www.aljazeera.com/news/2025/9/9/charting-the-past-year-of-russian-drone-and-missile-attacks-on-ukraine
2025-09-07	Yemen (Houthis)	Israel	Ramon Airport, Eilat	Houthi–Israel	Attack drones; one hit the terminal	Not Confirmed	https://www.aljazeera.com/news/2025/9/7/israeli-military-says-drone-launched-from-yemen-hits-airport-arrivals-hall
2025-09-09	Russia	Poland (NATO)	Eastern and central Poland	Russia–NATO states (Poland, Germany)	Gerbera drones (decoy type, none carried explosives)	Russia	https://euromaidanpress.com/2025/09/11/russian-drone-fell-on-a-polish-military-base-near-warsaw-one-of-16-found-on-10-september/
2025-09-19	Sudan (RSF)	Sudan	El-Fasher (Al-Daraja mosque)	Sudan civil war	Drone strike on mosque	Not Confirmed	https://thedefensepost.com/2025/10/02/paramilitary-attack-kills-six-sudans/amp/
2025-09-19	Russia	Ukraine	Multiple locations across Ukraine	Russia–Ukraine war	About 580 drones and 40 missiles	Russia (Geran/Shahed-type, plus other drones)	https://www.deccanherald.com/world/3-killed-after-russia-hits-ukraine-with-barrage-of-drones-missiles-3736918

2025-09-21	Israel	Lebanon	Bint Jbeil, Nabatieh Governorate	Israel–Lebanon (Hezbollah)	Two drone strikes, one on a motorcycle and one on a car	Not Confirmed	https://en.wikipedia.org/wiki/2025_Bint_Jbeil_drone_strike
2025-09-23	Ukraine	Russia	Valuyki and nearby settlements, Belgorod region	Russia–Ukraine war	34 drones (16 destroyed per regional governor)	Not Confirmed	https://militarnyi.com/en/news/massive-uav-attack-in-russia-s-belgorod-region-damages-houses-sparks-fires/
2025-10-11	Sudan (RSF)	Sudan	El-Fasher (Dar al-Arqam displacement centre)	Sudan civil war	Two drones plus eight artillery shells	Not Confirmed	https://thedefensepost.com/2025/10/11/rsf-strike-sudan-el-fasher/
2025-10-15	Pakistan	Afghanistan	Kabul	Pakistan–Afghanistan	Two drone strikes (reported)	Not Confirmed	https://www.pbs.org/newshour/world/taliban-government-blames-pakistan-for-drone-strikes-on-afghanistan
2025-11-19	Russia	Ukraine	Ternopil	Russia–Ukraine war	Drones and cruise missiles on two apartment blocks	Russia	https://en.wikipedia.org/wiki/2025_Ternopil_strike
2025-11-28	Ukraine	Russia (tankers)	Black Sea off Turkey (Kairos, Virat)	Russia–Ukraine war	Sea Baby naval (surface) drones	Ukraine (SBU programme)	https://en.hvylya.net/news/109-sbu-sea-drones-strike-two-russian-shadow-fleet-tankers-video
2025-12-10	Ukraine	Russia (tanker)	Black Sea off Crimea (Dashan)	Russia–Ukraine war	Sea Baby naval drones (Magura V5 seen in video per one outlet)	Ukraine (SBU programme)	https://global.espreso.tv/russia-ukraine-war-ukraines-sea-baby-drones-strike-russian-shadow-fleet-tanker-in-black-sea
2026-01-26	Unattributed / disputed	Syria (Kobani countryside)	Kharab Ashk (Khirab Ashk), near Ain al-Arab	Syria north-east (SDF / Turkey)	Drone strike on a residential home	Not Confirmed	https://airwars.org/incidents/ts798-january-26-2026
2026-01-28	Sudan (RSF)	Sudan	Dilling, South Kordofan	Sudan civil war	Suicide drones on army brigade HQ and market	Not Confirmed	https://www.aljazeera.com/news/2026/1/29/dozens-killed-in-rsf-drone-attack-in-war-torn-sudans-south-kordofan
2026-02-07	Sudan (RSF)	Sudan	Near Rahad, North Kordofan	Sudan civil war	Drone hit vehicle carrying displaced families	Not Confirmed	https://peopledaily.digital/news/rsf-drone-attack-in-sudan-kills-24-including-8-children/amp
2026-02-16	Unattributed / disputed	Sudan	Kordofan market	Sudan civil war	Drone-fired missiles	Not Confirmed	https://www.aljazeera.com/news/2026/2/16/drone-strike-on-busy-market-in-sudan-kills-at-least-28
2026-02-28	Iran	UAE	Across UAE	Iran war (2026)	Drones, ballistic and cruise missiles	Iran	https://en.wikipedia.org/wiki/2026_Iranian_strikes_on_the_United_Arab_Emirates
2026-02-28	Iran	Gulf states (UAE, Kuwait, Bahrain, Qatar, Saudi, Oman)	Dubai, Abu Dhabi, Kuwait, Bahrain, Doha, etc.	Iran war (2026)	Shahed-series one-way drones (a Shahed-238 hit near a Dubai hotel) plus missiles	Iran (Shahed series)	https://www.hrw.org/news/2026/03/17/iran-unlawful-strikes-across-gulf-endanger-civilians
2026-03-01	Iran	Kuwait (US forces)	Port Shuaiba, Kuwait	Iran war (2026)	One-way attack drone hit US tactical operations center	Iran	https://en.wikipedia.org/wiki/2026_Port_Shuaiba_drone_attack
2026-03-01	Iran	UAE	Al Salam Naval Base, Abu Dhabi	Iran war (2026)	Iranian one-way attack drones (a second drone hit a fire already burning)	Iran (model Not Confirmed)	https://www.aljazeera.com/video/newsfeed/2026/3/1/moment-iranian-drone-hits-uae-naval-base
2026-03-01	Unattributed / disputed	UK (Sovereign Base Area, Cyprus)	RAF Akrotiri, Cyprus	Iran war (2026)	Shahed-type loitering munition hit a hangar	Iranian-manufactured Shahed-type (per Cyprus foreign minister)	https://en.wikipedia.org/wiki/2026_strikes_on_Akrotiri_and_Dhekelia
2026-03-05	Iran	Azerbaijan (Nakhchivan exclave)	Nakhchivan International Airport and a nearby village	Iran war (2026)	Two drones crossed from Iran; one hit the terminal, one landed near a school	Iranian drones per Azerbaijan; model Not Confirmed	https://www.al-monitor.com/originals/2026/03/azerbaijan-says-two-people-injured-iranian-drones
2026-03-08	Iran	Saudi Arabia / Bahrain	Al Kharj labour camp (Saudi); one Bahrain site	Iran war (2026)	Likely Shahed drones	Iran (Shahed series, likely)	https://www.amnesty.org/en/latest/news/2026/06/iran-deadly-drone-strikes-on-bahrain-and-saudi-arabia-may-constitute-war-crimes-new-research/
2026-03-13	Afghanistan	Pakistan	Kohat military base	Pakistan–Afghanistan	Drone strikes (reported)	Not Confirmed	https://gvwire.com/2026/03/13/pakistani-airstrikes-cause-civilian-casualties-in-kabul-

