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# Information Advantage

## *Using Cyber Warfare and HMI to Seize the Initiative*

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### Introduction

The cyber domain and the information dimension are the most contested areas in today's security environment. As information technology—including artificial intelligence (AI) and machine learning (ML)—continue to improve, the cyber domain and information will become increasingly more important. It is therefore prudent to thoroughly analyze these spheres and study how to obtain information advantage over our adversaries, enabling the U.S. Army to remain the world's preeminent land force.

Joint Publication (JP) 3-04, *Information in Joint Operations*, is a good starting point. It defines *information* through the lens of relational value.<sup>1</sup> That is, information in and of itself does not possess value, but rather is valuable based on its relevance to the individual actors operating within a specific situation.<sup>2</sup> Further, it does not carry universally applicable values to each actor, nor does it carry the same value at each level of operation or interaction within that situation. Therefore, an important principle emerges: military operations should be anchored on how to gain, exploit and maintain relational advantage in the information dimension.

This report provides a primer on how to seize the advantage in the information dimension. It does not restate the existing joint or Army doctrinal approach to the subject; rather, it explores theoretical concepts, providing novel ways to incorporate cyber, AI and autonomous and semi-autonomous systems into the Army's pursuit of information advantage. It provides an optimal method of operating, organizing and equipping for information advantage by offering an alternative way to think about doctrine, Army formations and arraying the battle.

First, this report briefly examines Army thinking in operating in the information dimension. Next, it examines how Social Science visualizes information. Third, it uses the Social Science lens to provide an alternative method to approach conceptual and doctrinal methods for information operations. Fourth, it provides a doctrinal, organizational and battlefield framing alternative for how Army forces could gain, exploit and maintain information advantage. This approach is not intended as a replacement for existing Army thinking on the subject, but rather as an auxiliary concept intended to further refine and sharpen the current approach. Last, this report concludes with a series of recommendations for considering information, information advantage and dominating adversaries in the information dimension.

### U.S. Army's Approach to Operating in the Information Dimension

The Army defines the information dimension: "The content and data that individuals, groups, and information systems communicate and exchange, as well as the analytics and

The integration of cyber warfare, artificial intelligence and autonomous systems can provide the U.S. Army with a significant information advantage.

1. Joint Publication (JP) 3-04, *Information in Joint Operations* (Washington, DC: Government Printing Office, 2022).  
2. JP 3-04.

technical processes used to exchange information within an operational environment.”<sup>3</sup> Operating in this dimension can take many forms. The Army fashions its primary role in this space as gaining and exploiting information advantage: “Information advantage is a condition when a force holds the initiative in terms of situational understanding, decision-making, and relevant actor behavior.”<sup>4</sup> Relational value provides the context for how the Army approaches the idea of information.

The Army must identify alternative ways in which to organize, equip and operate its forces to optimize for information advantage.

It holds that information is the *raison d’être* for command and control (C2), situational understanding, decisionmaking and nearly all action across the warfighting functions.<sup>5</sup> As a result, the Army seeks to gain, exploit and maintain the idea of information advantage in relation to potential and realized adversaries. According to the Army, information advantage is “a condition when a force holds the initiative in terms of situational understanding, decisionmaking, and relevant actor behavior.”<sup>6</sup>

The Army attempts to achieve information advantage through five levers.<sup>7</sup> First, it attempts to enable it to enhance C2. Second, it protects it to secure data, information and networks. Third, it informs it to maintain trust and confidence. Fourth, it influences it through directed information operations that effect behavior change of foreign relevant actors. Fifth, it uses it to attack and so affect threat actor C2.<sup>8</sup> Overall, the Army’s approach to information advantage is guided by the principles of offensively oriented operations, combined arms and the knowledge that information is commander driven and Soldier enabled.<sup>9</sup>

The Army’s cognitive approach to information, information advantage and operating in the information dimension is sound. Nonetheless, examining information through an alternative lens—that of Social Science—can provide value and hopefully help to sharpen the manner in which the Army approaches this sphere.

## Understanding Information and Operating in the Information Dimension

Gaining and exploiting information dominance is how the Army tends to view operating in the information dimension and the cyber domain. Recent updates to information doctrine provide a good starting point for thinking about how to operate in this dimension.

