

Ambivalent Acceleration: War, Battlefield Deployment, and Money Push Defense AI But Fundamental Questions Remain Unresolved

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Abstract

Artificial intelligence (AI) goes to war and is not (yet) winning. Contrary to the prevailing rhetoric, this outcome results from the fact that AI is still primarily considered an extension of existing military systems and platforms, thus prolonging the imaginaries, concepts, and practices developed to use them. Against this background the chapter discusses the current state of defense AI in 37 nations along six lines of effort: Thoughts and concepts, development, organization, funding, fielding and operation, and training.

*With Artificial Intelligence, we have developed technology
to strike targets without harming innocents
(Iran International 2025)*

*Out with Utopian Idealism, In with Hard-Nosed Realism
(Department of Defense 2026)*

War, battlefield deployment, and the increase in defense spending and private defense funding constitute the triple accelerator that explains the current defense AI push. So far, however, this push does not constitute a breakthrough. This is the core message of this chapter, which analyses the state of defense AI across 37 nations. For this purpose, the chapter updates the core findings of *The Very Long Game* (Borchert et al. 2024, henceforth TVLG), published in July 2024. At the time, this study presented the first comprehensive in-depth-assessment on the global state of defense AI.¹ By looking at 25 nations,² this volume did not speculate about the potential use of defense AI but discussed how these nations currently think about, develop, organize, fund, field and operate and train for it. This chapter updates the record by taking into account developments in the original 25 nations until May 2026 and adding the findings of another 12 case studies on Bahrain, Belgium, Brazil, Indonesia, Kuwait, Oman, Pakistan, Poland, Qatar, Saudi Arabia, Romania, and the United Arab Emirates.³

War is the core driver as it ultimately determines how armed force can use AI. This temporarily stops speculation about its added value. With Russia's war on Ukraine, the military intervention of Israel in Gaza after October 2023, the 2024-2025 missile war between Iran and Israel, the 5-day war between India and Pakistan in 2025, the US military intervention in Venezuela in early 2026, and the most recent US-Israeli attack on Iran, six different types of military conflict create various operational requirements to evaluate the performance of AI on the battlefield. Of these examples, the India-Pakistan war is most interesting as it represents a military conflict in which AI solutions not developed in the Western hemisphere play a prominent role. Although the use of AI in this conflict is similar to others, it will be interesting to see if India and Pakistan will promote their AI solutions as 'battle proven' among nations of the Global South and to what extent this label will resonate amid growing demands for 'digital emancipation' from Western (read: US) big tech.

In parallel to urgent war demands, generative and agentic AI solutions have become increasingly popular and complement machine learning as the predominant AI paradigm. As will be discussed later, large-language models (LLM) currently largely shape how armed forces think about AI, mostly triggered by reports about the role of generative AI in the US military intervention in Venezuela. In tandem, Maven Smart System, a data fusion platform, is omnipresent given reports about its use in preparing and conducting strike operations against Iran.⁴ Both

¹ This chapter references new sources wherever information has been updated. Without further reference, information is based on *The Very Long Game*.

² The first wave included studies on Australia, Canada, China, Denmark, Estonia, Finland, France, Germany, Greece, India, Iran, Israel, Italy, Japan, the Netherlands, Russia, Singapore, South Korea, Spain, Sweden, Turkey, Taiwan, the United Kingdom, Ukraine, and the United States.

³ Until the end of 2026, the Defense AI Observatory plans to publish another eight case studies on Belarus, Colombia, Hungary, Malaysia, Nigeria, New Zealand, South Africa, and the Philippines. All studies can be downloaded from: <https://defenseai.eu/english>. Accessed 31 May 2026.

⁴ Maven Smart System grew out of Project Maven, which the US Department of Defense launched in 2017. Originally developed by several companies, today Palantir serves as the prime contractor (Mands/Allen 2026; Manson 2026).

examples stimulate operators' imagination, prompt emulation – for example, Germany, Japan, South Korea, Taiwan, India and others have started to develop generative AI solutions for defense applications –, and incentivize nations to substitute US technology by local solutions, as initiatives for *Maven à la française* illustrate (Ruitenbergh 2026). Moreover, US AI technology solutions and the US government's push to use them in other nations (Resilience Media 2025) shape a very specific understanding of what it means to field "AI first" armed forces (Department of Defense 2026). At the same time both use cases also reinforce moral and legal concerns regarding the proper conceptualization of responsible military use of AI amid the need to ingest (and digest) massive data volumes.

Like few other military conflicts since the second World War, Russia's attack on Ukraine has resulted in a defense spending hike and led to a significant influx of private money into defense in Europe. Other conflicts have had similar effects in other regions. Consequently, world military expenditure reached close to USD2.9trn in 2025, a 41% surge since 2016 (Liang et al. 2026). In parallel, global venture capital poured into the defense sector reached a record USD49.1bn in 2025 (Ruitenbergh 2026b). In Europe, AI and computing have attracted the most funding in 2019-2025 (Dealroom/NIF 2026). New financial oxygen temporarily nixes the need for painful spending compromises but creates challenges of its own. At least in some European countries domestic opposition against the defense spending boom is rising (Birchard 2025). At the same time, it needs to be seen if the advent of commercial and private defense investors will send the right long-term market signals to defense developers or if their involvement increases the risk of "harmful innovation" (Kuo 2022) that redirects money and attention to seemingly attractive market segments while neglecting others.

In combination, these three forces evoke the impression of a defense AI breakthrough.⁵ This impression, however, obfuscates the fact that many long-term challenges, which TVLG has identified, remain in place or have become even more acute. First, emulation has become even more dominant, albeit with a different twist. Two years ago, emulation primarily meant that partners and challengers of the United States developed their defense AI concepts, solutions, and organizations in lockstep with Washington because they wanted to remain interoperable or prevent the US from leapfrogging. Today, war particularly in Ukraine and the Middle East reinforces emulation in the sense that nations want to implement the lessons that ongoing wars seem to teach about the relevance of defense AI. However, as will be discussed later, these wars also reinforce predispositions about defense AI deployment and development priorities, which begs the question what winning is all about when every nation is striving to use AI for the same military missions and tasks.

Second, most armed forces continue to develop and use AI in a way that helps improve existing systems. Despite its importance the question of who adapts to whom remains underexplored. Developing AI against the background of existing systems or platforms will always shape AI in line with their prime tasks. Using AI in this way reinforces dominating defense verticals as military services tend to champion technologies that best serve their interests (Builder 1989; Posen 1984; Rosen 1991) and risks neglecting important cross-service functions, which tend to lack institutional champions.

Finally, concerns about digital sovereignty are significantly more pronounced today than two years ago. This concern has not only become a key political issue in Europe but also in the Arab Gulf states (Borchert 2025b: 22-25), Brazil (Moralez/Rivas 2026: 10, 16), Indonesia

⁵ Critical observers are right to argue that the belief in AI's inevitability for military purposes also is the result of very clever framing and storytelling (Schwarz 2025).

(Bimo/Jatmiko 2025: 12, 47), or Pakistan (Ali 2025: 15, 19, 28). For defense AI and other emerging technologies, it creates a geostrategic dilemma in the sense that the partner you may want to work with for geopolitical reasons is the one that limits your geoeconomic leeway. In principle, this dilemma is not new for defense actors. For decades rising powers were subject to the export control regimes of technologically more mature partners that were hesitant to share technology. This, in turn, has incentivized rising powers do advance defense indigenization. But calls for digital sovereignty are different in the sense that unlike core defense technologies digital dual use technologies are as relevant for national security as for national prosperity. Thus, not getting access to the respective technologies, because your partner understands technology as a lever for “extractive concessions” (Korteweg/van Wijk 2026), will set back your ambition to diversify economically and endanger your security. Consequently, like-mindedness on defense and digital sovereignty many no longer mean the same thing for the same group of nations.

Against this background, the following sections provide an overview of how 37 nations around the globe currently

- think about defense AI to illustrate how existing military concepts define and shape the use of defense AI;
- develop defense AI to outline existing defense research and development (R&D) priorities related to AI, highlight important research projects and priorities, and portray the national defense AI ecosystem;
- organize defense AI with a focus on specific structures and processes that have been put in place to advance organizational adaption of defense AI;
- fund defense AI to highlight spending priorities;
- field and operate defense AI to give an overview to what extent AI is already used to support existing military missions;
- train for defense AI to analyze how armed forces prepare for a future in which they cooperate with cognitive machine intelligence.

The remainder of this chapter will first provide a quick introduction into the technicalities of AI. A summary of the main findings of all case studies follows second. Rather than providing country-specific abstracts, I use the six lines of effort discussed above to advance a cross-country understanding of who is doing what, why and how concerning defense AI. Third, the chapter will interpret these findings and suggest that some of them confirm existing expectations, whereas others are surprising and tell uncomfortable truths. Concluding remarks round off the chapter.

Defense AI: What’s In a Word

AI is popular, but challenging as there is no unifying definition. Until today, most nations rely on generic definitions put forward by international organizations, while only a few nations have adopted defense-specific definitions as Table 1 illustrates. Common to these specific definitions is the role of humans in setting objectives and a task or governance specific description of what AI is meant to do.

Country	Definition
Australia	Machine-based systems that, given a set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment (Department of Defence 2025: 5)
Canada	The capability of a computer to do things that are normally associated with human cognition, such as reasoning, learning, and self-improvement (Department of National Defence 2024: 4)
United States	(1) Any artificial system that performs tasks under varying and unpredictable circumstances without significant human oversight, or that can learn from experience and improve performance when exposed to data sets; (2) An artificial system developed in any context that solves tasks requiring human-like perception, cognition, planning, learning, communication, or physical action; (3) An artificial system designed to think or act like a human, including cognitive architectures and neural networks; (4) A set of techniques, including machine learning, that is designed to approximate a cognitive task; (5) An artificial system designed to act rationally, including an intelligent software agent or embodied robot that achieves goals using perception, planning, reasoning, learning, communicating, decision making, and acting (Congress 2019)
United Kingdom	Family of general-purpose technologies, any of which may enable machines to perform tasks normally requiring human or biological intelligence, especially when the machines learn from data how to do those tasks; for example, recognizing patterns, learning from experiences, making predictions and enabling actions to be taken (Ministry of Defence 2022: 4).
EU	A machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments (European Parliament 2024: 44)
France	Interdisciplinary field of theoretical and practical study which seeks to understand the mechanisms of cognition and thought and use a combination of hardware and software to imitate them in order to assist or replace human activities (Ministère des Armées 2019: 3)
NATO Science and Technology Organization	Systems that display intelligent behavior by analyzing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems). Alternatively, AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications (NATO STO 2023: 26)
OECD	A machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment (OECD 2024: 4)

Table 1: Specific Defense AI and Generic Civilian AI Definitions

Reference to the “family” of technologies is important, as AI uses and depends on different methods with much of the literature focusing on machine learning (ML). ML posits that “knowledge is learned from data” and that the respective algorithms run “on a training dataset and produce an AI model” (Allen 2020: 3). This notion has become very popular due to the prevalence of digital commercial business models that seek to leverage (consumer) data as well as the rapid improvement of computing resources to handle large volumes of data. The ML focus, however, has created a narrow perspective on AI, which stems from the focus on and the perceived role of data. Digital business models for consumer markets constitute the implicit reference point. These are data-centric because users provide their data in exchange for digital products and services. In addition, digital companies want to work “model-free” as AI systems should replace and scale the steps that were previously developed using specialist expertise and engineering skills. To this end, ML systems should process large amounts of data to reproduce a desired behavioral pattern.