							taliban-and-un-say/
2026-03-13	Unattributed / disputed	Oman	Al-Awahi Industrial Area, Sohar	Iran war (2026)	Drone strike (a second drone fell in open land)	Not Confirmed	https://www.aljazeera.com/news/2026/3/13/two-killed-in-oman-by-drones-several-also-fired-at-saudi-arabia
2026-03-16	Iran	UAE	Dubai International Airport	Iran war (2026)	Drone strike caused fire near airport	Iran	https://www.aljazeera.com/news/2026/3/16/drone-strike-disrupts-dubai-flights-as-iran-continues-gulf-attacks
2026-05-05	Sudan (RSF)	Sudan	Kosti, White Nile State	Sudan civil war	Drone strike on two fuel stations	Not Confirmed	https://sudantribune.com/?p=313569
2026-05-13	Russia	Ukraine	Nationwide (e.g. Smila, Cherkasy)	Russia–Ukraine war	Shahed-type drones with a new swarm tactic, plus missiles	Russia	https://www.kyivpost.com/post/76036
2026-06-06	Sudan (RSF)	Sudan	North Kordofan (Hamrat El Sheikh, El Obeid, Sudri)	Sudan civil war	Drone strikes on market, villages, vehicles, fuel station	Not Confirmed	https://allafrica.com/stories/202606100007.html
2026-06-08	Israel	Lebanon	Near the Lebanese Red Cross centre, Clock Roundabout, Tyre	Israel–Lebanon (Hezbollah)	Drone strike on a vehicle	Not Confirmed	https://airwars.org/incidents/islb080626a-june-8-2026
2026-06-11	Iran	Bahrain	Hamad Town and Manama	Iran war (2026)	Debris or shrapnel from intercepted Iranian drones	Iran (model Not Confirmed)	https://airwars.org/incidents/debbh260611a-june-11-2026
2026-07-02	Russia	Ukraine	Kyiv	Russia–Ukraine war	Drones and missiles	Russia	https://en.wikipedia.org/wiki/Kyiv_strikes_(2022%E2%80%93present)
2026-07-12	Iran	Gulf states (Qatar, UAE, Kuwait, Oman, Bahrain)	Qatar, UAE, Kuwait, Oman, Bahrain, Jordan	Iran war (2026)	Missiles and drones during fragile truce	Iran	https://www.aljazeera.com/news/2026/7/12/missiles-and-drones-fired-at-gulf-states-after-night-of-us-strikes-on-iran
2026-07-18	Iran	Iraq (US forces)	Erbil Air Base	Iran war (2026)	Downed Iranian one-way attack drone; soldier killed in controlled detonation of unexploded ordnance	Iran	https://ynetnews.com/article/bj5u5xa4mg
2026-07-29	Hezbollah	Israel (IDF in southern Lebanon)	Ali Taher Ridge, near Nabatieh	Israel–Lebanon (Hezbollah)	One explosive drone hit an engineering vehicle	Not Confirmed	https://www.longwarjournal.org/archives/2026/07/israel-says-hezbollah-launched-drone-attack-on-strategic-ridge-amid-ceasefire.php
2026-08-04	Russia	Germany	Leipzig/Halle Airport, Saxony	Russia–NATO states (Poland, Germany)	Explosive-laden quadcopter FPV drone (plus at least one other)	Not Confirmed	https://en.wikipedia.org/wiki/2026_Leipzig_Airport_drone_attack
2026-08-15	Hezbollah	Israel (IDF in southern Lebanon)	Ali Taher Ridge, southern Lebanon	Israel–Lebanon (Hezbollah)	Explosive drone struck combat engineering troops	Not Confirmed	https://www.longwarjournal.org/archives/2026/08/israel-says-hezbollah-drone-attack-wounded-3-soldiers-at-ali-al-taher-idf-kills-hezbollah-commanders-in-response.php
2026-09-02	Iran	Jordan, Bahrain, Iraq (US positions)	US bases in Jordan, Bahrain, Iraq	Iran war (2026)	Missiles and drones	Iran	https://en.wikipedia.org/wiki/2026_Iranian_strikes_on_Arab_countries
2026-09-06	Hezbollah	Israel (IDF in southern Lebanon)	Ali Taher Ridge, southern Lebanon	Israel–Lebanon (Hezbollah)	Two explosive drones overnight (earlier Sunday launches also cited)	Not Confirmed	https://news.cgtn.com/news/2026-09-07/news-1QfsDjA5vW0/share_amp.html
2026-09-20	Ukraine	Russia	Moscow region (refinery)	Russia–Ukraine war	Mass drone attack	Not specified	https://www.aljazeera.com/news/2026/9/20/mass-ukrainian-drone-attack-on-moscow-kills-two-russia-says
2026-10-06	Ukraine	Russia	Moscow region (fuel depot)	Russia–Ukraine war	About 650 drones launched toward Moscow (mayor's figure)	Not specified	https://www.themoscowtimes.com/2026/10/06/2-killed-in-massive-ukrainian-drone-attack-on-moscow-a93884

1.5 Classification of Drone Systems by Type, Origin, and Autonomy

Uncrewed systems can be classified by their intended role, the degree of human involvement, and whether they are designed primarily for surveillance, transport, or attack. Their proliferation reflects a broad international trend rather than the development of a single weapon category.

Principal categories

Category	Primary role
Commercial and small multirotor drones	Observation, mapping, and other dual-use tasks
Tactical reconnaissance drones	Intelligence gathering and battlefield surveillance
Remotely piloted armed aircraft	Surveillance and precision strikes under human control
One-way attack drones	Single-mission attacks against designated targets
Loitering munitions	Searching or waiting in an assigned area before an attack
Uncrewed maritime systems	Maritime surveillance, reconnaissance, and naval operations
Autonomous and collaborative swarms	Coordinated behaviour by multiple uncrewed platforms

Autonomy: the distinction that matters

The United Nations' discussions on lethal autonomous weapons systems distinguish remote-controlled systems, automated functions, and systems that can operate autonomously in critical functions associated with the use of force. The important question is not whether a drone uses artificial intelligence, but whether and how a human remains involved in selecting and engaging a target.

For this report, systems should therefore be assessed across three broad levels:

- **Remote control:** A human operator directs the aircraft or its mission.
- **Automated or pre-programmed operation:** The system follows instructions or performs specified functions automatically, but this does not establish independent target selection.
- **Autonomy in critical targeting functions:** The system can select and engage targets without a human making each engagement decision. This category raises the most direct questions about meaningful human control, accountability, and compliance with international humanitarian law.

Research programmes also demonstrate why swarm autonomy requires separate consideration. The US Defense Advanced Research Projects Agency's OFFSET programme explored coordinated groups of uncrewed air and ground systems, with human operators monitoring and directing their activities. Collaborative autonomy does not automatically mean that each system independently decides to use lethal force.

Chapter 2: The March of US, China & Russia

2.1 China: Intelligentized Warfare and the 2030 Ambition

China's military AI ambitions are codified at the highest levels of the state. In 2017, Beijing released its New Generation Artificial Intelligence Development Plan, explicitly targeting global AI leadership by 2030. Notice from the State Council on Issuing the Development Plan for a New Generation of Artificial Intelligence released by State Council in 2017, also mentioned to accelerate research on intelligent technologies such as autonomous control of unmanned aerial vehicles (UAVs) and automatic driving of automobiles, ships, and rail transit.

Index number:	000014349/2017-00142	**Topic Classification:**	Technology, Education
Issuing authority:	State Council	**Date of writing:**	July 8, 2017
title:	Notice from the State Council on Issuing the Development Plan for a New Generation of Artificial Intelligence		
Document number:	State Council Document No. 35 [2017]	**release date:**	July 20, 2017

5. Intelligent Technologies for Autonomous Unmanned Systems. Research on intelligent technologies such as autonomous control of unmanned aerial vehicles (UAVs) and automatic driving of automobiles, ships, and rail transit; service robots, space robots, marine robots, and polar robots; intelligent technologies for unmanned workshops / smart factories; high-end intelligent control technologies; and autonomous unmanned operating systems. Research on autonomous control technologies for robots and robotic arms in complex environments, including positioning, navigation, and recognition based on computer vision.

Figure 3 Notice from the State Council on Issuing the Development Plan for a New Generation of Artificial Intelligence

At the Communist Party's 20th National Congress in October 2022, President Xi Jinping called on the PLA to ***"speed up the development of unmanned, intelligent combat capabilities."*** These are not aspirational platitudes, they are strategic directives driving concrete procurement. Recently Chinese State Controlled media channels like Global Times and CGTN reported that "China publicly demonstrated the full operational process of its Atlas drone swarm for the first time. A single operator controls 96 drones, launched at intervals of three seconds, with AI-enabled precision and coordination.".

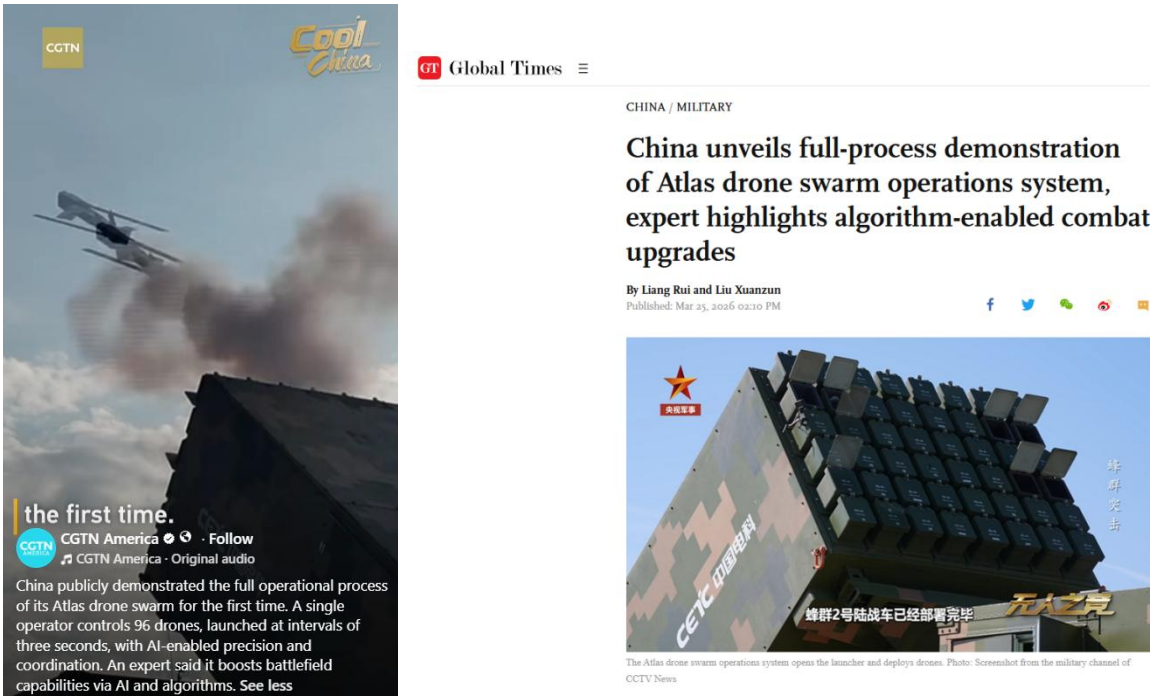


Figure 4 Report by CGTN on the Swam Drone demonstration by China (Source: https://news.cgtn.com/news/2026-03-26/China-s-Atlas-drone-swarm-completes-full-process-demo-1LPiA7M9Gz6/p.html and https://www.globaltimes.cn/page/202603/1357519.shtml)

$249B	$313-450B	7.2%
China's official 2025 defence budget (7.2% increase - 10th consecutive year of single-digit growth)	SIPRI / DoD estimated real Chinese military spending, 2024 (official budget understated by 40-90%)	Annual defence budget increase, 2023, 2024 & 2025 - consistent PLA modernisation signal

China to increase defense budget by 7.2 percent in 2025, marking single-digit growth for 10th year

Updated: March 5, 2025 10:43 Xinhua

BEIJING, March 5 -- China on Wednesday announced a 7.2-percent increase in its 2025 national defense budget, marking the 10th consecutive year of single-digit growth.