Nonetheless, a review of the concept of information is critical to understanding how to unlock, manipulate and retain information dominance. First, what is the importance of data, and what is its relationship to information and decisionmaking? Moreover, why and how are those ideas critical to the discussion? Second, why is information advantage important? Third, how is information dominance generated, manipulated and exploited in a practical sense, i.e., on the battlefield?<sup>10</sup> Finally, what do these factors suggest regarding how the Army might operate, organize and equip to maximize its goals for information advantage and dominating the information dimension? The next section addresses each of these questions.

### *Using Social Science to Explain Operations in the Information Dimension*

The relationship between data, information and decisionmaking is the critical causal link to weaponizing information and dominating an adversary. The Social Sciences provide an excellent auxiliary point of view on this topic.

The Army separates data from information, but, for the purpose of this section, that distinction is not required. In the Social Sciences, information is fuel for rational decisionmaking among competitors.<sup>11</sup> In the conflict space, information operates along a spectrum. On one end is perfect information, and on the other end is the absolute absence of information.<sup>12</sup> Perfect information is the idea that one combatant (Actor A) knows every conceivable thing

3. Army Doctrinal Publication (ADP) 3-13, *Information* (Washington, DC: Government Printing Office, 2023), 1-10.

4. ADP 3-13, viii.

5. ADP 3-13, 1-1.

6. ADP 3-13, 2-3.

7. ADP 3-13, 2-4.

8. ADP 3-13, viii.

9. ADP 3-13, viii.

10. For simplicity, the term *battlefield* is used throughout this article. There are many other terms that one might use to denote where military forces engage in conflict, such as *battlespace*. The choice of terminology is tangential to the salient discussion on information and information dominance.

11. Martin Hollis, *The Philosophy of Social Science* (Cambridge, MA: Cambridge University Press, 2016), 116–117.

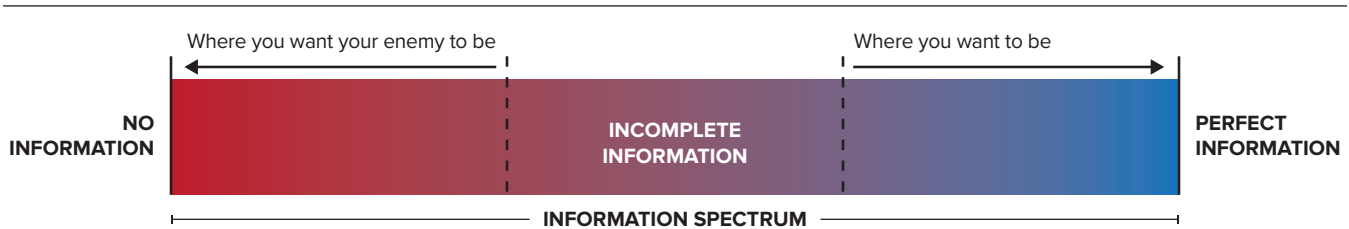
12. Roger Myerson, *Game Theory: Analysis of Conflict* (Cambridge, MA: Harvard University Press, 1997), 74–76.

both about himself and an adversary (Actor B).<sup>13</sup> Perfect information, especially in conflict among states, is a theoretical idea that, realistically, has almost no practical utility. It is all but impossible, for example, to get inside an adversary’s head and appreciate the norms and values that inform the rationality he uses to make decisions. This is one of the challenges individuals have when trying to understand why people like Vladimir Putin, Bashar Al-Assad or Saddam Hussein make seemingly irrational decisions of state and international affairs, to include war and warfare.

On the flip side, the absolute absence of information is the antithesis of perfect information.<sup>14</sup> On this end of the spectrum, an actor knows nothing about himself, his adversary or his environment. Just as perfect information is impossible, so too is the absolute absence of information. An Army force, or any other participant in a conflict, operates with varying and unique degrees of incomplete information. The terms *incomplete information* and *imperfect information* are generally interchangeable with one another; in this article, we use *incomplete information*. Incomplete information is the idea that a combatant has some knowledge about himself and any of the other actors engaged in a conflict.<sup>15</sup> This is the type of information all participants possess when engaged in conflict, but the levels of incomplete information are not static. All combatants can improve their information through data collection, such as enemy-oriented reconnaissance activities or routinized friendly-force status reporting. Likewise, an adversary can approach incomplete information in much the same way. (see Figure 1).