This data-centric logic has also captured military thinking. All the countries surveyed describe data as their most important strategic asset and are gearing data strategies towards exploiting this “data treasure,” also by investing in powerful hardware. Data-centric approaches are resource-intensive and require personnel, computing power, energy, infrastructure, bandwidth and recording time, which become even scarcer in the event of war (Chahal/Fedasiuk/Flynn 2020: 10-13; Michel 2023: 16-21). Paradoxically, they are also past-oriented, i.e., armed forces can only evaluate what has been collected. While collected data can describe the dynamics of the past⁶ it cannot describe dynamic operating principles of the physical environment in which armed forces operate (Borchert/Schütz/Verbovszky 2023: 47).

Generative and agentic AI, which have become extremely popular as of recently, partly reinforce this data-centric focus, as both are ML methods. Generative AI can be used to create content such as text or code, while agentic AI puts the focus on executing tasks, that the former might have set up. It is the combination of both elements that has captured analysts fantasies as even individuals could – literally – command armies of software agents (Rickli/Knapp 2026). The US Department of Defense, for example, used different LLMs in 2023 to respond to sensitive combat-related questions (Manson 2023) and signed contracts with a total of eight leading AI companies in early 2026 to use their models on classified networks (The Guardian 2026). However, the combination of generative and agentic AI also creates challenges that “arise from both the architectural dependence on static, pretrained models and the difficulty of instilling agentic qualities such as causal reasoning, planning and robust adaption” (Sapkota/Roumeliotis/Karkee 2025).

Military users need to understand the limits of different AI methods as not all AI is created equal. AI may be considered a general-purpose technology (Horowitz 2018: 39-41; Scharre 2023: 3), but it also is a “bag full of methods” (Hofstetter 2014: 136-142). Some AI methods are better suited than others to address military tasks. Being precise about which method best suits what task is important to set the goals for defense AI to achieve. Four general approaches are important to distinguish (Brandlhuber 2021: 14; Allen 2020: 4):

- Unsupervised learning, which does not require labels for data used, is helpful for data analytics, anomaly detection or auto-coding.
- Supervised learning, which uses data labelled by human operators, is used for speech or image recognition, video analysis, auto translation, and to classify signals.
- Reinforcement learning, which allows for AI agents to generate their own data based on interacting with the relevant environment, in which they operate, is instrumental for optimal sequencing of actions over several iterations, hedging strategies to support risk management or strategic decision-making.
- Finally, cooperation and emergence result from AI agents that interact with their environment and are useful for dynamic resource management (e.g., to improve sensor capabilities), optimal resource sharing (e.g., optimal allocation of sensors and effectors to engage targets), or efficient routing.

Against this background, the US Defense Advanced Research Projects Agency (DARPA) has proposed differentiating three waves of AI (DARPA undated a; Borchert/Schütz/Brandlhuber 2023: 27):

⁶ ML models may generalize from this data but only within a scope consistent with collected data.

- First wave AI leverages handcrafted knowledge. Human experts construct expert systems that capture the specialized knowledge of human experts in rules that systems can apply.
- Second wave AI focuses on correlational learning. Statistical and probabilistic methods are used to train neural networks to perform classification and prediction tasks.
- Third wave AI emphasizes contextual reasoning. Here, computing systems have full situational awareness, which means that these systems reason in context and understand the consequences of their action and actions undertaken by third parties like adversaries, for example.

The transition from second to third wave AI is essential to understand given the latter's ability to self-learn. First and second wave AI focus on extracting patterns from (big) data by using classification and regression. Third wave AI, in contrast, strives to develop solutions that learn how best to learn by using context-aware, complex, and multi-stage decision-making commensurate with the relevant operational environment, mission tasks, and overall rules of engagement. This is pivotal for defense AI, because reinforcement learning, which is important for ML, has yielded impressive performance results in ideal-type games with perfect information (Silver et al. 2017; Vinyals et al. 2019). Imperfect information and uncertainty, however, are typical for military operations. That's why third wave AI needs to address, for example, the fact that tactical military decisions occur along a decision sequence in which prior decisions are contingent for later decisions, non-decisions may significantly limit a commander's future freedom of action, and adversarial operations in the electromagnetic spectrum may jam or even neutralize sensors and thus hamper situational awareness and situational understanding. Third wave AI thus needs to be able to interpret this mission-relevant context to avoid prejudicing decisions to hamper mission success at later stages.

Markov-Decision-Processes constitute one mathematical approach relevant to tackle these challenges as they model decision-making in an environment, "which changes state randomly in response to action choices made by the decision maker" (Littman 2001). Additional methods include adversarial learning to advance the robustness of ML (Bai et al. 2021), transfer learning (Zhuang et al. 2019) to develop defense AI solutions that can be transposed from the defense metaverse, a virtual twin of the battlefield (Borchert/Schütz/Brandlhuber 2023), into physical reality, as well as meta learning (Vettoruzzo et al. 2023) to enable decision-making policies to evolve commensurate with a non-stationary mission environment that changes over time. As a result, third wave AI addresses uncertainty by emphasizing emergence, not linearity or regularity, as the key principle and posits that formation, rather than formulation, matters for successful adaption (Mintzberg/Ahlstrand/Lampel 2005: 177; Popescu 2018).

Military operators and analysts need to understand, that emergence is no longer an abstract capability. What has been demonstrated as a most effective behavior in the defense metaverse (Borchert/Brandlhuber 2024) has arrived on the battlefield two years later. As Kateryna Bondar (Bondar 2026: 27-29) reports, Russia's V2U loitering munition, which uses Chinese technology components, seems to operate as "distributed, partially swarm-capable systems in which each unit processes information locally while remaining aware of nearby drones." Mutual awareness also reportedly allows the group to execute "evasive maneuvers" when facing a threat. Moreover, a "group of seven V2U loitering munition deviated from preplanned mission after detecting a concentration of vehicles and civilians, autonomously forming a circular holding pattern before initiating coordinated attacks" thus making it "one of the most innovative and dangerous unmanned systems currently observed in active combat use."

Who Does What, Why, and How?

Before summarizing the main findings of the 37 case studies, a word of caution is needed. Although detailed, the case studies, which are based on open-source information and expert interviews, only provide a snapshot of the national defense AI endeavors until May 2026. Based on the case studies, this summary is selective. In addition, the summary also simplifies, for example, by equating a single project with a national focus on developing or deploying defense AI. This, in turn, might not always adequately describe the respective levels of maturity and could inflate the importance of individual projects or initiatives.

Thinking About Defense AI

Two years after publishing TVLG the question what armed forces want AI to accomplish remains challenging to answer. Accelerated deployment witnessed throughout this period affects the way armed forces prioritize using AI. In addition, the growing popularity of generative and agentic AI shapes imaginaries that often limit – rather than broaden – the understanding of what AI could do and what type of AI should (not) be used for which military task. In sum, most armed forces want to improve and optimize what they are doing today, rather than exploring how using defense AI might empower them to accomplish new tasks and missions. What may surprise at first sight, becomes less puzzling when looking at the underlying drivers shaping national defense AI perspectives.

Strategic Motives

Three strategic motives are at play (Table 2). The first group of nations has adopted a threat-based approach. In this case, one strategic challenger or a complex set of regional challenges has been identified, and defense AI is seen as a key solution. The textbook example are China and the United States, which see each other as prime challengers and focus on defense AI to contain the other. The same logic applies to neighboring pairs of countries like Greece and Turkey, South Korea and Japan vs. China and North Korea, Poland and Belarus and Russia as well as Ukraine and Russia. Israel, India, Pakistan, and Romania also operate under this perspective, but with additional regional drivers shaping their view. India, for example, is also concerned that defense AI might empower other nations to dominate the country, which prompts New Delhi to invest in indigenous solutions. This view, in turn, also prompts Pakistan to invest in defense AI solutions of its own (Ali 2025). Iran considers Israel, the United States, and their allies in the region as an existential threat shaping its approach to defense AI. A similar driver is at play in Romania, where the geostrategic situation around the Black Sea is a major source of concern (Csernatonu 2026). Finally, Taiwan is a special case as all three strategic motives are at play with the threat from China as the key driver.

Fear of Missing Out (FOMO)	AI as a Capability Multiplier	Threat-Based Thinking
BEL, DNK, GRE	BEL, DEU*, DNK*, ESP, EST*, FRA*, FIN*, GBR*, GRE, ITA*, NLD*, ROU, SWE*, RUS, TUR*	GRE, POL*, ROU*, RUS, UKR
	BRA, CAN, USA*	USA*
TWN*	AUS*, KOR, IDN, SGP*	CHN, KOR*, IND, JPN, PAK, TWN*
ARE*, SAU*	BHR, IRN, ISR, KWT, OMN, QAT*	ARE, IRN, ISR

Country Code: ARE United Arab Emirates, AUS Australia, BAH Bahrain, BEL Belgium, CAN Canada, CHN China, DEU Germany, DNK Denmark, ESP Spain, EST Estonia, FIN Finland, FRA France, GBR United Kingdom, GRE Greece, IDN Indonesia, IND India, IRN Iran, ISR Israel, ITA Italy, JPN Japan, KOR South Korea, KWT Kuwait, NLD The Netherlands, OMN Oman, PAK Pakistan, POL Poland, QAT Qatar, ROU Romania, RUS Russia, SAU Saudi-Arabia, SGP Singapore, SWE Sweden, TUR Turkey, TWN Taiwan, UKR Ukraine, USA United States

* Fear of Missing Out on Ukraine's use of defense AI (FOMO-U)

Table 2: Three Strategic Drivers of Defense AI

The second group of countries fears missing out (FOMO) or falling behind. Compared to TVLG this category is diversifying:

- Core FOMO still matters for a few countries. Belgium, for example, sees a risk of falling behind other partners in NATO and the EU if it does not succeed in catching up on defense AI (Fiott 2026). Denmark has traditionally been a key US ally and fears a strategic disconnect, although the Trump administration's policy forces the country to reconsider its strategic orientation. Greece, whose armed forces went through several years of underfunding after the international financial crisis in 2008/09, fears missing out on Turkey's mastering of defense AI.
- In the Arab Gulf region, Saudi Arabia and the United Arab Emirates compete for AI leadership. This turns FOMO into a notable will to Crowd-Out Your Neighbor (COYN) as countries are afraid not to offer the best-connected digital infrastructure, the fastest super-computer, or not being able to outspend regional rivals (Borchert 2025b: 22).
- The most interesting new subgroup emerges around the fear of missing out on Ukraine's (FOMO-U) use of defense AI. Based on assessing official documents and statements that explicitly reference to learning lessons from the war in Ukraine, this group includes, inter alia, Australia, Denmark, Estonia, Finland, France, Germany, Italy, Poland, Romania, Singapore (also referring to lessons from the war in Gaza), South Korea, Sweden, Taiwan, the Netherlands, the United Kingdom, the United States, and Turkey. This group also includes Qatar, Saudi Arabia, and the United Arab Emirates to the extent these countries seek AI-enhanced air defense solutions for lower engagement levels.