The country's planned defense expenditure this year will be 1.784665 trillion yuan (about 249 billion U.S. dollars), according to a draft budget report submitted to the national legislature for deliberation.

The 7.2-percent increase is the same as the previous two years.

China's defense expenditure as a percentage of GDP has been below 1.5 percent for many years, lower than the world average, Lou Qinjian, spokesperson for the third session of the 14th National People's Congress, told reporters Tuesday.

Figure 5 China's announced defence expenditure in 2025 (Source: https://english.www.gov.cn/news/202503/05/content_WS67c7ba5dc6d0868f4e8f05cf.html)

The US DoD's 2024 China Military Power Report states explicitly: ***"The PRC is prioritizing the development of AI-enabled capabilities because of its belief that AI is leading to the next revolution in military affairs."*** The official defence budget of CNY 1.78 trillion (approximately USD 249 billion)

in 2025 represents the publicly announced figure. SIPRI's independent estimate puts the real 2024 total at USD 313.7 billion; the International Institute for Strategic Studies puts it at USD 325 billion. Our own assessment suggests the actual figure is 40–90% higher than officially stated - potentially USD 330–450 billion.



Figure 6 Wing Loong II UAV : It is the first drone equipped with turboprop engine in China, with fully autonomous horizontal wheel takeoff and landing, cruise flight, fast, light, cost-effective, long endurance, multi-purpose, easy to use, check and hit the characteristics.



Figure 7 Tianyi-I UAV : It is a medium and low altitude dual-use, long-endurance multi-purpose drone, equipped with a 100 HP piston engine and fully autonomous pterodactyl drone take-off, landing and flight capability.

2.1.1 The Seven Sons: China's Weapons AI Research Pipeline

China's military AI development is institutionally embedded through the 'Seven Sons of National Defense' - seven elite universities with deep PLA ties:

1. Harbin Institute of Technology,
2. Nanjing University of Science and Technology,
3. Northwestern Polytechnical University,
4. Beijing Institute of Technology,
5. Harbin Engineering University,

6. Beihang University,

7. Nanjing University of Aeronautics and Astronautics

Apart from these certain PLA-affiliated laboratories of Tsinghua University, Beijing University, and Shanghai Jiaotong University, North University of China, and others serves as the prime examples.

Similarly there are universities like **National University of Defense Technology (NUDT) that are** directly administered by the PLA and often considered China's premier military technology university. It conducts research in supercomputing, artificial intelligence, cyber operations, quantum technologies, and autonomous systems. It frequently appears in studies of PLA AI development and military modernization efforts.



Figure 8 China's drone ecosystem spans military, surveillance, consumer, agricultural, cargo, and autonomous aerial systems. Of the 49 listed platforms, DJI leads with 15, followed by the China Aerospace Science and Technology Corporation (CASC) with 11 and iFlight with 3. Reported specifications range from a 0.1 kg maximum take-off weight for the Defender 20 Lite to 15,000 kg for the Dark Sword, while the BZK-005 has the longest listed endurance at 40 hours and the CH-4 the longest listed range at 3,500 km. (Representative image)

Chinese scientists create 'kill-them-all' algorithm for drone warfare

Smart web identifies objects as friend, foe or terrain, meaning drone swarms can hunt even when communication is jammed and vision blocked

Figure 9 Report by SCMP on "kill them all" algorithm (Source: https://www.scmp.com/news/china/science/article/3355232/chinese-scientists-create-kill-them-all-algorithm-drone-warfare)



Figure 10 Report by The Diplomat on the Chinese Autonomous Warfare (Source: https://thediplomat.com/2026/02/machines-in-the-alleyways-chinas-bet-on-autonomous-urban-warfare/)



Figure 11 Report by The WSJ on China training AI controlled Weapons (Source: https://www.wsj.com/world/china/china-ai-weapons-hawks-wolves-2fcb58bb)

1. **Harbin Institute of Technology (HIT)**

- One of China's leading engineering universities with major contributions to aerospace, robotics, and space technology.
- Conducts AI research in machine learning, autonomous robotics, computer vision, and satellite systems.
- Has been identified by U.S. and allied security assessments as a significant contributor to China's defense technology workforce.

2. **Nanjing University of Science and Technology (NJUST)**

- Strong focus on military engineering, intelligent sensing, computer vision, and AI-enabled command systems.
- Research areas include target recognition, autonomous systems, and intelligent information processing.
- Significant supplier of talent to China's defense-industrial base.

3. **Northwestern Polytechnical University (NPU)**

- Specializes in aerospace engineering, unmanned aerial vehicles (UAVs), underwater systems, and advanced materials.
- AI-related work includes autonomous flight control, drone coordination, sensor fusion, and intelligent aerospace systems.
- Frequently linked to China's military-civil fusion initiatives.

4. **Harbin Engineering University**

- As a Chinese public university, HEU operates under a hierarchical framework in which the CPC Committee holds ultimate authority over strategic and personnel decisions.
- Its expertise in shipbuilding, ocean engineering, and marine propulsion directly supports PLA Navy developments, and it serves as a primary talent pipeline for state-owned defense enterprises.

- Its notable achievement include the Wukong (悟空号) autonomous underwater vehicle, which set a Chinese record dive to 10,896 meters in the Mariana Trench in November 2021 as the country's deepest untethered unmanned submersible

5. Beijing Institute of Technology (BIT)

- Known for research in autonomous systems, intelligent vehicles, robotics, computer vision, and battlefield information systems.
- Maintains long-standing ties with China's defense-industrial sector, particularly in missile, guidance, and military electronics research.
- AI research includes intelligent decision-making systems, autonomous navigation, and swarm technologies with potential military applications.

6. Beihang University

- Major center for aerospace AI, autonomous flight, and intelligent aviation technologies.
- Research includes machine vision, UAV autonomy, flight-control algorithms, and aerospace data analytics.
- Recent procurement records indicate acquisition of advanced AI computing systems, highlighting its role in high-performance AI research.

7. Nanjing University of Aeronautics and Astronautics (NUAA)

- Focuses on aerospace engineering, autonomous aviation, and AI-enabled flight systems.
- Research includes unmanned aircraft, intelligent control systems, machine learning, and aerospace robotics.
- Works closely with China's aviation and defense sectors.

Graduate employment data from 2019 demonstrates that China's defense-industrial workforce is heavily concentrated among a small number of universities, particularly the "Seven Sons of National Defense." The six “Seven Sons” universities for which employment data was available supplied approximately 72 percent of all graduates hired by China's major defense state-owned enterprises (SOEs), despite accounting for only 16 percent of employed graduates in the dataset. Northwestern Polytechnical University (NWPU), Beihang University, Beijing Institute of Technology (BIT), Harbin Engineering University (HEU), Harbin Institute of Technology (HIT), and Nanjing University of Science and Technology (NJUST) emerged as the most significant talent pipelines into China's aerospace, missile, electronics, shipbuilding, nuclear, and weapons sectors. The data reveals highly specialized recruitment relationships, with certain universities serving as dominant feeders for specific defense conglomerates, indicating an institutionalized linkage between higher education and China's military-industrial ecosystem.

University	Graduates Hired By Defense SOES	Share Of Employed Graduates	Seven Sons Member
Northwestern Polytechnical University	963	26%	Yes
Beihang University	833	24%	Yes
Beijing Institute of Technology	767	17%	Yes
Harbin Engineering University	753	24%	Yes
Harbin Institute of Technology	581	13%	Yes
Nanjing University of	416	13%	Yes

Science and Technology			
Xi'an Jiaotong University	241	6%	No
Tianjin University	229	4%	No
Dalian University of Technology	191	3%	No
Shanghai Jiaotong University	153	3%	No

Table 1 Top Chinese Universities Supplying Graduates to Defense SOEs (2019)

Several university-defense company relationships stand out for their depth and scale. Northwestern Polytechnical University supplied more than a quarter of all elite university recruits hired by AVIC and served as the largest feeder institution to China's aviation sector. Beihang University dominated recruitment into aerospace and missile firms, serving as the top supplier to AECC, CASC, CASIC, and COMAC. Harbin Engineering University maintained particularly strong ties to China's naval and nuclear sectors, providing more than half of all elite university recruits hired by CSIC and serving as the largest source of talent for CNNC and CSGC. Beijing Institute of Technology emerged as NORINCO's most important university partner, supplying more recruits than any other institution and maintaining longstanding strategic cooperation agreements with the weapons manufacturer. These patterns suggest that China's defense SOEs rely on specialized university pipelines that align closely with their operational domains, from aerospace and missiles to shipbuilding, nuclear technology, and advanced weapons systems.