Figure 1

### The Information Spectrum



The ability for one combatant to operate closer to perfect information than the adversary is an information advantage in its purest form. The greater the gap between the two combatants, the greater information advantage the forerunner possesses. Moreover, if Actor A possesses information advantage and can maintain that asymmetry for a situationally advantageous period of time, such as the length of time required to conduct a military operation, then Actor A possesses information dominance. Although wars are won and lost through long-term materiel overmatch, engagements and battles are often won through information dominance.

Information advantage and dominance are not just the product of protecting one’s own information while sussing out information about other combatants. Given today’s information technology, data can also be manufactured to present false information for eager data-seekers to find. Manufactured information can also increase the information asymmetry one combatant possesses by creating many misrepresentations of reality, leaving a morass from which an adversary attempts to decipher the truth. That is, the possession of relative truth, coupled with the transmission of falsehoods on the battlefield, can result in increased information advantages by pushing a combatant deeper into the realm of incomplete information, while solidifying one’s own standing relative to perfect information.

These ideas are important to recall and reemphasize because of the overinflated sense of novelty placed on information collection and dissemination technology today, such as drones, sensors and space-based technology.<sup>16</sup> Moreover, it is important to understand that

13. R. Duncan Luce and Howard Raiffa, *Games and Decisions: Introduction and Critical Survey* (New York: Dover Publications, Inc., 1985), 42–44.  
 14. Luce and Raiffa, *Games and Decisions*, 44.  
 15. John von Neumann and Oskar Morgenstern, *Theory of Games and Economic Behavior* (Princeton, NJ: Princeton University Press, 1944), 15.  
 16. Dominika Kunertova, “The War in Ukraine Shows the Game-Changing Effect of Drones Depends on the Game,” *Bulletin of the Atomic Scientists* 79, no. 2 (2023); Anthony King, “Robot Wars: Autonomous Drone Swarms and the Battlefield of the Future,” *Journal of Strategic Studies* 47, no. 2 (2024).

the Army’s adversaries, to include state-based forces and non-state actors, fully appreciate this concept.<sup>17</sup> Therefore, to seize the initiative in the information dimension, we must not assume primacy just because of who we are and what we represent. Instead, we must always account for struggle in the information dimension. The struggle persists because data and information are the building blocks for rational decisionmaking.

### *Rational Decisionmaking in the Information Dimension*

Information advantage is important because it is the most vital element to decisionmaking in warfare.<sup>18</sup> Furthermore, it is important to highlight that rational decisions and cost-benefit outcomes are not necessarily universal. That is, one’s own ideological beliefs about right and wrong are generally irrelevant when examining other actors’ decisions. This is because rationality is a personal assessment, whether that decision is made by a political leader, a military leader, or anything in between. Favoring own’s own beliefs at the expense of seeking true understanding about an adversary’s decisionmaking can cause observation and anchor bias. In turn, this can inhibit an Army force’s ability to clearly see and understand the data inherent in a specific situation. This is because correct and unvarnished information is the foundational building block for military intelligence, and intelligence is the source for all strategic, operational and tactical activities on the battlefield.<sup>19</sup> A simple theory flows from the Army’s logic regarding information. That theory (data-to-military activity theory) is:

$$\text{data} \rightarrow \text{information} \rightarrow \text{intelligence} \rightarrow \text{decisionmaking} \rightarrow \text{military activity.}^{20}$$

This theory of information is consistent with the Social Science’s insistence that rationality and rational decisions are based on economic considerations; that is, the potential cost-benefit outcomes of situational decisions, which are guided most often by resource constraints, are dependent on the information at hand.<sup>21</sup>

Taking that theory a step further, it follows that if the Army can acquire data a) quickly, b) at scale and c) sort good data from bad data, it can then improve the information disseminated through its networks, fueling a commander’s ability to make decisions regarding potential military activities. At tactical levels, collecting data and identifying its validity to drive decisionmaking and tactical action is fairly easy. This is because the decisionmaker can often see the causality between their orders and instructions and their impact or effect on an adversary. However, as one moves up the levels of command to the high tactical (e.g., division and corps) to operational (e.g., joint task forces, land component commands or field armies), this concept becomes increasingly difficult because commanders and staffs are far removed from being able to observe the causality of their orders and instructions. As a result, good and quick data helps senior military leaders make timely and well-informed decisions.<sup>22</sup>

Looking at the data-to-military activity theory from an inverse position illuminates several risks. The risk of data and tempo manipulation is obvious. This is because we must assume that the Army’s enemies are aware of the Army’s interest in data—to include obtaining it quickly, obtaining it at scale, and the preference for good information over bad data. Adversaries can disrupt decisionmaking, prompting the Army to question its information.