The third group includes countries that interpret AI primarily as a capability multiplier. Members of the other two groups also share this perspective but drive defense AI development via threat or FOMO-based foci. It will be interesting to see how in particular cooperation with Ukraine will shape this group.

Who Shapes Whom?

Strategic motives play a role when asking if and to what extent others are shaping national defense AI perspectives. Partners play a foundational role (Table 3). Here, the United States remain the pivotal player, particularly for its allies in the Asia-Pacific region. European partners of the United States also look to other members of NATO and the EU for inspiration. In this context, inspiration implies that partners incorporate US military concepts and thinking in

their defense capstone documents, mimic US organizational reforms, and emulate US defense solutions, like the Joint All-Domain Command and Control (JADC2) concept, to remain interoperable. Emulation, however, also comes with risks. Taiwan’s AI-pilot project – modelled after DARPA’s Alpha Dogfight – illustrates these risks by proving to be “organizationally far-reaching but conceptually ill-formed” (Kitsch 2024: 6).

Challengers Shape Thinking	Agnostic	Partners Shape Thinking
GRE (TUR) RUS (UKR) UKR (RUS)	ESP, FRA, SWE	BEL, ESP, (EU, NATO) DEU, DNK, FIN, GBR, POL, ROU (USA) EST (USA, FRA, NATO, GBR) GRE (ISR, USA) ITA, NLD (NATO, USA) TUR (UKR)
USA (CHN)	BRA	CAN (USA)
CHN (USA) IND (PAK, CHN) PAK (IND)	IDN	AUS, CHN, JPN, KOR, TWN, SGP (USA)
IRN (ISR, USA) ISR (regional context)	BHR, KWT, OMN	ARE, QAT, SAU (USA)

Table 3: Who Shapes the Thinking on Defense AI?

Despite remaining pivotal, the United States’ elevated role is under pressure from two sides. First, the current Trump administration’s generally dismissive attitude vis-à-vis partners undermines trust in cooperation and increases concerns about using US technology, as controversies around Palantir illustrate (Ulbricht/Egbert 2024; Taskale 2025). Fear the US could leverage its defense technology to discipline partners are not new (Blankenship 2023; Spindel 2023). But the spat between the US Department of Defense and Anthropic over the latter’s resistance to let the Department use its generative AI solutions for specific military tasks is of a different quality given the Department’s attempt to designate a US company as a supply chain security risk. As this verdict is also relevant for commercial companies using Anthropic’s software, it has caused heated push back. The Information Technology and Industry Council, for example, argued the Department’s designation undermined the competitiveness of US technology and helped push initiatives for US-free digital defense solutions elsewhere (Freifeld 2026). In addition, the June 2026 decision that demands Anthropic to make sure that no foreign national user, “whether inside or outside the United States” (Anthropic 2026), has access to the company’s latest AI solutions, fully vindicated this concern.

Second, the ‘Ukrainization’ of defense creates a powerful new role model. Leveraging FOMO-U, Kyiv understands how to strategically position its solutions in AI and unmanned systems as the cutting edge of modern warfighting. Unlike Israel, whose use of AI in Gaza is very controversial (Abraham 2023, 2024), Ukraine seems to benefit from a perception advantage grounded in the role of a smart, modern-age digital David that is fighting a ruthless Goliath. But challenges emerge, as some of Ukraine’s solutions run on US software, which has led to warnings indicating there was a risk of unwanted data and technology proliferation to the US (Intelligence Online 2026).

Strategic challengers are as powerful as partners and allies in shaping defense AI perspectives. Again, the case studies on China and the United States highlight how closely both nations monitor each other’s defense AI moves. In addition, the threat-based perspective discussed above also shapes the perspectives of those countries that feel existentially threatened by neighbors or a cocktail of different risks. Interestingly, the match is not always perfect. While Greece’s thinking on defense AI is motivated by the military and defense industrial

challenges posed by Turkey, the latter is increasingly replacing its traditional focus on the US by emphasizing its own foreign policy and indigenous defense industrial ambitions.

Between these two poles, only few countries remain. France traditionally emphasizes its role as a self-determined nuclear power and tries to chart its own course regarding defense AI. Sweden and Spain, by contrast, are a bit more difficult to locate. Spain's national security strategy talks about the China challenge, but it is not much of a strategic driver for its thinking on defense AI, which seems more influenced by initiatives driven from inside NATO and the EU. Sweden, traditionally very close to the US, takes an agnostic perspective as its thinking is shaped by internal drivers like total defense and NATO. In Bahrain, Kuwait, and Oman (Borchert 2025) as well as Indonesia (Bimo/Jatmiko 2025) more pronounced defense AI approaches need to emerge, while the absence of conventional threats shapes Brazil's approach (Moralez/Rivas 2026).

Human or Tech-Centric Understanding

Whether countries adopt a human or a technology-centric approach to defense AI is important to understand the relationship between human operators and machines. The human-centric approach builds on the idea that AI is to complement, not replace human beings. By contrast, a technology-centric approach posits that AI shall facilitate and accelerate full technical autonomy and machine-machine interaction.

Compared to mid-2024 the picture is surprisingly stable as most countries stay within the human-centric approach (Table 4), but with nuances. Estonia supports a human-centric approach but is not a "normative hawk" on regulation. South Korea belongs to this group as well, but demographic aging and a dramatically shrinking personnel basis of the armed forces could become drivers for a more technology-centric view in the future. For the time being, Russia and the US also adhere to the human-centric paradigm. Although Russia explores AI to advance autonomy on C2 the country considers AI a support function not to replace human decision-making (Bondar 2026a). With the 2023 Replicator swarm initiative (Hicks 2023; Tucker 2024) and DARPA's latest Decentralized AI through Controlled Emergence (DICE) initiative (DARPA undated b) the US has launched activities that point towards more tech-centric future perspectives.

A more tech-centric paradigm is also emerging in three other nations. Following the attack on Israel in October 2023, its armed forces deployed numerous unmanned systems, for example, in tunnels built by Hamas, and used AI to command these systems as well as support tracking and detection (Mimran et al. 2024). Turkey wants to leverage AI in tandem with the country's expertise on uncrewed assets to advance autonomous operations across domains. Turkish defense company Havelsan has been championing the "Digital Troops" concept that reflects this idea and is building a product portfolio around it. In addition, the country's defense engineers posit that it is more difficult to arrange for man-machine integration than to enable machine-machine interaction, which adds to the country's edge towards a technology-centric approach (Kurc 2024). For Ukraine, achieving machine autonomy with defense AI is one of the country's declared development priorities for the near future, also because the war shows that connectivity that provides one option for human operators to continue piloting uncrewed assets, is brittle in combat (Goncharuk 2024).

Finally, there are several nations that take an agnostic view, but across this group there are strong drivers that point towards the likelihood of a more technology-centric stance in the future. Denmark's need for wide area surveillance with uncrewed assets and defense AI could

entice a more technology-centric approach. Estonia, Iran, Singapore, and Taiwan see the option to free up scarce manpower with the help of AI and uncrewed systems. Greece is still agnostic, but strategic rivalry with Turkey could tilt the balance depending on where Turkey is heading. Russia’s position is moving between both poles, in particular regarding the interplay between defense AI and lethal autonomous weapon systems (LAWS). Finally, Sweden, like Denmark, sees a need for wide area surveillance, for which defense AI could augment uncrewed assets. In addition, the need to counter hypersonic weapons could prompt a more technology-centric stance with defense AI playing a prominent role in analyzing data related to this specific threat.

Tech-Centric Approach	Agnostic	Human-Centric Approach
TUR, UKR	DNK, EST, GRE, SWE, RUS	BEL, DEU, DNK, ESP, EST, FIN, FRA, GBR, ITA, NLD, POL, ROU, RUS, TUR, UKR
USA		BRA, CAN, USA
		AUS, CHN, KOR, JPN, IDN, IND, PAK, TWN, SGP
ISR	IRN	ARE, BHR, ISR, KWT, OMN, QAT, SAU

Table 4: Human or Tech-Centric Understanding of Defense AI

Developing Defense AI

Before addressing current defense AI development priorities in detail, it is worth asking which of the three waves of defense AI shapes national mindsets. As argued above, this differentiation serves as an indicator for defense AI applications that are aligned with the status quo (second wave AI) or illustrate potential “breakout” solutions (third wave AI).

The overwhelming majority of the countries (Table 5) follows a data-focused understanding of defense AI. Within this group the ambition to develop local data and AI models has markedly strengthened since 2024. Arab Gulf nations, for example, have launched several initiatives to build models reflecting the needs of Arabic languages and Islamic values (Borchert 2025). In parallel, countries like Australia, Germany, France, the Netherlands and the United Kingdom increasingly consider AI a sovereign defense industrial capability.

Focus on Data	Agnostic	Focus on Emergence
BEL, DEU, DNK, FIN, FRA, GBR, GRE, ITA, NLD, POL, RUS, ROU, SWE, UKR	EST, ESP, TUR	(DEU), (RUS), (UKR)
BRA, CAN, USA		USA
AUS, CHN, IDN, IND, JPN, KOR, PAK, SGP, TWN		
ARE, BHR, ISR, KWT, OMN, QAT, SAU	IRN	

Table 5: Data or Emergence-Based Defense AI Development

Few countries hold an agnostic position. Estonia’s defense AI strategy underlines the need for an adequate digital information infrastructure, which includes data (Ministry of Defence 2025b). Restricted access to data continues to be a challenge in Spain (Ricart 2024). To what extent Iran can implement its plans for a new defense AI roadmap and a data center remains (Recorded Future 2025) to be seen amid ongoing uncertainties related to the military conflict with Israel and the US. Turkey’s development priorities indicate a weak tilt towards emergence in combination with uncrewed systems.