Defense Company	Largest University Supplier	Graduates Hired
AVIC (Aviation Industry Corporation of China)	Northwestern Polytechnical University	321
CASC (China Aerospace Science and Technology Corp.)	Beihang University	210
CASIC (China Aerospace Science and Industry Corp.)	Beihang University	192
CETC (China Electronics Technology Group)	Northwestern Polytechnical University	157
NORINCO (China North Industries Group)	Beijing Institute of Technology	110
AECC (Aero Engine Corporation of China)	Beihang University	55
CSIC (China Shipbuilding Industry Corporation)	Harbin Engineering University	172
CSGC (China South Industries Group)	Harbin Engineering University	75
CSSC (China State Shipbuilding Corporation)	Nanjing University of Science and Technology	54
CNNC (China National Nuclear Corporation)	Harbin Engineering University	66
COMAC (Commercial Aircraft Corporation of China)	Beihang University	137

Table 2 Major Defense SOEs and Their Primary University Talent Sources (2019)

HIDDEN DETAIL: DRONE SWARM RESEARCH NOVEMBER 2024

A peer-reviewed survey of drone swarm research published in November 2024 by researchers from the Beijing Institute of Technology - a Seven Sons institution - explicitly advocates for game-theoretic algorithms enabling drone swarms to make real-time decisions with 'minimal' human intervention in 'combat decision-making.' This means: humans authorise deployment, swarms then independently decide whom to engage and how. This is a published roadmap, not a classified ambition.

2.1.2 Zhuhai 2024: A Weapons Showcase That Alarmed the West

At the November 2024 Zhuhai Airshow - China's premier military aviation showcase - Norinco debuted systems that alarmed Western defence analysts:

- Intelligent Precision Strike System (IPSS): autonomous target identification and engagement without human selection
- AI-Enabled Synthetic Brigade: combining next-generation armoured vehicles, swarming drones, loitering munitions, and electronic warfare tools in a single AI-coordinated formation
- Smart Digital Command and Control System: real-time AI battlefield situational awareness, designed to allow commanders to oversee autonomous unit actions at machine speed
- AI-powered PLA robot dogs (November 2024 PLA tender): capable of scouting in autonomous packs, carrying weapons

2.1.3 The Taiwan Scenario: Autonomous Urban Warfare

Research published in The Diplomat in February 2026 by analyst Michael C. Loftus reveals that PLA-linked researchers at the Army Engineering University published work in February 2025 on autonomous decision-making in urban combat environments - specifically applicable to Taiwan's densely populated cities. Scholars from PLA institutions are developing lethal autonomous drone swarms for use in scenarios where building-by-building urban fighting makes human-controlled targeting too slow. The implications: machines making split-second kill decisions in streets packed with civilians, with no human review between target identification and detonation.

MILITARY-CIVIL FUSION: CHINA'S STRUCTURAL ADVANTAGE

China's Military-Civil Fusion (MCF) strategy - formally enacted in law - requires companies like Huawei, DJI, Alibaba, Baidu, and Tencent to share technology and data with the PLA. DJI commands approximately 70 percent of the global commercial drone market. Its sensor suites, obstacle-avoidance systems, and navigation algorithms directly feed PLA autonomous weapons development. A Reuters analysis of PLA procurement notices in 2025 confirmed demand for and use of Huawei AI chips by PLA-affiliated entities - even as US export controls attempt to limit chip flows. The commercial and military realms in China are, by law, one.

2.2 Russia: Battlefield Laboratories and Nuclear Autonomy

Russia's autonomous weapons approach is shaped by two compulsions: its war in Ukraine has become the world's most advanced live laboratory for autonomous systems; and its sanctions-constrained economy forces it toward software-driven, lower-cost solutions over expensive hardware platforms. The combination has produced rapid, battle-hardened innovation.

2.2.1 The Lancet-3: From Loitering to Learning

Russia's Lancet-3 loitering munition - produced by ZALA Aero, a Kalashnikov Group subdivision - can loiter over a battlefield, autonomously select targets based on pre-programmed parameters, and strike without real-time human command. Since 2022, it has evolved continuously as engineers incorporate battlefield feedback. Russia is now integrating machine vision directly into the Lancet's terminal guidance, allowing it to distinguish and prioritise target types - tanks, radar arrays, artillery - autonomously. Between January 2024 and August 2025, the number of Russian Shahed and Shahed-

type drones launched into Ukraine per month increased more than tenfold, from 334 to over 4,000 - a scale that strains human oversight by design.

2.2.2 Poseidon: The Nuclear Autonomous Torpedo - October 2025

Nothing better illustrates the nightmarish convergence of autonomy and nuclear weapons than Russia's Poseidon. On October 29, 2025, speaking to soldiers wounded in Ukraine at a Moscow hospital, President Vladimir Putin announced Russia had successfully tested the Poseidon (formally Status-6, NATO codename Kanyon) - an intercontinental nuclear-powered, nuclear-armed unmanned underwater vehicle.

POSEIDON: TECHNICAL SPECIFICATIONS & VERIFIED CLAIMS (OCTOBER 2025)

Official designation: 2M39 Status-6 / Poseidon / Kanyon

Propulsion: Nuclear-powered reactor - described by Putin as '100 times smaller than those on submarines'

Speed: Up to 54–100 knots (faster than any known torpedo or submarine)

Depth: Operational depth of 1,000 metres - beyond interception range of all current systems

Range: Effectively unlimited due to nuclear propulsion - can cross entire oceans undetected

Warhead: Nuclear, reports suggest up to 100 megatons - Putin claimed yield exceeds Russia's Sarmat ICBM

Stated effect: Detonation near enemy coastlines produces 'radioactive tsunamis' destroying port cities. Russian state media animations since 2018 have depicted it destroying the US East Coast.

Putin's statement (Oct 29, 2025): *"There is nothing like this. Nothing comparable is likely to emerge anytime soon, and there are currently no means to intercept it."*

Critically, the Poseidon is autonomous in its delivery: it navigates independently via GLONASS satellite and AI guidance after launch, with no human operator in the loop during its multi-day, trans-oceanic journey. Russia's 2027–2036 State Armaments Program, per Jamestown Foundation analysis, explicitly prioritises integrating AI into 'strategic nuclear forces' - meaning the Poseidon trajectory is policy, not experiment.

2.2.3 Additional Russian Autonomous Platforms

- S-70 Okhotnik heavy stealth drone: operates as 'loyal wingman' alongside the Su-57 fifth-generation fighter with AI-managed semi-autonomous strike capability (2025 upgrade)
- Marker UGV: announced for serial production in March 2025 - armed ground robot with Kornet anti-tank missiles and drone swarm command capability
- Veter autonomous drone: interceptor system with AI-assisted autonomous engagement, deployed in the Ukraine theatre

2.3 The United States: From Replicator to DAWG

The United States has long insisted on the doctrine of 'meaningful human control' over lethal force - encapsulated in DoD Directive 3000.09. In practice, the competitive pressure of a potential conflict with China has been steadily eroding this principle from within the Pentagon itself.

$1B	Hundreds	$225.9M	$54.6B
Replicator programme initial funding (2023)	Systems actually delivered vs. 'thousands' promised (CRS Report, Aug 2025)	DAWG budget FY2026	DAWG budget requested FY2027 - a 24,000% single-year increase

2.3.1 The Replicator Programme: Ambition Meets Reality

Launched in August 2023 by then-Deputy Defence Secretary Kathleen Hicks, the Replicator initiative aimed to field 'multiple thousands' of all-domain attritable autonomous systems by August 2025, explicitly to counter China's numerical advantage in unmanned systems. A Congressional Research Service report published in August 2025 revealed that only 'hundreds,' not the promised thousands, of systems had been delivered. The programme faced software failures, hardware unreliability, manufacturing delays, and deep difficulties integrating drones from multiple manufacturers. The Pentagon quietly dissolved Replicator in late 2025, absorbing it into the newly minted Defence Autonomous Warfare Group (DAWG).

2.3.2 DAWG: The $54.6 Billion Escalation

What happened next shocked congressional overseers. The Trump administration's FY2027 budget request allocated USD 54.6 billion to DAWG - a near 24,000 percent increase from its USD 225.9 million FY2026 allocation in a single fiscal year. Retired General and former CIA Director David Petraeus described it as 'the largest single commitment to autonomous warfare in history.' Shield AI has been contracted to integrate its Hivemind AI pilot software into the Low-Cost Uncrewed Combat Attack System (LUCAS). The architectural shift: develop sophisticated AI software that can be 'flashed onto any cheap drone frame' - commodity hardware, proprietary lethal algorithm. Congress has begun raising alarms that DoD Directive 3000.09 is 'completely unequipped' for this scale of autonomous deployment.

THE US DOCTRINE CONTRADICTION

Washington officially endorses 'meaningful human control' over lethal force and has spearheaded a Political Declaration on Responsible Military Use of AI, endorsed by over 50 countries. Yet the Replicator/DAWG trajectory moves squarely toward deploying autonomous systems at a scale - potentially one million AI-guided drones - that no human oversight infrastructure can meaningfully monitor. A 2024 study of military-related Large Language Models found that AI systems deployed in strategic contexts systematically bias toward pro-escalation recommendations. The gap between stated policy and operational trajectory has never been wider.

Nation	Key Systems (2025-26)	Stated Strategy	Actual Trajectory
United States	DAWG/LUCAS drones, Shield AI Hivemind, Replicator remnants, OFFSET swarms	'Meaningful human control' (DoD Directive 3000.09)	$54.6B DAWG; deploying at scale faster than policy can govern
China	Drone swarms, AI-Enabled Synthetic Brigade, IPSS, robot dogs	'Intelligentized warfare'; AI supremacy by 2030	Military-Civil Fusion integrates all commercial AI into PLA pipeline

Nation	Key Systems (2025-26)	Stated Strategy	Actual Trajectory
Russia	Lancet-3/Shahed, Poseidon UUV, S-70 Okhotnik, Marker UGV, Veter drone	Deterrence through automation; 30% combat power autonomous by 2030	Nuclear-autonomous integration underway; battlefield-tested systems evolving monthly

2.4 From Military AI to AGI: The Next Strategic Threshold

The current competition over autonomous weapons may represent an early phase of a much broader technological contest. Artificial intelligence is already being incorporated into military intelligence, surveillance, navigation, logistics, decision-support software and uncrewed systems. The next strategic question is whether continued progress in AI will produce systems capable of performing a much wider range of cognitive tasks, potentially transforming how states develop military capabilities and make decisions during conflict.