Furthermore, thoughtful adversaries will also attempt to control the flow of data, either overburdening an opponent with so much data that it cannot be adequately processed, or by constricting the flow of data to such a degree that that opponent literally does not have enough information to act on. As this actor feverishly hunts for information, looking for anything to help drive military operations, they can more easily be duped into incorporating poisoned data. On the other hand, a network that is overburdened with data is liable to be corrupted, decreasing an organization’s faith in all of the information received. This idea can also be represented as a theory:

$$\text{data} \otimes \text{information} \otimes \text{intelligence} \otimes \text{decisionmaking} \otimes \text{military activity.}^{23}$$

17. Samuel Bendett, *The Role of AI in Russia’s Confrontation with the West* (Washington, DC: Center for New American Security, 2024), 5-6; Ulrich Jochheim, “China’s Ambitions in Artificial Intelligence,” European Parliamentary Research Service no. 696.206 (2021), 1–2; Paul Mozur, John Liu and Cade Metz, “China’s New Rush to Dominate A.I. Comes with a Twist: It Depends on US Technology,” *New York Times*, 28 February 2024; Suzaanne Maloney, “The Path Forward on Iran and Its Proxies,” *Brookings Institution*, 2024.

18. ADP 3-13, viii.

19. ADP 3-13, 1-1.

20. The “→” represents an implication. For example,  $A \rightarrow B$  means, “if A, then B.” In the situation outlined here, Data → Information means, “If you have data, then you can have information.” This concept applies from the theory’s starting point to its end.

21. Luce and Raiffa, *Games and Decisions*, 7–8.

22. Anthony King, *Command: The Twenty First Century General* (Cambridge, MA: Cambridge University Press, 2019), 401.

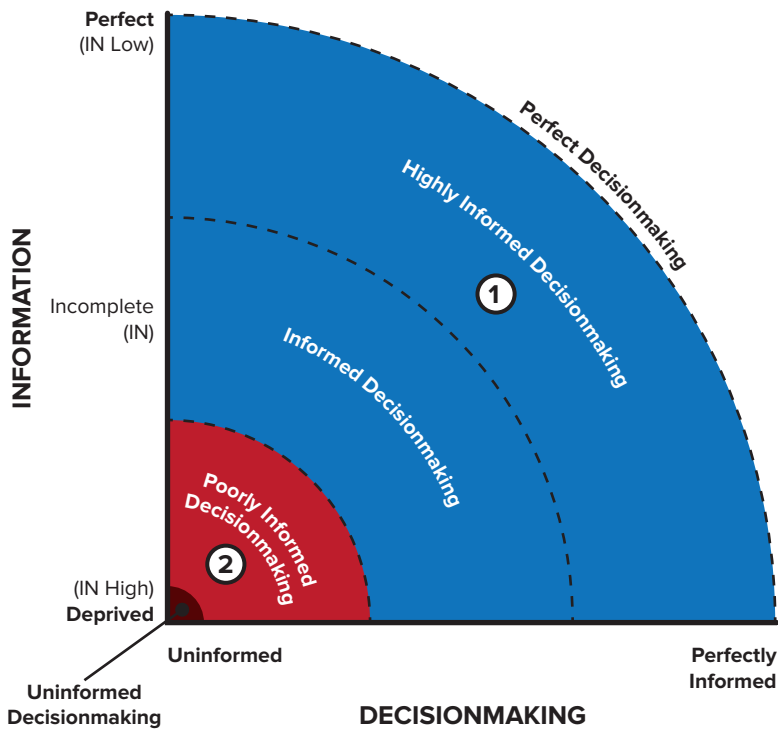
23. The “⊗” represents a disruption. For example, “ $A \otimes B$ ” means, “A disrupts B.” In the situation outlined here, Data ⊗ Information means, “a disruption in data results in a disruption in information.” This concept applies from the theory’s starting point to its end.