Finally, emergent AI is no longer an abstract concept. The United States discusses and explores the military benefits of third wave AI thanks to dedicated programs managed by DARPA. The agency's latest DICE initiative will double down on leveraging “the principles of decentralized self-organization” to “dynamically form teams using peer-to-peer coordination to execute complex missions” (DARPA undated b). These ideas have been at the core of two capability and technology development projects launched within the Bundeswehr’s Center for Digitalization and Technology Research (dtec.bw) that give Germany a lead on emergent AI tactics in NATO and the EU.⁷ In addition, emergent AI is tiptoeing into the battlefield (Bondar 2026; Kirichenko 2026; Militarnyi 2026).

Combining the data vs emergence perspective with technology and human-centric approaches to defense AI produces the 2x2 matrix depicted in Figure 1 and Figure 2. Both charts illustrate that data and human-centric paradigms continue to be dominating in all 37 nations, but change is underway:

- As argued, the United States is the most prominent candidate to embrace emergence for future operations, but it remains to be seen to what extent different service preferences can be aligned with future solutions that move towards decentralized and horizontal, rather than vertical, command and control (C2) approaches. DARPA’s DICE initiative also suggests that the US will maintain a human-centric philosophy as envisaged solutions are meant to maintain alignment with commander’s intent and doctrine (DARPA undated b).
- Once the United States move towards emergence, China is likely to follow suit as it wants to play on par. Whether China would move towards field IV via emphasizing machine autonomy (field II) before embracing context-aware defense AI solutions is hard to say right now, as the country is exploring LLM-based solutions and emergent coordination for future swarming (Ping et al. 2025, Chen/Stewart 2025).
- The fact that Russian systems operated in Ukraine are the first to show emergent swarm behavior in combat is telling. It suggests that for the moment the country enjoys an advantage in fielding this capability. Russia thus qualifies as the third candidate for the emergence category, although it is not yet clear to what extent Moscow will scale this capability.
- With Israel, Ukraine, and Turkey three countries qualify for moving the data-centric focus from a human to a more tech-centric paradigm. As in the case of Turkey, this does not (yet) suggest fully self-organizing defense assets. Israel, however, could and Ukraine already is exploring this option.
- Finally, Iran, Singapore, and South Korea could adopt a more pronounced machine autonomy paradigm as they see value in compensating demographic aging and shrinking armed forces with more technical autonomy. And Iran, given the erroneous downing of Ukrainian International Airline flight 572 in 2020 by a ground-based air defense battery, considers more autonomy to avoid human errors.

⁷ In full disclosure GhostPlay and GhostPlay@SEA provide the funding for the work of the Defense AI Observatory.

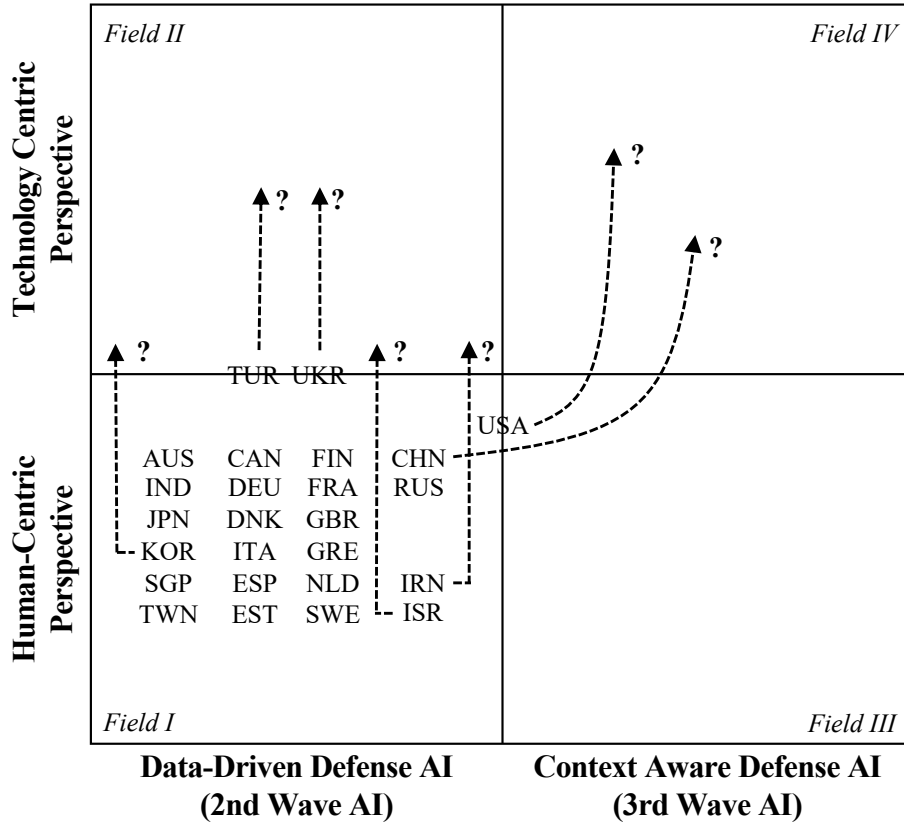


Figure 1: Four Paradigms to Develop Defense AI in mid-2024

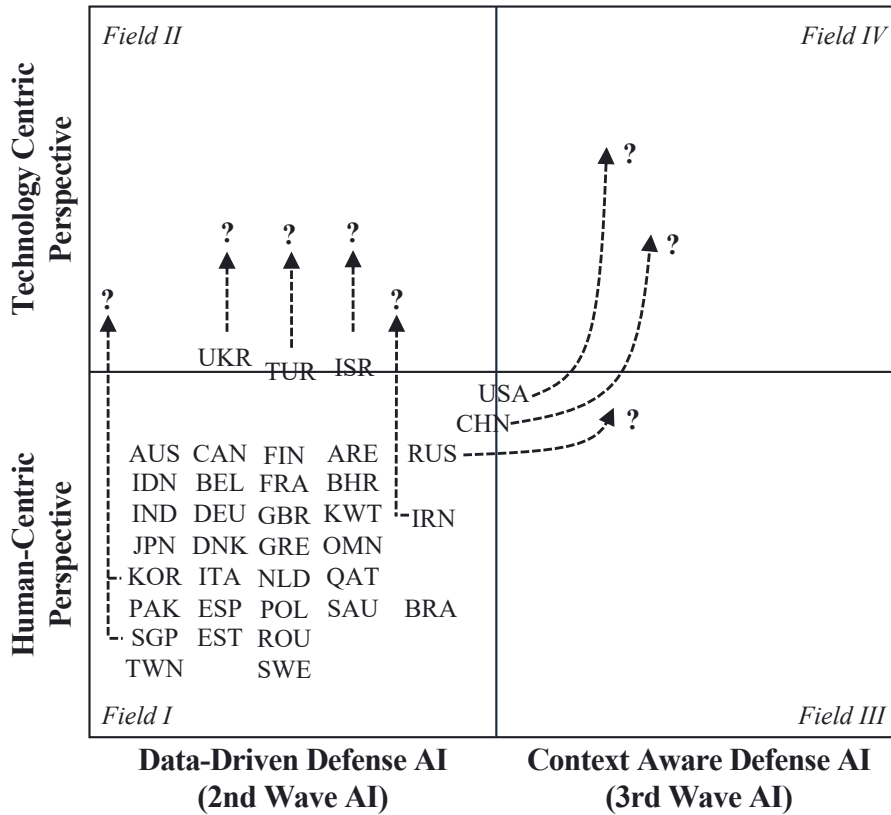


Figure 2: Four Paradigms to Develop Defense AI in mid-2026

Against this background, Table 6 provides an overview of the 15 (of 37) top defense AI research and development (R&D) priorities across the 37 nations analyzed.⁸ The table compares 2024 with 2026 priorities and indicates in brackets the number of countries which prioritize the respective defense AI use case or application. Within two years the R&D priorities have evolved significantly:

- While in 2024 the combination of AI with unmanned systems and intelligence, surveillance, and reconnaissance (ISR) was the dominating R&D priority, the pendulum has shifted towards using AI in the digital domain for cyber security/defense in 2026. This is likely to reflect a growing understanding of the digital infrastructure as an object of military attacks. If we include AI for electronic warfare in this cluster, these three priorities are harbingers of what armed forces need to prepare for to continue using AI successfully.
- In 2026 a second priority cluster emerges around AI for ISR, unmanned systems and targeting, which reflects the importance these applications play in ongoing military conflicts.
- The third priority constitutes of AI solutions for countering unmanned systems, mostly low and slow flying platforms, air defense as well as radar and early warning systems. This cluster describes shortfalls that the war in Ukraine and Iranian attacks on Arab Gulf countries have brought to the fore.
- With defense industrial R&D, data models, and AI methods, the 2026 list includes priorities not yet covered in 2024. These cross-functional segments reflect a growing understanding of AI as a sovereign capability that requires data and AI models that reflect specific language, cultural, religious, and operational requirements as well as digital solutions that shield national data and insights from unwanted third-party access.
- With close-in weapon systems, encryption, tactics development as well as influence operations and defense industrial production, five applications rank at the bottom the 2026 R&D priority list. From an analytical perspective it is worth paying attention on these use cases as they could become future differentiators. This is particularly true for tactics development and AI-enhanced defense industrial production as respective solutions play key roles in preparing armed forces to sustain protracted warfare (Borchert 2025a).

Although only quantitative in nature, the comparison shows that more and more countries identify development priorities for the same missions or use cases. But when everybody aspires to be active in the same segments, technology-induced competitive advantages are of limited use. Analysts that want to understand who could take the lead will need to look at the qualitative differences of the various AI methods used for the respective solutions and assess the interplay of AI with other elements relevant for force transformation such as culture, concepts, operator proficiency, or frontline experience.

⁸ The overview has been updated based on the 2024 findings in TVLG and a review of open-source official strategy, doctrine, and R&D documents as well as identified R&D programs.

Top Defense AI R&D Priorities in Mid-2024 (N = 25 Nations)		Top Defense AI R&D Priorities in Mid-2026 (N = 37 Nations)	
1	Unmanned systems (21)	1	Cyber and computer network operations (35)
2	Intelligence, surveillance, reconnaissance (20)	2	Data analytics and data management (32)
3	Predictive maintenance; logistics; maintenance, repair, overhaul (17)	3	Intelligence, surveillance, reconnaissance (32)
4	Command and control (15)	4	Unmanned systems (32)
5	Data analytics and data management (15)	5	Target detection, identification, classification (31)
6	Cyber and Computer network operations (14)	6	Command and control (30)
7	Manned-unmanned teaming (14)	7	Defense industrial research and development (new, 30)
8	Target detection, identification, classification (14)	8	Radar and early warning systems (new 29)
9	Common operational picture (13)	9	Common operational picture (28)
10	Decision and planning support (12)	10	Electronic warfare/Electromagnetic spectrum operations (28)
11	Training/Simulation-based training (11)	11	Countering unmanned systems (28)
12	Modelling, simulation, red teaming, and wargaming (10)	12	Air defense (26)
13	Swarming (9)	13	Predictive maintenance; logistics; maintenance, repair, overhaul (26)
14	Air defense (8)	14	Training/Simulation-based training (26)
15	Electronic warfare/Electromagnetic spectrum operations (8)	15	Data models and AI methods (new 25)

Table 6: Defense AI Development Priorities 2024 vs. 2026

Organizing Defense AI

According to Jensen/Whyte/Cuomo (Jensen/Whyte/Cuomo 2022: 3), structure is one of two key factors determining if and to what extent the use of information technology will lead to military innovation, because the “structure of institutions channels the flow and interchange of information across the formation.”⁹ Whether nations undergo organizational reform to prepare for the use of defense AI is thus an important question. The cross-national perspective (Table 7) suggests that most countries have created new functions and even new organizations. This constitutes a major shift compared to the publication of TVLG, when most nations tasked existing organizations with defense AI.