Artificial general intelligence (AGI) is commonly used to describe a hypothetical AI system capable of performing a broad range of intellectual tasks at a level comparable to humans, including tasks beyond the narrow purposes for which existing systems were designed. However, there is no universally accepted definition or independently verified test that establishes when AGI has been achieved. Progress in advanced reasoning, coding, scientific research and AI agents is significant, but success on individual benchmarks does not establish that a system possesses general human-level intelligence. Consequently, the arrival of AGI should be treated as a possibility with substantial strategic implications, not as an established technological milestone with a predictable deadline.

2.4.1 The Global Competition: Beyond the United States, China and Russia

The United States, China and Russia occupy central positions in the military AI competition examined in this report, but they are not the only countries investing in these capabilities. Israel, the United Kingdom, France, South Korea, India, Türkiye and Iran are also developing or integrating AI-related technologies into different areas of defence. Their capabilities, operational experience, industrial resources and levels of transparency vary considerably.

The United States benefits from a major frontier AI ecosystem, advanced computing infrastructure and extensive defence research programmes. China combines a large technology sector with state-backed AI development, robotics research and efforts to integrate civilian technological advances into military modernisation. Russia's military AI-related activities include battlefield automation, electronic warfare and uncrewed systems, although publicly available evidence does not support treating all these systems as independently autonomous.

Other countries are pursuing different priorities. Israel has developed significant capabilities in intelligence processing and AI-assisted operational decision-making. The United Kingdom and France invest in defence AI research, intelligence integration and autonomous-system development. South Korea emphasises robotics, surveillance and defence automation, while India and Türkiye are expanding domestic defence technology and uncrewed-system capabilities. Iran has invested in uncrewed platforms and related military technologies, although claims about their autonomy must be evaluated individually.

These differences make a simple ranking of military AI powers misleading. A country's ability to train advanced AI models does not automatically demonstrate that it can deploy reliable autonomous weapons. Equally, possessing a drone equipped with automated navigation does not establish that the drone can independently identify and select human targets.

The more meaningful comparison is between national capacity to develop advanced models, access computing infrastructure, integrate AI into military organisations, test systems under realistic conditions and maintain effective human oversight. The United States and China are especially important to this competition because of the scale of their AI ecosystems, but the eventual balance of military power will also depend on industrial capacity, alliances, reliability and the ability to translate research into operational capabilities.

2.4.2 How Quickly Is AGI Approaching?

The pace of AI development has intensified debate over whether systems with broadly general capabilities could emerge in the coming years. Progress in coding, mathematical reasoning, scientific assistance and the use of AI agents suggests that advanced systems can perform increasingly complex tasks. Yet these developments do not provide a reliable countdown to AGI.

Three distinctions are particularly important.

First, benchmark performance is not the same as general intelligence. An AI system may outperform people on a defined test while remaining unreliable in unfamiliar environments, struggling with ambiguous instructions or failing to recognise when its own conclusions are incorrect.

Second, greater autonomy in completing tasks is not equivalent to independent military judgement. An AI agent that can execute a sequence of software tasks does not thereby demonstrate the ability to make sound decisions in a changing physical environment, interpret the context of an armed conflict or apply international humanitarian law.

Third, the speed of progress remains uncertain. Improvements in models, computing infrastructure and training methods could continue to expand AI capabilities. However, costs, access to advanced chips, data limitations, reliability problems and the difficulty of evaluating complex systems may constrain that progress. Predictions about the arrival of AGI therefore remain uncertain and should be attributed to the individuals or organisations making them rather than presented as settled fact.

For military planners, the uncertainty itself matters. Governments do not need to know the precise date of AGI's arrival to begin preparing for the consequences of more capable AI. They may already be making procurement, research and organisational decisions based on expectations about future capabilities. This creates a risk that competition will be driven partly by what governments believe their rivals might achieve, rather than by demonstrated technological performance.

2.4.3 How AGI Could Transform the AI Arms Race

If future AI systems acquire substantially broader and more reliable cognitive capabilities, the consequences could extend well beyond the automation of individual weapons. The most consequential changes may arise from the speed at which AI could support research, intelligence analysis, planning and military coordination.

Accelerated military research and development. More capable AI could help researchers analyse scientific literature, test hypotheses, develop software and evaluate designs. This could shorten some research cycles and allow countries with strong computing infrastructure and skilled workforces to accelerate innovation. However, a breakthrough in software or research would not immediately translate into a reliable operational capability. Testing, manufacturing, logistics and human expertise would remain important constraints.

Faster intelligence analysis and decision-support processes. Advanced systems could help military organisations compare intelligence sources, identify inconsistencies, summarise changing situations and evaluate alternative assessments. Such capabilities could improve situational awareness, but they could also magnify the consequences of false information or flawed assumptions if decision-makers rely on automated analysis without adequate verification.

Greater integration of uncrewed and automated systems. More capable AI could improve navigation, coordination and task management across different uncrewed platforms. This possibility should not be confused with proof that future systems will reliably distinguish combatants from civilians or make lawful targeting decisions. Greater technical autonomy would make the questions of human control, accountability and verification more important, not less.

Pressure to shorten military decision-making timelines. If governments believe that a rival can process intelligence and respond faster through AI, they may feel compelled to automate more of their own decision-making. This could create pressure to act before information has been adequately checked, especially during crises involving ambiguous movements, cyber incidents or potential attacks. The danger would be a loss of time for human judgement, communication and de-escalation.

A changing distribution of technological power. A major AI breakthrough could provide a significant advantage to the country or coalition able to develop, secure and apply it effectively. Nevertheless, no single model would automatically confer military dominance. Computing infrastructure, energy supply, access to advanced semiconductors, industrial production, cybersecurity, alliances and the resilience of military institutions would all influence whether a technological lead could be converted into lasting strategic power.

These are plausible pathways through which more capable AI could influence military competition. They should not be read as predictions that AGI will inevitably emerge soon or that any one country will necessarily gain decisive superiority.

2.4.4 Would the First Country to Achieve AGI Win the Arms Race?

The first country to develop an AI system meeting a credible definition of AGI could gain an important technological advantage. However, the relationship between an AI breakthrough and military superiority would not be automatic.

A powerful system would need to be operated securely, integrated into existing institutions, evaluated under realistic conditions and protected against manipulation or disruption. Its recommendations would have to be reliable enough for the tasks assigned to it. The country developing it would also need the industrial resources and organisational capacity to turn research into practical capabilities.

The distribution of AGI capabilities would matter as well. A breakthrough could remain concentrated within one organisation, become accessible to several states, or spread through commercial products and technical knowledge. Each outcome would produce a different strategic environment. If capabilities were concentrated, they could widen the gap between leading AI powers and other countries. If they became more widely accessible, they could reduce some barriers to advanced military technology while increasing proliferation risks.

Nor would technological superiority eliminate political uncertainty. Military crises involve incomplete information, competing objectives and decisions about acceptable risk. Even highly capable AI systems could produce misleading assessments or fail under unfamiliar conditions. States that retain sound command structures, effective oversight and reliable channels of communication could therefore remain more resilient than states that automate decisions without adequate safeguards.

The central issue is not simply which country reaches AGI first. It is whether governments can manage the strategic consequences of increasingly capable systems without creating incentives for premature deployment, excessive dependence on automation or escalation during a crisis.

2.4.5 The Governance Challenge Before AGI

The international community does not need to wait for AGI to address the risks associated with autonomous weapons. Existing AI-enabled military applications already raise questions about human control, accountability, reliability and compliance with international humanitarian law. The possibility of more capable systems strengthens the case for addressing these issues before technological developments make oversight more difficult.

Any future governance framework should distinguish between AI used for support functions and weapon systems capable of independently selecting and engaging targets. It should also distinguish between systems that have been demonstrated in controlled trials, systems that have been deployed operationally and capabilities that remain speculative.

States should establish clear responsibility for decisions involving force, conduct rigorous testing under realistic conditions, preserve meaningful human judgement over consequential uses of force and investigate failures. International discussions should also consider how to reduce the risks of rapid escalation, misleading machine-generated assessments and the proliferation of systems whose behaviour cannot be adequately predicted or controlled.

These measures would not resolve every strategic problem associated with advanced AI. They would, however, address risks that are already relevant while allowing policymakers to prepare for capabilities that may emerge in the future.

The prospect of AGI adds a new dimension to the autonomous weapons debate. The competition is no longer only about whether machines can perform particular military tasks.