The relationship between these four activities of data—overburdening, depriving, corrupting and poisoning—creates what can be understood as a causal pathway relationship, or more simply, the data pathway.

This data pathway is critical for enhancing one’s own information and decreasing the relevance of a competitor’s information. Therefore, if Actor A can create a high degree of separation between the usefulness of the data within its own system and that of Actor B, it can generate information advantage. If either of those actors can maintain information advantage over time, relative to an adversary, they are capable of achieving information dominance (see Figure 2).

Figure 2

### Information Advantage Graph



- Perfect information (about an enemy and about oneself) is impossible.
- Completely uninformed decisionmaking (about an enemy and about oneself) is impossible.
- ① Where we want to be.
- ② Where we want the enemy to be.
- The greater the gap between ① and ②, the greater amount of information advantage for ① over ②.
- If ① can maintain information advantage over ② over an extended amount of time, then the former can be said to possess information dominance over the latter.
- Perfect decisionmaking is impossible.
- Completely uninformed decisionmaking is impossible.

### Seizing the Initiative in the Information Dimension

Bold steps are required for the Army to maximize its potential in the information dimension. It must carefully examine how to reorganize its forces, rewrite its concepts and doctrines, and reimagine the battlefield. This section provides recommendations for each of these tasks—which should be undertaken collectively and simultaneously.

#### Organizing Army Forces

New Army forces are critical to unlocking the transformative potential of the information dimension. Innovating military organizations requires more than paring AI-enabled unmanned combat platforms, creating AI-Major Generals, or proliferating drone swarms. Innovation must focus on how to create time and geographical separation on the battlefield through data, tempo and combat operations far forward of an Army force’s main body. Separation allows Army commanders the time needed to gather information, make informed decisions, align resources and proactively move forces into position for combat.<sup>24</sup>

The primary goal of this approach is to eliminate hostile forces before a close battle can be joined, thus preserving the Army force’s main body to a) maintain freedom of action

24. King, *Command*, 57–58.

Data and information must be reimagined as part of seeking alternative paths for organizing, equipping and operating Army forces on future battlefields.

to continue toward its designated objective, b) preserve combat support forces, c) preserve close-combat forces and d) allow Army forces to arrive at their objective fresh. The secondary goal of this approach is to provide Army force commanders with a) increased situational information, b) increased information for future planning, c) increased time to position forces to capitalize on planned and emerging opportunities and d) increase physical space to array forces for military operations.

To meet those goals and to seize the initiative in the information dimension, the Army would benefit from developing data and tempo forces. The Army is already dabbling in this space, as the existence of the XVIII Airborne Corps' data warfare company and the Multi-Domain Task Forces (MDTFs) indicate.<sup>25</sup> Data and tempo forces should be organized to (1) collect information pertaining to the enemy and the operating environment, (2) transmit false pictures of reality to the adversary, (3) influence the enemy toward opportune dispositions with offensive fires, cyber and other battlefield shaping technology and (4) manipulate the tempo of an opponent's operations. AI can be very beneficial here by helping handle the potential trove of both outgoing and incoming data.

### Data Force

A data force (DF) should be developed to operate primarily in the data region of a reimagined battlefield (the reimagined battlefield is discussed in the subsequent section). This formation should be an Army force's catalyst for generating information advantage, and, if situationally relevant, information dominance. Moreover, to maximize the DF's potential to seize the initiative in the information dimension, it should be fielded at all levels of command, tailored to fit the scale of operations for the Army force that it enables. The DF should be the conduit linking the joint force to its data-generation and data-manipulation capabilities. The DF's purpose is three-fold.

First, it should exist to gather deep information about an adversary to support strike options. Second, DF should weaponize the data pathway to encumber, confound and suboptimize an adversary's ability to operate in the information dimension. Third, the DF—at any echelon—should be capable of linking into the joint force, special operations forces and theater-level, deep-sensing capabilities. It should be organized around the incorporation of robotics, AI, ML and autonomous and semiautonomous systems and should be operating with humans on the loop. Its primary focus should be on collecting data, presenting false information realities to an adversary, manipulating tempo to support the Army force commander's plan, serving as the conduit for joint fires and cyber effects integration into Army operations, and being the triggering element that causes an adversary to reveal its intentions or strategy.