So far, the United States and France are among the few countries that have set up new project-specific organizations to advance defense AI. Project Maven in the US explored the use of defense AI for ISR and made progress thanks to the new, small, dedicated project structure – but later faced organizational challenges and resistance upon transitioning into the prevailing functional organization (Manson 2026). France set up ARTEMIS.IA as a public-private partnership to provide the armed forces with a set of different applications to analyze big defense data volumes but could not deliver the key goal of identifying and selecting best-in-class proposals because loopholes in the design provided options for circumventing the setup’s competitive nature.

⁹ The other factor is resonance understood as the “degree to which prevailing ideas about how war is fought and problem-solving routines accommodate new information flows” (Jensen/White/Cuomo 2022: 3).

Most countries, by contrast, have set up dedicated new defense AI functions or units at the level of the MoD, while others also established new research and development (R&D) entities to drive defense AI forward.¹⁰ The list includes:

- Australia: Defense AI Center and the Defense Innovation Hub
- Canada: Creation of a the DND/CAF AI Center (DCAIC) in addition to creating the Digital Services Group and the CAF Cyber Command
- Estonia: Formalization of an AI coordination function in the Ministry of Defense in addition to setting ab the Future Capability and Innovation Command
- Finland: Creation of the AI Center of Excellence, which had hitherto used existing structures
- France: New Ministerial Agency for Defense AI (AMIAD), which emerged out of the Defense AI Coordination Unit
- Germany: Chief AI Officer in the Ministry of Defense and new Innovation Center of the Bundeswehr (InnoZBw)
- Indonesia: National Task Force on Cyber and AI and the National Defense Council with a coordinating role related to AI
- India: Defense AI Council (DAIC) and Defense AI Projects Agency (DAIPA)
- Israel: AI and Autonomy Administration in the Ministry of Defense
- Japan: Defense Innovation Science and Technology Institute
- Poland: AI Implementation Center within the Cyberspace Defense Forces Component Command
- Russia: Centralized AI Headquarters under the Government and Presidential Administration
- Sweden: Civil-Military AI and Security Consortium to coordinate activities
- Ukraine: AI Defense AI Center to coordinate defense AI development with frontline experience
- United Kingdom: Responsible AI Senior Officer (RAISO) position and UK Defense Innovation
- United States: Chief Digital and Artificial Intelligence Office (CDAO)
- Singapore: SAF AI Center, which is part of the new SAF C4 & Digitalization Command
- South Korea: National Defense AI Center
- Taiwan: Defense Innovation Office and AI Project Office in the Ministry of Defense

Project-Based Approach	Entrusting Existing Organizations with Defense AI	Creating New Organizations to Deal with Defense AI
FRA	BEL, DNK, ESP, ROU, TUR	DEU, EST, FIN, FRA, GBR, GRE, ITA, NLD, POL, ROU, RUS, SWE, UKR
USA	BRA CHN, PAK	CAN, USA AUS, JPN, KOR, IDN, IND, SGP, TWN
	ARE, BHR, IRN, KWT, OMN, QAT, SAU	ISR

Table 7: How to Organize Defense AI

Several countries still task existing organizations to advance and coordinate defense AI activities. Turkey, for example, has added the task of coordinating defense AI stakeholders to the portfolio of the State Secretariat for the Defense Industry (SSB). The six Arab Gulf states have created specific ministerial positions and even inter-ministerial coordination activities

¹⁰ NATO is also reported to set up a new AI Center of Excellence in France (Fauroux 2026).

but for the time being these activities pertain to all government activities and are thus not defense-specific (Borchert 2025: 52-54). Similarly, Iran has created a non-defense National AI Organization (Kazinform 2025) to advance activities.

In addition to organizational change at ministerial levels, several countries also introduced novel elements at service and command levels. The USA launched the AI and Data Accelerator (AIDA) initiative to “embed teams of data experts within combatant commands” (Barnett 2021). France uses AI coordinators at service levels in a similar way. The Netherlands involves experts of the Data Science Center of Excellence as defense AI advisors to cooperate with specific warfare centers to formulate doctrine and set up projects. Australia has established a central organization within the Joint Capabilities Group to coordinate efforts among the services. India has adopted a similar approach with setting up a new AI Subcommittee and a Joint Working Group on AI for the services and is also considering setting up a tri-service Data Force (Sajwan/Rathore 2026). In Israel, many of the existing independent AI units of the Israel Defense Force (IDF) have been absorbed into the IDF Bina AI Division (Ynet 2025). China has dissolved the Strategic Support Force and created the Information Support Force as well as the Cyberspace Force, which are both expected to be involved in AI development activities (Lin/Liao 2024; Arthur 2024). So far, South Korea still seems to be the only country designating dedicated experimental units for each service to advance defense AI adoption.

Funding Defense AI

Sustained funding is essential for defense capability development. Defense AI is no exception to this rule. But funding still presents the biggest analytical challenge. The significant spread in funding, that ranges from low one-digit million figures per annum in some countries to close to USD30bn only for AI supercomputers in the US FY27 budget request (Vincent 2026), makes a volume-based comparison useless. In addition, national budgetary laws and diverging definitions of funding categories move cross-country analyses close to comparing apples with peaches. Therefore, the findings depicted in Table 8 need to be interpreted with care.

Somehow Financed	Dedicated AI Budget Line	Program of Record	Dedicated AI Budget Line and Program of Record	Dedicated AI Budget Line, Program of Record and Interagency Funding
BEL, ESP, GBR, GRE, ROU	DNK, EST, FIN, ITA, NLD, SWE	AUS	DEU, FRA, POL, RUS, TUR, UKR	
BRA			CAN, USA	
IDN, PAK, SGP	IND, JPN, TWN		CHN	KOR
BHR, KWT, OMN	ARE, ISR, QAT, SAU	IRN		

Table 8: How to Fund Defense AI

Starting from left to right, the category ‘somehow financed’ suggests that it is not clear, what the respective countries spend on defense AI because budgets are not disclosed. While money is available, different defense budget lines are tapped to fund the respective projects. If funding is sustainable, is hard to say in these cases.

Compared to mid-2024 the number of countries with dedicated defense AI budgets lines has increased. This means that defense AI officially appears in the defense budget, most often in

the form of R&D projects that are either listed at aggregate levels or with respect to different R&D priorities, use cases, or technology fields. Italy's spending, for example, also includes funds to advance the networking of ecosystem partners to include specialized civilian AI research institutes. In the Netherlands, the government has committed to invest €150M until 2029 for five priority technologies including defense AI (Brekelmans 2025). Israel adopted a new five-year defense development plan with AI and robotics at its core (Bob 2026). Japan significantly boosts its defense AI spending, and Taiwan has adopted a new budget line on AI-assisted C5ISR (Ministry of Defence 2026; Dotson 2026). In Qatar, Saudi Arabia and the United Arab Emirates, governments have set aside three-digit million Euro amounts to fund individual defense AI projects (Borchert 2025b: 56-58).

When defense AI is mentioned, like in Australia and Iran, as a program of record, it signifies that procurement activities are ongoing, which also suggests multi-year funding. The final two categories in Table 8 show that the listed countries budget defense AI as part of ongoing defense R&D efforts as well as procurement projects. Germany, for example, has launched Uranos KI, an AI-enhanced surveillance project worth €80M meant to support the Bundeswehr's 45 Armored Brigade to be stationed in Lithuania (Hall 2025). While integration of AI into ongoing procurement projects sounds like good news at first, it implies that it is – absent access to more classified budgetary material – close to impossible to gauge the true level of defense AI spending related to the respective procurement project. So far, South Korea remains the only country that has engaged civilian ministries, primarily the Ministry of Science and Information and Communications Technology, in co-funding the development of defense AI.

Despite significantly growing defense budgets, it remains difficult to assess how effectively governments spend on defense AI. Overcoming the situation is challenging, as an internationally accepted taxonomy on defense AI performance measurement, including spending, is missing. In view of developing such a taxonomy (Soesan et al. 2026), it will be important to combine input, output, outcome, and impact perspectives to assess what has been made available and what has been achieved. In this regards, three aspects are key:

- First, a spending taxonomy could create transparency regarding the input factors needed to produce defense AI solutions such as hardware (e.g., edge computing, high-performance computing), data management and data curation, data analytics, digital models of physical assets (e.g., missiles, radars, vehicles), mathematical models, advanced simulation environments, and software development.
- Second, the taxonomy needs to consider the performance of AI models and approaches commensurate with the tasks to be fulfilled. The metrics for this category should vary as second wave AI, for example, focusing on classification or pattern recognition, would need benchmarks like accuracy or false positive rates, whereas third wave AI, that can be used to develop AI tactics, will need benchmarks like exploitability, defined as the ability of one player to take advantage of a suboptimal adversarial move.
- Finally, the taxonomy needs to look at effectiveness and focus on outcome and impact generated by defense AI. Benchmarks could ask if an AI-enhanced ground-based air defense system engaged more adversarial targets with less munition and in shorter time or what the minimum size of an AI-empowered swarm that successfully neutralizes or destroys destroy an adversarial tank formation would need to be.