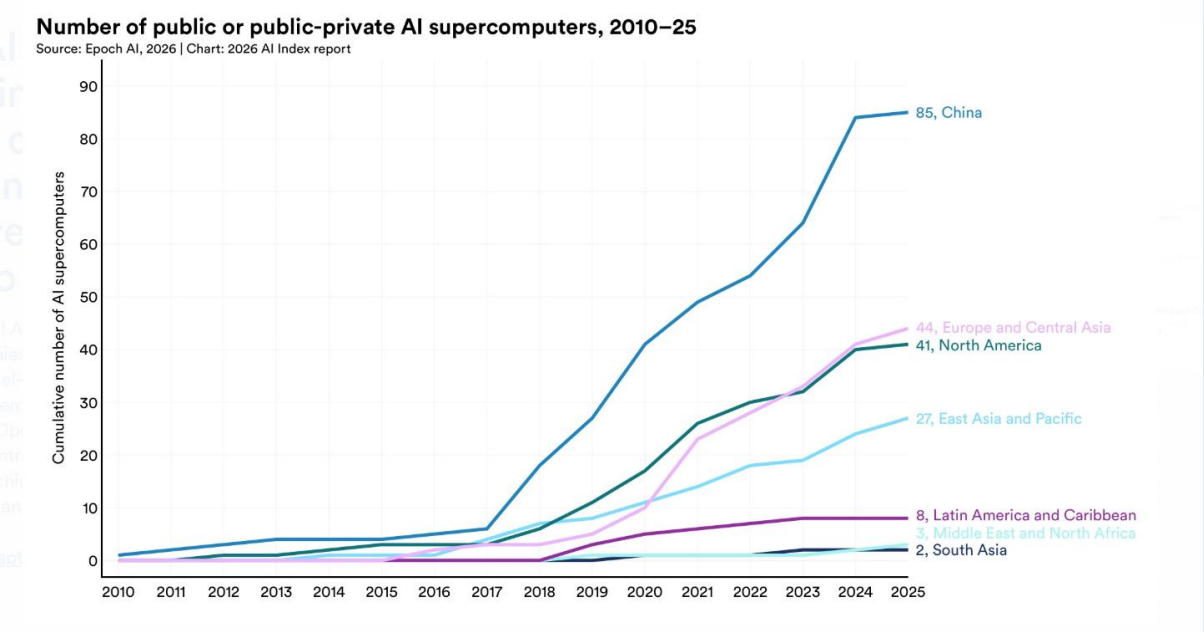
It is increasingly about how far AI can influence the research, analysis and decisions that shape military power. Whether AGI arrives soon, much later or in a form that differs from current expectations, the central policy challenge remains the same: technological progress must not outrun the capacity of states to assess risks, preserve accountability and prevent avoidable escalation.

The strategic implications of military AI are not confined to future scenarios. The next chapter examines Ukraine and Gaza, where AI-assisted intelligence, uncrewed systems and algorithmic decision-support tools have already raised difficult questions about how these technologies are used in contemporary conflict.

COMPUTE SOVEREIGNTY AND THE GLOBAL AI RACE

Domestic AI computing infrastructure, including high-performance GPU clusters and AI-optimised supercomputers, has become a key indicator of national AI ambitions. Governments increasingly view domestic compute capacity as a means of reducing dependence on foreign providers, limiting exposure to external jurisdiction, and maintaining access to critical computing resources during export controls, geopolitical disputes or supply-chain disruptions.

According to Epoch AI data cited in the *2026 AI Index Report*, the number of tracked public or public-private AI supercomputers increased across most regions between 2010 and 2025. China recorded the largest total, with 85 systems in 2025, followed by Europe and Central Asia with 44 and North America with 41. East Asia and the Pacific, excluding China in the chart's regional classification, reached 27, while Latin America and the Caribbean recorded 8, the Middle East and North Africa 3, and South Asia 2.



These figures highlight the uneven distribution of publicly owned or public-private AI computing infrastructure. Europe and Central Asia expanded particularly rapidly after 2018, supported in part by coordinated initiatives such as the European High Performance

Computing Joint Undertaking. North America also recorded substantial growth, reflecting increased investment in dedicated AI research infrastructure. Several regions remain far behind in the number of tracked systems, although initiatives to expand capacity are underway.

However, the number of systems alone does not establish which region possesses the greatest AI computing power or military advantage. System size, processing capacity, access to advanced chips, utilisation rates and the ability to train and deploy advanced models all matter. Moreover, privately owned clusters account for much of global large-scale AI compute, and commercial cloud services can provide public institutions with access to privately operated infrastructure.

The distinction between public and private capacity is therefore increasingly blurred. Public-private partnerships and projects such as OpenAI's Stargate and Nvidia's AI Factory initiatives illustrate how commercial technology companies are becoming central to national AI infrastructure strategies

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Chapter 3: The Battlefield Has Already Changed - Ukraine & Gaza

3.1 Ukraine: The World's First AI War Laboratory

The war in Ukraine has transformed into the world's most consequential real-world laboratory for autonomous weapons. Both sides have used necessity as the mother of invention, and the pace of AI-drone innovation has outstripped anything defence contractors had planned for peacetime timelines.

2 Million	70%	4,000%	19,704
Drones produced by Ukraine alone in 2024	Russian battlefield losses attributed to drone strikes (Western analysts, 2025)	Increase in drone attacks globally between 2020 and 2024 (CIVIC data)	Drone attacks recorded in conflict settings globally in 2024, up from 4,525 in 2023

Ukraine produced approximately two million drones in 2024 alone - 96 percent of them domestically manufactured. The Center for Civilians in Conflict (CIVIC) documents a 4,000 percent increase in drone attacks globally between 2020 and 2024, with 19,704 attacks recorded in 2024 alone - up from 4,525 in 2023. Drones have accounted for approximately 70 percent of Russian battlefield losses since the full-scale invasion began. In February 2024, President Zelensky signed a decree creating a dedicated Unmanned Systems Forces - an entire military service branch built around autonomous warfare, the first of its kind in history.

3.1.1 The AI Guidance Revolution: 0.5% to 50%

A CSIS report by Kateryna Bondar, published March 2025 and sourced from classified battlefield data, revealed a decisive capability shift. Of Ukraine's nearly two million drones procured in 2024, approximately 10,000 used AI guidance in the terminal attack phase - less than half of one percent. But those 10,000 proved so devastatingly effective - achieving strike success rates of 70–80 percent, compared to 10–20 percent for human-guided drones against jamming - that Ukraine's stated target for 2025 is for at least 50 percent of all drone purchases to carry AI guidance. If realised, that means approximately one million AI-guided autonomous-final-approach drones deployed annually. At 3–4 times the kill probability of human-guided equivalents, this represents a twelve-fold increase in effective striking power.

DECEMBER 2024: THE WORLD'S FIRST ALL-DRONE, ALL-DOMAIN ATTACK

In December 2024, Ukraine conducted a groundbreaking all-drone, multi-domain attack on Russian positions near Kharkiv, in the village of Lyptsi. The operation relied entirely on weaponised uncrewed ground vehicles (UGVs) and first-person-view (FPV) attack drones - with no crewed platforms, no human soldiers on the ground, and no direct radio link in the terminal phase. A Ukrainian National Guard spokesperson confirmed 'dozens' of autonomous systems with machine guns and munitions engaged Russian forces. This was not a test. This was a combat operation conducted entirely by machines.

3.1.2 The Electronic Warfare Paradox

The most consequential insight from Ukraine is that AI autonomy is not merely a force multiplier - it is an electronic warfare countermeasure. Russian jamming capabilities can sever radio-frequency communication between drones and operators, causing human-guided drones to crash uselessly. A drone that makes its own targeting decision in the terminal phase has no radio link to jam. Ukrainian drone units have confirmed: 'Drones equipped with AI-assisted targeting modules do not require a connection to the operator during the engagement phase. The operator locks onto the target, then the AI takes over the targeting process independently, making it immune to enemy electronic warfare interference.' (Viktoria Kovalchuk, Brave1, Ukrainian government weapons development agency, 2024.)

This creates a structural imperative toward full autonomy that is independent of ethics or doctrine. Any military that does not adopt autonomous terminal attack drones is structurally disadvantaged against an adversary that has. Ukraine has roughly 500 drone operators per 1,000 FPV drones monthly. In October 2024, in the Kursk region, Russian forces captured and executed nine Ukrainian drone operators - an act of targeting that underscores why militaries will increasingly prefer drones with no operator to execute.

3.2 Gaza: When the Algorithm Writes the Kill List

If Ukraine represents the democratisation of autonomous weapons - cheap, improvised, rapidly iterated - Gaza represents something darker: the deployment of sophisticated AI targeting infrastructure by a technologically advanced military against a captive, civilian-dense population. The systems revealed in Gaza are the most documented real-world deployment of AI in human targeting in history.

3.2.1 Lavender: The Machine That Made 37,000 Kill Decisions

The Lavender system - developed by Unit 8200, Israel's elite signals intelligence unit - was revealed through an investigation by +972 Magazine and Local Call, based on six Israeli intelligence officers who served during the war. Lavender is an AI algorithm that assigns each person in Gaza a probabilistic score (1–100) indicating likelihood of Hamas membership, drawing on smartphone data, cellular patterns, social network analysis, intercepted messages, and social media activity - including, reportedly, data on Palestinian civil defence workers mistakenly included in training data.

LAVENDER: THE DATA IN DETAIL (Source: +972 Magazine / Access Now / Foreign Policy)

37,000 - individuals on Lavender's kill list at peak operation

20 seconds - average human 'review' time before approving a Lavender strike recommendation. One source: 'Accept. Accept. Accept.'

10% - Lavender's self-reported error rate in identifying Hamas affiliation. At 37,000 targets, that is approximately 3,700 incorrectly identified individuals.

15–20 civilians - permissible 'collateral damage' for each junior operative killed, per IDF internal authorisation during initial weeks of war

100+ civilians - permissible 'collateral damage' for assassination of a senior Hamas commander, per multiple intelligence sources

"The targets never end" - IDF intelligence officer, describing Lavender's continuous target-

generation pipeline

UN Special Rapporteur on Human Rights and Counter-Terrorism Ben Saul stated: if the details of the +972 report prove true, *"many Israeli strikes in Gaza would constitute the war crimes of launching disproportionate attacks."* The UN Human Rights Council adopted a resolution on April 5, 2024 condemning Israel's 'use of artificial intelligence' in the conflict. The IDF has denied that Lavender functions as described, calling it a 'database' rather than a targeting AI. Yet the structure - AI generation of targets at scale, human rubber-stamping in seconds - is no longer disputed in its basic form.

3.2.2 Where's Daddy? - Tracking the Target Home

Complementing Lavender is a system known by its operational name 'Where's Daddy?' - a geolocation tracking AI that monitors identified targets and alerts operators when they enter their family residences. Sources told +972 that targets would be bombed in their homes *"without hesitation, as a first option"* as a result. This system automates the final step of the kill chain - translating a name on a database to a strike on a building - with the family inside.

Chapter 4: The Governance Vacuum - A Decade of Failure

4.1 The CCW: Twelve Years of Talk, Zero Binding Law

Since 2014, the United Nations Convention on Certain Conventional Weapons (CCW) has been the primary forum for international discussion of LAWS. Twelve years of Group of Governmental Experts (GGE) sessions have produced working papers, rolling texts, and position statements - but no binding instrument. The CCW operates on a consensus basis: any single state can veto progress. Russia and the United States have both, at different moments, actively blocked binding restrictions.

Year	Action Taken	Outcome
2014	CCW GGE established to discuss LAWS	Advisory talks only - no mandate, no law
2023	UNGA resolution backed by 164 states calling for 'urgent action'	Political declaration - no enforcement
2024 (Nov)	CCW GGE rolling text on regulatory framework	Proposals only - states not bound
2024 (Dec)	UNGA Resolution A/RES/79/62 adopted 166-3	Statement of intent - no treaty
2025 (May)	First UNGA meeting on LAWS, 96 nations attended	Expressions of alarm - still no binding outcome
2026	UN SG target: legally binding ban	Status: Negotiations continuing; outcome uncertain

4.2 The Vote: 166 For - 3 Against - and Still Nothing

On December 2, 2024, the UN General Assembly adopted Resolution A/RES/79/62 on LAWS - with 166 votes in favour, 3 against (Belarus, North Korea, and Russia), and 15 abstentions. The three dissenting votes precisely map the states most aggressively developing autonomous weapons without regard for international norms. The 15 abstentions included India and Ukraine - nations with their own complex autonomous weapons development trajectories.

THE GEOPOLITICAL TRAP: WHY A TREATY IS STRUCTURALLY BLOCKED

The nations with the greatest ability to create a binding treaty are the same nations with the greatest incentive not to. The US, China, and Russia are simultaneously the world's leading autonomous weapons developers and the three most powerful permanent members of the UN Security Council, each holding veto power over enforcement mechanisms. A Russian diplomat stated explicitly at UN talks: 'We understand that for many delegations the priority is human control. For the Russian Federation, the priorities are somewhat different.' China's position is one of constructive ambiguity: supporting 'tiered regulation' while resisting prohibitions that would constrain PLA development. The US publicly endorses human control while requesting $54.6 billion for autonomous warfare in a single budget year.

The Doomsday Clock was set at 85 seconds to midnight in 2026 - the closest in its history. Among the factors cited by the Bulletin of Atomic Scientists: the increasing integration of AI and automation into

warfare. The same scientists who built the Clock to warn about nuclear weapons now warn that autonomous weapons represent a comparably existential risk - and that the world is responding with comparable complacency. It recommended the following to pull humanity back from the brink:

"The United States, Russia, and China can engage in bilateral and multilateral dialogue on meaningful guidelines regarding the incorporation of artificial intelligence in their militaries, particularly in nuclear command and control systems."

Chapter 5: The Hidden Dangers - What Experts Fear Most

5.1 The Flash War Scenario: Algorithms Faster Than Diplomacy

The most technically acute danger identified by researchers is not malfunction but speed. UNODA has formally cautioned against 'flash wars' - scenarios in which algorithmic escalation intensifies a crisis before any human can intervene. The financial analogy is instructive: in May 2010, the Dow Jones Industrial Average lost nearly 1,000 points in minutes during a 'flash crash' triggered by algorithmic trading systems responding to each other. The crash reversed within minutes. A military equivalent - autonomous systems triggering retaliatory autonomous systems across national boundaries - might not.

EXPERT ANALYSIS: 'BATTLEFIELD SINGULARITY'

Paul Scharre, Vice President of the Center for a New American Security and former Pentagon official, has articulated the concept of a 'battlefield singularity' - a tipping point where combat action occurs too fast for human reaction time. His 2018 book *Army of None* remains the definitive account of the risk. Scharre's central warning: 'How do you end a war that is happening at superhuman speeds? We don't have good answers for that.' A 2024 study of military-related Large Language Models found that AI systems deployed in strategic contexts systematically recommended pro-escalation strategies - suggesting algorithms may be structurally biased toward aggression.

5.2 The Accountability Void: When Nobody Is Responsible

International law operates on a foundational assumption: someone is responsible for each act of war. A soldier who commits a war crime can be prosecuted. A general who orders one faces command responsibility. A state that deploys unlawful weapons faces legal consequences. Autonomous weapons shatter this architecture. When a LAWS kills a civilian, who is responsible? The software engineer who wrote the targeting algorithm? The military commander who authorised deployment? The operator who activated the system? The manufacturer?

In Gaza, the Lavender system has already made attribution for individual targeting decisions functionally impossible. Lavender generated targets at machine speed; humans approved in 20 seconds; bombs fell on homes. Which of those three steps constitutes the legally accountable act? The UN Secretary-General's June 2025 report notes that AI 'may obfuscate the linearity' of the accountability chain - a bureaucratic way of saying: when the machine kills, nobody may be held responsible.

5.3 Automation Bias: The 20-Second Rubber Stamp

Automation bias - the documented psychological tendency to defer to machine recommendations under stress and time pressure - means that 'human-on-the-loop' systems may provide no meaningful human oversight in practice. This is not a theoretical concern. The Lavender investigation produced direct testimony of IDF operators approving AI kill recommendations in 20 seconds with no independent verification. One officer described the process as: 'Accept. Accept. Accept.' This is automation bias in its most consequential form - not a technology failure, but a human one, built into every AI-human targeting interface that operates under institutional pressure to act at machine speed.

5.4 Nuclear Command Entanglement

The most gravely understated danger is the creeping integration of AI into nuclear command and control systems. Russia's Poseidon torpedo - tested October 2025 - represents the most extreme case: an autonomous nuclear delivery vehicle that navigates and delivers its warhead without a human operator in the loop after launch. But the danger is not limited to terminal delivery.

THE NUCLEAR AI RISK: KEY INDICATORS

Russia's 2027–2036 State Armaments Program explicitly prioritises AI integration into 'strategic nuclear forces' - not just conventional weapons.

A 2025 US Army TRADOC Mad Scientist Laboratory analysis warned that Russia's evolving nuclear command doctrine suggests a 'devolution in nuclear authority to tactical commanders,' with AI integration accelerating the risk of unauthorised or miscalculated nuclear use.

In November 2024, China and the US issued a joint statement pledging to keep humans in the loop for nuclear launch decisions - a bilateral commitment covering only the terminal act, not the AI-assisted threat assessment and recommendation systems that precede it. It is not a treaty. It is not binding.

If an AI system incorrectly identifies an incoming object as a nuclear missile - a scenario that occurred multiple times in the Cold War with human operators, including the Petrov incident of 1983 - and that assessment is fed into an automated retaliatory system, the window for human correction may be seconds.

5.5 The Proliferation Cascade: From Superpowers to Warlords

The history of dangerous technologies is a history of proliferation. What starts in superpower arsenals ends in the hands of non-state actors. The autonomous weapons trajectory is more alarming than any previous case: the barrier to entry is dramatically lower, manufacturing requirements are commercially available, and the technology is inherently dual-use.

- Turkey's Kargu-2 (price: approximately $5,000 per unit) was deployed in Libya by a non-treaty party with limited international accountability
- Iran-supplied autonomous Shahed drones have enabled Houthi forces to strike commercial shipping across the Red Sea, disrupting global trade routes
- ISIS used commercially available drones for rudimentary autonomous attacks in Syria and Iraq as early as 2016
- Russian Shahed drones in Ukraine have been found containing AI chipsets, thermal vision, and inter-unit communication hardware - commercial-grade components assembled into weapons

TAIWAN: THE MOST DANGEROUS FLASHPOINT

A CIGI (Centre for International Governance Innovation) analysis identifies the Taiwan Strait as the most acutely dangerous scenario for autonomous weapons escalation: 'A deadly accident between the PLA and US military, or one of Washington's allies, involving these weapons around Taiwan or

in the South China Sea, could trigger a globally destabilising war that no one really wants. Without a formal de-escalation process in place, an incident involving lethal robots - due to unit malfunction or operator error - could spiral out of control quickly.' Given China's specific development of autonomous urban warfare swarms intended for Taiwan's cities, this is not a hypothetical scenario. It is the intended use case.

Chapter 6: The Proliferation Problem - Beyond the Big Three

6.1 The Second Tier: Who Else Is Building

While US-China-Russia competition dominates headlines, a second tier of autonomous weapons development is quietly underway that may ultimately prove more destabilising - precisely because these nations operate with fewer constraints, less transparency, and greater willingness to export to unstable regions.