Fielding and Operating Defense AI

Like the defense AI R&D priorities (Table 6), national fielding and operating priorities for defense AI are aligning. Here, however, differences between the 37 nations remain more pronounced (Table 9):

Top Defense AI Deployment Priorities in Mid-2024 (N = 25 Nations)		Top Defense AI Deployment Priorities in Mid-2026 (N = 37 Nations)	
1	Unmanned systems (21)	1	Cyber and computer network operation (32)
2	Intelligence, surveillance, reconnaissance (17)	2	Unmanned systems (32)
3	Target detection, identification, classification (14)	3	Intelligence, surveillance, reconnaissance (29)
4	Data analytics and data management (14)	4	Data analytics and data management (28)
5	Predictive maintenance; logistics; maintenance, repair, overhaul (11)	5	Target detection, identification, classification (26)
6	Training/Simulation-based training (11)	6	Training/Simulation-based training (25)
7	Air and missile defense (9)	7	Defense industrial research and development (new, 24)
8	Cyber and computer network operation (9)	8	Countering unmanned systems (22)
9	Common operational picture (8)	9	Modelling, simulation, red teaming, and war-gaming (17)
10	Precision effects (8)	10	Predictive maintenance; logistics; maintenance, repair, overhaul (17)
11	Battle and combat management (7)	11	Radar and early warning systems (new, 15)
12	Command and control (7)	12	Enterprise services (14)
13	Enterprise services (7)	13	Space-based assets (14)
14	Information and influence operations (7)	14	Air and missile defense (13)
15	Manned-unmanned teaming (7)	15	Common operational picture (12)

Table 9: Top Defense AI Deployment Priorities 2024 vs 2026

- As in 2024, the unmanned systems-targeting-ISR cluster continues to play a top role, only preceded by the growing use of AI for cyber security/defense. Two years earlier, AI-enhanced cyber defense only constituted a deployment priorities for around a third of the countries.
- Using AI to advance solutions to counter unmanned systems is the one application that grew significantly in prominence compared to 2024, when only two nations had fielded AI for this mission. This is also significant as the use of AI for air and missile defense has only marginally advanced as a priority during the past two years, which underlines existing capability gaps at the lowest air defense engagement layer.
- In 2024, around a third of all countries deployed AI for battle and combat management systems. This proportion sunk slightly with eleven nations deploying it in 2026. Here, interesting qualitative differences could emerge in the future given the prominence of Systematic's SitaWare suite, de facto standard in NATO countries, Ukraine's Delta system that has been tested by many NATO partners (Kirichenko 2026), and Maven Smart System.
- Predictive maintenance and logistics remain prominent with around half the countries fielding AI for this purpose. Similarly, around a third of all nations deploy AI to advance solutions for manned-unmanned teaming.
- Fielding AI for border security is a relevant application area in countries, where armed forces perform respective tasks, such as in the United Kingdom, the Netherlands, Greece, Poland, Turkey, Israel, Iran, India, China, South Korea and Singapore.

- From a regional perspective, differences are narrowing as well, at least when looking at the top five deployment use cases. These are as popular among EU and NATO nations as in the Asia-Pacific region. The diffusion rate for AI to support ISR and targeting is, however, a bit lower in the Arab Gulf region.

Nations that are at war tend to emulate each other's AI use cases. Here, the Russia-Ukraine war is a telling example as both nations use AI for air and missile defense, C2, common operational pictures, computer network operations, decision and planning support, electronic warfare, fire support, influence operations, ISR, and to use and counter unmanned systems. Absent significant conceptual and tactical changes it is hard to see, how AI can provide one side with a decisive edge if both parties engage in tit for tat. Rather, close mutual emulation contributes to freezing frontlines (Lovett-Kiss 2025) and illustrates that competition creates look-alikes (Liou/Musgrave/Daniel 2015: 159).

While Table 9 exemplifies current use cases for defense AI, it does not yet indicate how nations roll out defense AI. In this regard Table 10 offers interesting insights. Right now, most of the countries use experiments and/or single projects to field specific defense AI solutions or integrate AI into other experiments. This illustrates, that two different ‘valleys of death’ continue to exist despite the significant rise of defense spending. The first, well-known, describes the challenge of transforming ideas into market ready products; the second is more ‘internal’ and captures the transition from R&D to procurement.

Experiments and Projects Involving AI	AI-Focused Experiments and Projects	Programs of Record Involving AI	AI-Focused Programs of Record	AI Part of Foreign Procured Systems	Battlefield Use
DEU, DNK, EST, ESP, FIN, FRA, GBR, ITA, NLD, POL, ROU, RUS, SWE, TUR	DEU, NLD, RUS	DEU, FRA, RUS, SWE	FRA	BEL, DEU, DNK, EST, GBR, GRE, ITA, NLD	RUS, UKR
BRA	CAN, USA	USA			USA
AUS, CHN, JPN, IDN, KOR, PAK, SGP, TWN	SGP, TWN	IND	JPN	IND	IND, PAK
ARE, BHR, KWT, OMN, QAT, SAU	IRN	ARE, ISR, QAT, SAU			IRN, ISR

Table 10: Modes of Fielding Defense AI Solutions

In contrast to the findings of TVLG, the past two years have witnessed an AI battlefield push. As argued above, Russia and Ukraine use AI for very similar use cases thus quickly nullifying each other’s technological advances. Other military conflicts shed light on additional operational requirements for which armed forces use AI:

- Reports about the use of Anthropic’s Claude in Operation Absolute Resolve, the January 2026 US intervention in Venezuela, suggest this generative AI solution has been used to analyze intercepted communication, satellite imagery, generating target lists and decision-support (Lemieux 2026). The role of AI in generating target lists and conducting targeting operations has also been a topic of heated controversy of the US-Israeli attack on Iran in April/May 2026. Here the focus was mainly on the role of the Maven Smart System, which

reportedly “recommended 1,000 discrete targets in the first 24 hours” of Operation Epic Fury (Jeffries, 2026). This raises concerns about the role left for human operators in verifying and greenlighting targeting operations.

- The risk of human overburdening and false trust in AI has also been at the forefront of international critique of Israel’s use of defense AI in Gaza after October 2023. Here, AI has been used to identify objects (Gospel), identify and track individuals of interest (Lavender, Where’s Daddy), managing the targeting cycle (Fire Factory), and operating various unmanned systems at the same time (Legion-X) (Abraham 2024; Mimran et al. 2024). Reports also suggest, that the IDF had access to US commercial cloud and AI solutions during military operations (Javadi 2025). Israel is also using AI to enhance air defense performance against missiles from Iran and its proxy forces in the region. While generally considered successful, these solutions seem to come under strain when Iran is using hard to predict attack patterns and mixes attack drones with missiles and hypersonic weapons (Baatool 2026; Iran International 2025a).
- Countries that are being attacked with AI-enhanced systems draw their own conclusions on how to prepare and advance their defense AI ambitions. Attacks on Iran between 2024 and 2026 have vindicated the country’s prior concerns about the impact of AI on conducting military operations and led the Iran Revolutionary Guards Corps (IRGC) to unveil a comprehensive AI development plan in January 2025 (Mehr News 2025). Iran also seems to have concluded that commercial data centers established in neighboring Arab Gulf countries constitute legitimate military targets. However, attacking them will most likely impact how other nations think about Iran’s own data centers in future military operations. In conducting military strikes, Iran reportedly benefited from Russia providing targeting data (Robertson et al. 2026), which mimics the US-European-Ukraine military-technological cooperation.
- The 5-day war between India and Pakistan in May 2025 represents a military conflict in which, if reports are accurate, AI of non-Western origin has been deployed. Pakistan seems to have used AI-enabled sensor fusion, electronic warfare, manned-unmanned teaming, and loitering munition (Menjon 2025), despite Pakistan's previous advocacy on restricting the use of Lethal Autonomous Weapons Systems (Ali 2025: 15-17). India, in turn, has claimed to have used AI-assisted weather forecasting systems, targeting solutions, recognized air pictures, and air defense against Pakistani drones, missiles, and loitering munitions (Casimiro 2025; Ministry of Information and Broadcasting 2025a and b). While India hailed the successful use of its indigenous AI solutions (Casimiro 2025), Pakistan seems to have benefitted from AI cooperation with China, also through on-site technical support (Singh 2025; NDTV 2026).

Finally, ‘learning by procuring’ is a prominent inroad for defense AI to enter a foreign market via the defense solutions procured from a partner. As the overview illustrates, this avenue is not only relevant for countries with less advanced national defense industrial bases but also for defense industrial heavyweights like Germany, Italy, the Netherlands, and the United Kingdom. In all four countries defense AI solutions enter the national defense ecosystem via purchases from the US and/or Israel. In fact, a modern 5th generation fighter jet like Lockheed-Martin’s F-35, advanced uncrewed systems like the Reaper or air defense solutions like Arrow need to be considered as pivotal defense AI transmission mechanism.

While using these systems can solidify the advancement of defense AI, this option also comes with challenges. A first challenge stems from the inevitable crowding-out effect that defense AI embedded with these systems might produce vis-à-vis indigenous defense AI applications. The second stems from properly understanding what kind of defense AI you get when importing foreign systems. In this regard, Moshe Patel, Director of the Israel Missile Defense Organ-

ization, made a telling statement at a May 2023 event at the Center for Strategic and International Studies in Washington, DC, when he argued that Israel would be integrating its air defense algorithms “inside the Finnish command and control” (CSIS 2023). How deep, supporters of the idea of digital sovereignty will ask, will nations be willing to integrate ‘foreign algorithms’ into national sovereign systems and to what extent will the buyer have a say in calibrating and adjusting these ‘foreign algorithms?’

Training for Defense AI

AI needs talents but competition for talents is fierce as armed forces, defense companies, and commercial industries vie for key experts.¹¹ Given the financial power of big tech, for example, Marie Louise Cummings already speculated years ago, that the defense community’s relative AI illiteracy could tilt the balance towards big private interests (Cummings 2018: 17). This, and the conviction, explicitly expressed in countries like Denmark, Estonia, and Finland, that armed forces should only operate AI systems they truly understand, has prompted many nations to step up training efforts.

Nonetheless, training is the one dimension where progress in comparison to the TVLG findings remains slow. Given the fact that most nations acknowledge the general-purpose character of AI and its broad impact on all facets of private and corporate life, the limitedness of existing training efforts is puzzling and increasingly problematic as defense AI deployment has accelerated. Many countries concentrate on making sure that soldiers understand and handle AI properly, Table 11 reveals. Updating the curricula of defense academies, setting up new courses, and advancing wargaming with AI are some of the initiatives undertaken by these countries.

Under Development	Military Service Workforce	Civilian Defense and Military Service Workforce	Defense Industrial and Military Service Workforce	Civilian Defense, Defense Industrial, and Military Service Workforce
DNK	EST, FIN, ITA, POL, SWE	BEL, DEU, GRE, NLD, ROU, UKR	ESP, TUR	FRA, GBR, RUS, (TUR)
	BRA, CAN	USA		
PAK	AUS, CHN, IND	KOR, IDN, SGP, TWN		JPN
	BHR, KWT, QAT, SAU	ARE, IRN, ISR, OMN		(IRN)

Table 11: Who Is Trained for Defense AI

A second group looks at the workforce more broadly and includes civilian defense personnel as well. In this regard, Greece and South Korea are of particular interest. Greece has been setting up comprehensive training programs at the military academies, while in South Korea the Ministry of Defense is cooperating with the Ministry of Science and Information and Communications Technology to educate AI literate soldiers and officers. Both countries emphasize that significant training efforts also of the civilian defense personnel are needed to make sure that defense talents are well prepared should they transit over to the civilian labor market. Similar drivers are at work in Israel, where the armed forces also use AI to early identify po-

¹¹ Specific data training initiatives have been launched, for example in Germany, Israel, the Netherlands, Spain, and Ukraine.

tentially outstanding future commanders, personalize training programs, and identify soldiers likely to extend their service. Similar initiatives are also being launched in the United Kingdom.