Country	System / Programme	Export Concern
Turkey	Bayraktar TB2 (exported), Kargu-2 loitering munition, AKINCI autonomous drone	Exported to 30+ countries; Kargu-2 deployed in Libya 2020 - first autonomous kill
Israel	Lavender AI targeting, Harpy autonomous drone (anti-radar), Harop loitering munition	Top-10 global arms exporter; AI targeting infrastructure field-tested in Gaza, available for export
Iran	Shahed-136 / Shahed-238 autonomous drone	Supplied to Russia (Ukraine), Houthis (Red Sea), Hezbollah (Lebanon)
South Korea	AI-powered sentry robots (SGR-A1) at DMZ	Deploys sentry robots with autonomous engagement capability; exports limited for now
UAE	EDGE Group autonomous systems	Active development; regional conflict deployment in Yemen

6.2 The Commercial Drone Problem: DJI and the $70 Pizza Box

The most democratising - and most alarming - factor in autonomous weapons proliferation is the commercial drone industry. DJI, the Chinese company commanding approximately 70 percent of the global commercial drone market, produces platforms whose cameras, obstacle-avoidance sensors, and navigation algorithms are directly applicable to weaponisation. Ukraine's conflict demonstrated that hobbyist quadcopters can be modified for lethal drop-attack use within hours, at costs as low as USD 400. AI guidance software for commercial drones is openly available via GitHub repositories.

THE SHAHED LESSON: COMMERCIAL COMPONENTS, MILITARY LETHALITY

In 2025, wreckage analysis of Russian Shahed drones attacking Ukraine revealed: Nvidia AI inference chipsets (designed for commercial edge computing), thermal-vision camera modules (designed for wildlife photography and industrial inspection), and inter-drone mesh communication hardware (designed for commercial drone light shows). The same components that power DJI's recreational obstacle avoidance and Nvidia's industrial vision AI are now being used to autonomously guide weapons into Ukrainian civilian infrastructure. UNODA's formal caution that 'the proliferation of dual-use AI to non-state actors further expands the threat' has moved from warning to documented reality.

Chapter 7: The Ethics of Algorithmic War

7.1 Can a Machine Comply with the Laws of War?

International Humanitarian Law (IHL), codified across the Geneva Conventions and Additional Protocols, rests on three foundational principles: distinction (distinguishing combatants from civilians); proportionality (harm to civilians must not be excessive relative to military advantage); and precaution (taking all feasible steps to minimise civilian harm). The question of whether any current or foreseeable AI system can reliably apply these principles in actual combat is not merely legal - it is empirical. And the evidence from Gaza is damning.

Lavender's 10 percent error rate means that 1 in 10 individuals on its kill list was incorrectly identified as a Hamas operative. At 37,000 targets, that is approximately 3,700 people wrongly marked for assassination. Under IHL's proportionality principle, each strike authorised against a wrong target - and all collateral deaths that follow - is a prima facie violation. Lavender also included civil defence workers in its training data, meaning the algorithm had systematically learned to identify peacetime humanitarian workers as militant characteristics. This is not a bug. It is a predictable outcome of training data that reflects the blurred civilian-combatant environment of urban warfare.

7.2 The Moral Agency Problem

THE FUNDAMENTAL ETHICAL QUESTION

The decision to end a human life is, under every major ethical framework - consequentialist, deontological, virtue-based - an act requiring moral agency: the capacity to reason about consequences, understand context, accept responsibility, and exercise judgment that no algorithm can replicate. Pope Francis, in one of his final major policy pronouncements before his death in April 2025, called on G7 leaders to ban autonomous weapons in war, stating that machines must not be given the power to decide whether humans live or die. This moral intuition commands majority public support across every poll that has asked it - yet it is not reflected in the policy of any major military power.

7.3 The Bias Problem: Whom Do Algorithms Hunt?

AI systems learn from historical data. If that data reflects existing patterns of racial, ethnic, socioeconomic, or gendered discrimination, the AI replicates and potentially amplifies them. Lavender's training data reportedly included social media activity, smartphone communication patterns, and proximity data - features that are systematically more likely to flag certain demographic and geographic profiles. The State of Palestine's UN submission warned: these systems are 'likely to be used to pursue unethical military objectives, to commit or accelerate war crimes, crimes against humanity and genocide, and to be tested notably on populations of the Global South.'

This concern has empirical grounding beyond Gaza. AI object-recognition systems trained predominantly on Western facial data have documented higher error rates for non-Western faces. An autonomous weapons system whose object recognition performs less accurately for certain ethnicities is not a weapons system that respects the laws of war - it is a weapons system that discriminates by design. The researchers who build such systems will mostly not know this. The civilians who face them will.

Chapter 8: A Path Forward - What Must Be Done

8.1 The Treaty Analogy: Why Binding Law Is Achievable

The analogy to the Chemical Weapons Convention (CWC, 1993) and the Ottawa Treaty banning anti-personnel landmines (1997) is instructive. Both were initially opposed by major military powers. The Ottawa Treaty was not signed by the United States, Russia, or China - yet its creation established a global norm that has dramatically reduced landmine use and casualties worldwide. The CWC achieved near-universal compliance - even Russia, despite the Novichok scandal, remains a formal party. These examples demonstrate that binding international law on weapons is achievable even against great-power resistance, if civil society, smaller states, and institutional pressure are sustained.

8.2 The Minimum Framework: Six Non-Negotiable Requirements

- A clear, internationally-agreed legal definition of LAWS, with specific thresholds triggering prohibition or regulation - ending the definitional ambiguity that has paralysed the CCW for twelve years
- A mandatory 'meaningful human control' standard, with independent verification mechanisms, for any weapon system involving AI lethal decision-making
- An outright ban on fully autonomous nuclear delivery systems - covering not just Poseidon but any AI-guided strategic weapon where the human launch decision cannot be rescinded in flight
- Export controls on AI targeting systems equivalent to existing controls on nuclear and chemical weapons components - including controls on commercial dual-use components demonstrably used in weapons applications
- A mandatory incident reporting and investigation mechanism for all LAWS deployments in conflict zones, feeding into an independent UN-mandated oversight body with forensic capacity
- International certification standards for AI weapons systems before deployment - analogous to airworthiness certification for aircraft - requiring demonstration of compliance with IHL principles under realistic test conditions

8.3 The Race Against Time: 2026 and Beyond

The CCW's Group of Governmental Experts mandate runs through 2026. The UN Secretary-General has called for a legally binding instrument by 2026. The Arms Control Association's January 2025 analysis concluded that progress 'should be accelerated to conclude by the end of 2025' - a deadline that passed without a binding outcome.

ZELENSKY AT THE UN: THE SOLDIER'S WARNING

Ukrainian President Volodymyr Zelensky, addressing the UN General Assembly in September 2025, delivered the most urgent warning of the year from the front line: *"It is only a matter of time before drones are fighting drones, attacking critical infrastructure and targeting people fully autonomous - all by themselves. No human involved."*

He was not predicting a distant future. He was describing the direction of travel his own military is accelerating toward - because in a war against a nuclear-armed adversary with electronic warfare superiority, autonomous systems without a human radio link are the only operationally viable option. The ethical imperative and the military imperative point in opposite directions. That is the true crisis.

The question before humanity is not whether autonomous weapons will exist. They exist now. The question is whether the international community will establish rules governing their use before a catastrophic incident - a flash war triggered by competing algorithms, an autonomous nuclear miscalculation, a mass civilian casualty event that no machine, no operator, and no government can be held accountable for - forces the issue in the worst possible way.

History suggests that humanity often waits for catastrophe before acting. The nuclear age began with Hiroshima and Nagasaki. Biological weapons conventions were negotiated after states developed arsenals, not before. Chemical weapons killed hundreds of thousands in World War I before the 1925 Geneva Protocol. The window to act on autonomous weapons - before the first catastrophic autonomous incident - may be measured in years, not decades. It may already be measured in months.

FINAL ASSESSMENT: THE STATE OF PLAY

The global autonomous weapons market: $14.4 billion in 2025; projected $33.5 billion by 2032. Growing faster than any governance framework.

Binding international law: None. Twelve years of UN talks have produced no enforceable instrument.

Nations with deployed LAWS: At minimum the US, Russia, Israel, Turkey, Iran, China (in development/testing). Approximately 200 autonomous weapons systems globally.

The Doomsday Clock: 85 seconds to midnight - the closest in history. disruptive technologies like artificial intelligence (AI), among the factors cited.

Conclusion: The Race for Autonomous Weapons and the Future of Global Security

The development of lethal autonomous weapon systems represents a fundamental shift in modern warfare, where artificial intelligence, robotics, and increasingly automated military decision-making are reshaping the balance between technological advantage and human responsibility. China's expanding military modernisation, its civil-military integration strategy, and its growing investment in AI and autonomous platforms deserve particular scrutiny, especially given the potential implications for Taiwan and regional security in the Indo-Pacific. However, assessing Beijing's capabilities requires distinguishing verified deployments and demonstrated systems from prototypes, official ambitions, and unconfirmed battlefield claims.

The same standard must apply to the United States, Russia, Israel, and other states investing in these technologies. The central danger is not simply that machines may operate without direct human control, but that increasingly rapid engagement cycles, unreliable target identification, cyber vulnerabilities, and competitive pressure could reduce the time available for meaningful human judgment and increase the risk of unintended escalation.

Although existing international humanitarian law remains applicable, international efforts to establish specific rules for autonomous weapons have yet to produce a binding global instrument. The September 2026 consensus on elements for a possible instrument offers a basis for further negotiations, but not a final legal settlement.

Ultimately, technological leadership should not be confused with strategic stability. Governments must establish clear human-control requirements, transparent testing standards, accountability mechanisms, and enforceable international safeguards before autonomous systems become more deeply embedded in military operations.

Without these measures, the race to develop increasingly autonomous weapons risks outpacing the institutions designed to prevent their misuse, leaving global security more dependent on algorithms whose decisions may be difficult to predict, explain, or reverse.

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