Within in this second group, military exercises and training constitute a special mechanism to forge bonds between nations and expose partners to new technology. For the Arab Gulf countries, for example, US NAVCENT Task Force 59 plays an important role as an organizer of multinational exercises (Borchert 2025: 65). African Lion, an exercise series organized by the US Africa Command in cooperation with the Royal Moroccan armed forces, plays a similar role (Chase 2026; Dias/Livesay 2026). In addition, Indonesia's Air Command and Staff College sends officer cadets to China for studies on AI-enhanced defense technology (Prajuli et al. 2026).

The third group of nations includes countries that look at training the military service and defense industrial workforces. This is the case in Spain, where industry plays an active role in advancing corporate AI training programs also in view of better integrating small and medium-sized enterprises into the AI-relevant supply chains of leading defense players. Turkey also belongs to this group, with the YETEN project playing a special role in AI-enhanced corporate matchmaking to identify the defense company best suited to develop specific technologies indigenously, which also includes a skills aspect.

Finally, a growing number of countries focus on advancing the AI expertise of their civilian defense, military services, and defense industrial workforce. In France, the new Ministerial Agency for Defense AI, located at the Ecole Polytechnique, serves as a new talent hub and industry has been taking action to advance AI proficiency (Ministère des Armées et des Anciens Combattants undated). In the UK, the Digital Skills for Defense program serves the same goal. In addition, the Defense Academy as well as the recent announcement of the government to create five Defense Technical Excellence Colleges work on advancing digital defense skills (ADS 2026; Mellor 2025, Gov.UK undated). Turkey's new AI Academic Thesis Program (APT) is meant to create a structured initiative to advance academic work on defense AI that could also potentially benefit the civilian defense workforce (Council of Higher Education 2025). Similar initiatives have been launched in Japan to stimulate talent exchange (Japan News 2024) and by universities in Iran that are close to the IRGC. Iran's 20-year strategic partnership with Russia covers training, too (Recorded Future 2025; Iran International 2025b). Russia has created military scientific units staffed with conscripts that are expected to follow a military-scientific carrier that could either lead them to work for military institutes or as experts of the armed forces. Like this idea, but with a different focus, France and Israel pool local expertise via 'digital reserve elements,' that can be activated in times of need.

Interpreting the Findings

Operational requirements, technological readiness, and conceptual maturity need to come together for armed forces to innovate. The above discussion underlined that the adoption of defense AI along these three trajectories is very uneven. As argued in TVLG, some findings confirm elements of the defense innovation literature and practice, whereas others are surprising and some even tell uncomfortable truths (Table 12). These three categories are still relevant today but need to be updated.

Category	Finding
Confirmed Expectations	<ul style="list-style-type: none"> ▪ Emulation is prevalent – with partners and challengers looking at the United States ▪ (Mature) Countries engage in ‘reverse emulation’ to avoid surprises ▪ Wars as teachers – but be very careful what lessons you learn
Surprises	<ul style="list-style-type: none"> ▪ Defense AI is ‘waiting for disruption’ ▪ Digitalization is a misleading indicator for a nation's defense AI prowess ▪ Defense industrial innovation is the neglected sibling of military innovation
Uncomfortable Truths	<ul style="list-style-type: none"> ▪ Defense AI ethics matters – but is shaped by very different motives ▪ War readjusts normative preferences ▪ Authoritarian use of defense AI poses risks – but do not overblow the threat

Table 12: Summary of the Core Findings Discussed in *The Very Long Game* (Borchert 2024: 28-33)

Confirming Expectations

New military ideas, concepts, and technologies diffuse in a multi-stage process. As Michael Raska (Raska 2016: 168-169) has argued, this process ranges from emulating what others have been doing, via adopting existing practices to developing novel concepts and tactics. Two years after releasing TVLG, emulation and initial adoption remain predominant, but new role models are emerging.

Ukraine is one new role model as many countries analyze its use of battlefield AI. Although it is not yet obvious what lessons these countries will implement, emulating Ukraine’s practice is likely to create a new force development path that will stabilize Ukraine-type warfighting imaginaries. Russia’s use of the V2U UAV illustrates another example. While Russia’s adversaries need to prepare against the threat this system creates its partners like Iran might benefit from technology transfer. This, however, will also depend on Russia’s willingness to beef up the capabilities of other nations at the cost of its own strategic advantage; a lesson Russia learned the hard way in cooperation with China. To what extent defense AI made in Pakistan and India, which has been used in the 5-day war, will succeed in export markets, is a question worth looking at for the future.¹² Overall, these examples illustrate that role models on how to use defense AI are diversifying.

As wars tend to vindicate technologies (Zaccagnini/Leccese 2026), technology export push from war zones is logical. Here, AI for unmanned systems as well as AI for air defense and to counter unmanned systems are booming segments. Ukraine’s and Israel’s solutions benefit from the fact that technology diffusion among adversaries creates similar threats in different war zones in Europe and the Arab Gulf region. So far, Ukrainian counter-drone solutions seem to complement rather than replace traditional air defense solutions of US and European origin in the Arab Gulf region, where China is also emerging as a potential partner for counter-drone technology.

In addition, defense AI diffusion among countries of the Global South is a new defense export vector that needs to be analyzed more closely. Here, the Russia-China-Iran-Pakistan defense nexus is of particular interest. Respective solutions are unlikely to reach Western markets but could become part of broader packages these nations are willing to form. All four nations depend on stable sea lanes of communication and functioning port infrastructure. Thus, it would not be a surprise if they started pushing protective AI-enhanced maritime security solutions into markets of the Global South to complement existing trade relations.

¹² India's drone manufacturers seem on the move to seize this opportunity (Bharadwaj 2026).

This reference to Global South cooperation also opens another analytical avenue. As long as defense AI is primarily considered a means to improve existing defense platforms or systems, ‘software will follow hardware’ and reinforce existing defense export patterns. This is visible in the Asia-Pacific region, where most countries still want to deepen cooperation with US defense players and big tech. Among Arab Gulf states, the situation is mixed, but their interest in advancing industrial strategic depth by investing in the United States is likely to extend existing corporate networks while underlying forces push for more digital indigenization. By contrast, market prospects start to look less gloomy in Europe, where proponents of digital sovereignty push back. To what extent digital sovereignty will serve as a driver to establish new patterns of defense collaboration, is an open question at the time of writing. On the one hand initiatives like Pax Silica¹³ suggest, that US partners want to remain aligned with Washington in a very critical technology field despite the geoeconomic challenges the current Trump administration presents. On the other hand, Singapore and France recently agreed to cooperate on developing generative AI models, which could offer future alternatives to US solutions (DSO 2025).

Surprises

The 2024 observation that defense AI is waiting for disruption remains valid because imaginaries and narratives around defense AI are surprisingly stable across cultures. When, as quoted at the beginning, the former IRGC Commander Hossein Salami uses the language of AI as a do-no-harm technology, he evokes a trope that EU and NATO nations have been developing and using for years. In so doing, he signals that Iranian military power should not only be seen as a brute force. Rather he implies that Iran masters a technology that pushes back Techno-Orientalism, i.e., the casting of “Western tech as rational and benevolent, while depicting non-Western tech as opaque or dangerous” (Adib-Moghaddam 2026: 44). As cynical as this claim may seem, it does underline that representatives of the IRGC strive for legitimization in similar ways as armed forces in other regions.

This rhetorical aspiration for legitimacy, which may puzzle Western readers, is important because of another noteworthy trend. The prevailing view that innovation is a pedigree of democratic states (Commander et al. 2022) tends to neglect the fact that leaders of countries with other political systems can surprise the world “with initiatives that (depart) dramatically from those adopted elsewhere” (Kennedy 2026: 6). When taking the above 2x2 matrix with the data vs. emergence and human vs technic-centric perspectives as the yardstick, it becomes clear that novel AI solutions, which may create competitive advantages on the battlefield, do no longer exclusively emerge in the West.¹⁴

Russia’s use of the V2U UAV is a case in point. So far, it is unclear where the respective algorithms have been developed, whether they emerge from a state lab, a company, or volunteers. Neither is it clear if China, which has supplied components for V2U might have been involved in co-developing the software. For the time being, we also don’t know if Russia is

¹³ Pax Silica is a US initiative to build secure supply chains for AI and semiconductor technology. Australia, Finland, Greece, India, Israel, Japan, Norway, Qatar, South Korea, Singapore, Sweden, the Philippines, the United Arab Emirates and the United Kingdom are signatories of the initiative. Taiwan is a non-signatory participant (State Department Undated).

¹⁴ Ukraine’s mastering of unmanned systems and AI, for example in the context of the 2024 operation near Lyptsi (Mak/Matviienko 2024) is impressive. It is a tactical evolution demonstrating what can be done by leveraging new technologies. Success was also made possible with support from Canada, the United Kingdom and the United States and others helping Ukraine deviating from past practices of hierarchical C2 towards more decentralized approaches (Joyner 2026; Temnycky 2022).

going to roll out the respective algorithms at scale. Nonetheless, Russia seems to be the first country to deploy technology that enables emergent behavior on the battlefield. Along similar lines but not yet fielded in combat operations (Cheung/Lau 2025), the launch of China's DeepSeek R1 LLM model in 2025 showed that by changing the training sequences, the model (initially) performed on par with the most sophisticated LLM models at the time and at a fraction of the usual training costs (Konkiewicz et al. 2025).

All this matters as defense AI cooperation among nations with other than democratic political systems is growing. So far, China and Iran have provided Russia with new technologies. With the V2U system Russia is likely to provide its partners with valuable battlefield insights. This matters as the trio cooperates with Belarus and Pakistan, which also cooperates on defense AI with Turkey. As argued, it is not a given that technology will travel easily among these nations as each of them harbors reservations to beef up partners at its disadvantage. But given the outlined defense export vectors, military analysts should put significantly more effort in understanding how countries that have been under heavy sanctions for years manage to produce defense technological surprise that can put them ahead of their competitors.

Uncomfortable Truths

In the past two years the forces of normative restraint have come under serious attack from within. A US President willing to dismantle with gusto those rules, norms, and principles that no longer comply with his administration's interests is setting a precedent (Schwartz 2026). This, of course, is not primarily an AI problem but a core international political concern. President Trump's early proclivity to undo the Biden administration's regulation on AI safety as well as the rebranding of the US military as an "AI first" fighting force willing to replace "utopian idealism" with "hard-nosed realism," as stipulated in the opening quotation, are two examples illustrating this development. And this trend matters as most nations continue to emulate US practice. Consequently, the big question is if the current US administration's practice of normative self-disentanglement affects strategic stability. 'Maybe' is the best guess right now.

On the one hand, there is a growing and disturbing congruence in outlandish rhetoric this US administration and the Russian president are using to dehumanize the other. President Trump muses about Iran's death as "a whole civilization" that will "never be brought back again" (Risse 2026), while his Secretary of Defense calls members of its leadership "rats" (Davis 2026). Similarly, President Vladimir Putin has called Ukrainians "vermin" that Russia must "disinfect" (Apt/Gienger 2026; Kohanets 2025). But if your opponent is denied human quality, why should you be bound by rules that respect this very human quality? Accepting human casualties and more indiscriminate military action are likely consequences – irrespective of the use of AI.

On the other hand, almost no other nation is currently willing to jump on this train. The instincts of normative self-restraint are very much alive among the remaining NATO and all EU nations. Key actors of the Global South such as Brazil (Moralez/Rivas 2026: 19-21), Indonesia (Bimo/Jatmiko 2025: 20-24), Pakistan (Ali 2025: 15-17) and the Arab Gulf nations (Borchert 2025: 22-25) continue to uphold the need to regulate the use of AI for military purposes. China is constructing and advancing its very own ideas on AI governance in general (Wong/Fedasiuk 2026, Zhang et al. 2026) but has joined the US in opting out from the 2026 declaration on the Responsible Use of AI in the Military Domain (REAIM, Waldersee 2026).

Second, and a bit more speculative at the time of writing, a gap seems to be emerging between democratic and authoritarian states. Although both groups follow the same R&D priorities, cracks in transatlantic defense technology cooperation arise at the time when defense technology cooperation between countries like China, Russia, and Iran seems to grow closer. The heavy use of tariffs and export controls adopted by the US administration to discipline partners in Europe and the Asia-Pacific region runs counter to the need to cooperate with these countries against authoritarian regimes. The core challenge for these partnerships is not technological dependence as such; rather it is the fact that US allies no longer trust the US to uphold joint principles and shared interests. And this matters for strategic stability as the estrangement from the US occurs at the very moment when strategic challengers grow closer and step up technology sharing.

Third, the current US push to field an “AI first” warfighting force is very reminiscent of preemptive strikes: In Venezuela and in Iran the US showed that armed force using AI can disrupt and destroy, but without fundamentally changing the situation on the ground. As psychologist Brandt A. Smith argued “under conditions of repeated success, (...) signals that align with prior successes are amplified. Disconfirming signals are discounted (...). Success rewards consistency, but consistency is the opposite of adaptation” (Smith 2026). Consequently, how armed forces are using defense AI is even more important than for what they use it. And here current US and Israeli AI deployment runs the risk of delegitimizing the technology because others disapprove the specific practice of using it – the same problem that was witnessed years ago when the practice of targeted killing overshadowed other forms of using UAV. It is true that US military leaders such as Admiral Frank Bradley, Commander of the US Special Operations Command, are wary of the tensions.¹⁵ This, in turn, means that the US is sending mixed signals of restraint and advancement, which may confuse allies even more.

Fourth, derailing US rhetoric vis-à-vis partners is one aspect that explains why the growing strive for digital sovereignty creates cooperation dilemmas. For years, market observers and strategic analysts have called data the new oil or the new gold. Thus, it is no surprise that armed forces want to protect what everybody considers a most valuable asset. This, on its own, is not a problem. Rather the problem stems from the fact that the infrastructure, that is needed to generate, share, and store data is primarily of American origin. Amid a more protectionist international environment, this dependence becomes toxic and explains, why more and more countries strive to establish their own digital ecosystems to reduce dependence. But, as in real life, emancipation from dominating parents is difficult, if alternative companions, like China, come with their own challenges.

Therefore, armed forces need to get more specific about what digital sovereignty means for defense AI and multinational cooperation in this area. This, for one, is a question of national ambition and strategic vision regarding what defense AI is meant to accomplish. The current focus of many armed forces on developing sovereign generative AI models is a case in point as serious doubts remain that these models are a good fit for the most demanding warfighting tasks. Second, armed forces need to ask in which areas dependence on defense contractors remains palatable and when they might need to develop defense AI solutions by themselves or by government-owned research entities. This is a most delicate topic as it brings to the fore the question where a nation’s most advanced conceptual and mathematical expertise resides. In addition to this public-private dimension of cooperation there is also the international dimension. Here, challenges arise from tensions between availability and sovereignty as solu-

¹⁵ At the 2026 Special Forces conference in Tampa, he argued troops “have to be very careful about how we come to (AI’s) employment and its inspiration into the delivery of lethality” (Toropin 2026).

tions that are ready to use are likely those that reinforce dependence on foreign suppliers. And adequate responses to this challenge require more serious thinking about what type of dependence – in political, military, technological, and economic terms – a nation is willing to accept.

Lastly, and in reverse of the famous dictum of Marc Andreessen (Andreessen 2011), data centers might eat AI. The frenzy about data centers, which is a logical consequence of the focus on data as the key input for AI, will create military challenges: Iran's attacks on neighboring Arab Gulf states shows that data centers have become military targets. This poses all sorts of questions about protection and redundancy, which, in turn, put a question mark behind the idea of boosting economic attractiveness, as in Europe, by making data centers the hub of regional clusters. To build data centers you need partners, which reinforces the question of whom you want to work with as companies providing key components for data centers have become geoeconomic targets (Javadi 2026; Kollar/Stokols 2025). Data centers are power hungry. Already in the past, the energy footprint of forces deployed abroad has been a key issue of concern in terms of energy logistics. More recent discussions about building nuclear mini reactors (WNN 2025) to meet the demand of ever-more energy hungry forces are very likely to create additional security demands and stir controversial discussions. Finally, data center buildout faces the same 'not-in-my-backyard' opposition that has haunted energy infrastructure development for decades. For example, last year around 48 data center projects "worth roughly USD156bn were blocked or stalled by community pushback in the United States (Zeigler 2026).¹⁶ All of this suggests that armed forces need to step up efforts to focus more strongly on mathematical models that tame the growing data appetite, which drives the data center frenzy.

Conclusion

AI goes to war and is not (yet) winning. This is the core finding of this chapter's comparative analysis of the state of defense AI in 37 nations. This outcome results from the fact that AI is considered an extension of existing military systems and platforms and thus also prolongs the imaginaries, concepts, and practices developed to use them. In this logic, the use of an FPV drone, a drone interceptor, a tank, a vessel, or a common operational picture shapes the function and therefore also the added value AI is supposed to deliver. Irrespective of what developers contend, AI as software is not eating military hardware. Quite the contrary. This chapter has demonstrated that a very diverse group of nations is aspiring to use AI for the same missions and tasks, while battlefield applications of warring parties mimic each other. "Ironically," Anthony King warns, "war at the speed of data may descent into a long, slow struggle for small pieces of terrain" (King 2025: 182).

King's warning raises two key interrelated questions: How do you want to fight tomorrow and what will be the consequences for software development? In response to the first question, General Michael Goen, director of the former Joint Artificial Intelligence Center of the US Department of Defense, argued in 2021, this question was for warfighters, not information technology (IT) experts (Tucker 2021). Goen was critical of the fact that standard IT solutions tend to unify and standardize military processes. This gives IT the upper hand and is exemplified by the dominance of data-centric defense AI approaches this chapter has discussed. However, this IT centric perspective is only one way to look at the challenge. The alternative per-

¹⁶ In China, by contrast, the mood seems to be completely different as "both the state and society (...) feel that they can't afford to slow down, for fear of falling back into the gravitational pull of the Century of Humiliation" (Xu 2026). How this might affect China's defense AI approach remains to be seen.

spective focuses on force transformation and uses IT to advance it. In this case, the strategic purpose of AI is to develop novel behavioral patterns and decision-making algorithms that help armed forces win in battle.

But what does winning mean? Most current observers would argue that winning means fighting like Ukraine against Russia, i.e., with the heavy use of unmanned systems, AI, unconventional ideas, and the long-term support of allies that provide strategic financial and industrial depth. The other more evolutionary perspective looks at Ukraine and recognizes its ‘younger self,’ i.e., a nation that combines resistance tactics with the pre-war defense industrial know-how that was sought after internationally, a vibrant and at times chaotic new dual-use tech-industrial ecosystem, and armed forces implementing concepts developed and honed with the help of allies. Whatever you see when looking at Ukraine, the critical question for force transformation is: For which theater and how long will Ukraine’s lessons hold and what (or who) will overwrite the lessons Ukraine is teaching?

This is the question that combines warfighting with software development. Most often, hardware is seen as the core problem. Innovation cycles in modern combat, the standard argument goes, turn around every four to six weeks and thus pose demanding requirements to respond to adversarial adaptation. But, the counterargument goes, if forces will be surprised by adversarial adaptation every four to six weeks, existing solutions are most likely too under complex to address the spectrum of variability enemy action presents. That’s why, software shall make the difference to upgrade hardware. But software developed in traditional ways will stiffen, rather than enhance flexibility as it focuses too strongly on data input and not enough on military impact.

So, if software is to provide armed forces with maximum flexibility to reconfigure at “campaign time,” as the Mosaic Warfare concept puts it (Grayson 2018: 11), software development must focus on continuous adaptation. This implies that AI systems learn when and how best to learn to adapt and thus succeed on the battlefield. Despite the current rhetoric on autonomy on the battlefield, the update logic means that current systems cannot automatically adapt but rather need human operators to tell them that current battlefield behavior deviates from past patterns, which can only be solved by running a new update cycle. But, and that is the challenge, nobody knows if updated software can be stabilized at pre-update performance levels. In response a different development approach is needed. First, software needs to become adaptive by using meta-learning that combines true battlefield observation with simulated battlefield behavior. This logic guarantees at least that performance levels will not deteriorate; at best it helps develop live-long improving systems. In this sense, meta-learning serves as a kind of safeguard mechanism to ensure that military AI systems can be safely updated over their lifecycle. Second, more advanced approaches strive to extend update cycles to reduce the need for frequent updates. These approaches use game theoretic principles to train decision making systems to develop non-exploitable policies, which effectively nullify the adversary's option for surprise. This renders software updates obsolete until the opponent structurally changes his operational capabilities. This prevents periods of increased losses on the battlefield while trying to adapt to adversarial tactical variations.

Today, defense AI methods using meta-learning and non-exploitability are the exception, not the norm. Their emergence in simulation environments and on the battlefield constitutes a tipping point. Continuously adapting AI will, by definition, evolve constantly, thus making it more challenging for adversaries to observe when changes occur. But this type of AI does not exist on its own as AI needs to interact with other military assets to deliver impact. Hence, its disruptive potential will to a very large degree depend on the synchronization with other tech-

nologies – and this may slow down its diffusion. How quickly it will diffuse is anything but easy to answer because AI, as software, mostly eludes our sensory perception. In fact, to be effective, AI needs to be embedded in sensors, missiles, platforms, decision-making procedures or other assets and technologies. Thus, the true impact of AI can only be evaluated in tandem with them – and it is this dependence that also shapes the performance of AI.

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