### Tempo Force

A tempo force (TF) should be developed to operate primarily in the tempo region of a reimagined battlefield. This formation should be an Army force's catalyst for generating temporal advantage, i.e., operating at a speed that provides asymmetric benefits to Actor A in respect to Actor B. It is important to remember that tempo and temporal advantage do not mean operating faster, but at a speed that best supports a commander's intent.<sup>26</sup> Some combat situations, for example, do not require speed, but actually seek slower tempos. The TF manipulates tempo for the Army force commander in four ways.

First, the TF can fuel frenetic-tempo activity, or operations that occur at an aggressive pace, driven by quickly moving reconnaissance-strike activities, well ahead of rapidly advancing close-combat forces. The goal of frenetic-tempo operations is to off-balance an adversary and then quickly exploit that situation with follow-on forces, or other situationally

25. Joshua Cowden, "New Data Warfare Company Activates as Beacon of Innovation for XVIII Airborne Corps," *Army News Service*, 9 June 2022; Andrew Feickert, "The Army's Multi-Domain Task Force," *Congressional Research Service* IF11797, 26 December 2023.

26. Trevor Dupuy, *Developing a Methodology to Describe the Relationship of Mobility to Combat Effectiveness* (McLean, VA: Historical Evaluation and Research Organization, 1967), 25.

appropriate solutions, to defeat the adversary before it has the time or wherewithal to regroup. Second, the TF can facilitate operations at a decelerated pace by functionally dislocating an adversary: eliminating their inherent mobility, suppressing them and fixing them in place.<sup>27</sup> Subsequently, the TF uses long-range strike, air-launched effects, drone strikes and AI-enabled autonomous land force systems to defeat the adversary well forward of any close battle area, preserving the Army force's close-combat forces and securing the Army force commander's freedom of action. Third, the TF can facilitate repetitive activities, or operations that occur at a routine or predictable clip. These allow an Army force commander to induce apathy in discernable patterns in an adversary's operations. AI has the potential to be transformative in this area as well. An AI-enabled TF, encoded with pattern recognition software, and capable of multidomain, long-duration sensing, is critical to unlocking this capability and helping to seize the initiative in the information dimension. Fourth, the TF can facilitate dynamic activities, i.e., operations that cause non-repetitive behavior to create uncertainty in an adversary's intelligence and decisionmaking systems. AI also has the potential to enhance an Army force's ability to seize the initiative in the information dimension here, as it can be used to identify patterns of behavior in adversary activity, enabling Army forces to respond accordingly and proactively.

In all this, it is important to first remember that everything that the TF is attempting to achieve is something that an adversary is also attempting to execute against it. Therefore, the TF should possess the requisite systems and capabilities to prevent tempo pathway operations from being conducted against them.

Akin to the DF, the TF—at all echelons—should be capable of linking into the joint force, special operations forces and theater-level and field army deep-sensing capabilities. It should be organized around the incorporation of robotics, AI, ML autonomous and semiautonomous systems and should be operating with humans on the loop. The TF's primary focus should be on a) facilitating the Army force commander's desired operational tempo, b) disrupting the adversary's preferred tempo, c) destroying the adversary's combat power in the overlap between the data and tempo regions and d) protecting the Army force's main body.

In terms of size and capability, the TF would be slightly larger and more robust than the DF. The DF would be more sensory and robot-oriented and focused on attacking information through non-kinetic methods. The TF, on the other hand, would be more kinetic, using autonomous, semi-autonomous systems and human-machine integrated (HMI) formations to attack with firepower to manipulate the situation's tempo.

In practice, the DF and TF should be assigned to each element of command and should provide the support necessary for a commander's data and tempo requirements. Moreover, they should be versatile enough that they can link in with the Army's MDTFs, theater fires commands and joint force so as to provide overwhelming cyber-power and firepower and to gain information advantage at key points on the battlefield.

### *Concepts and Doctrine for Army Forces*

To maximize the Army's potential to seize the advantage in the information dimension, the Army must develop strategies, concepts and doctrine that integrate data and tempo into activities of land war (note: "strategies, concepts and doctrine" will just be referred to as "doctrine" henceforth). Moreover, the Army and Army forces must evolve how they visualize and frame the conduct of military operations. To be sure, the "deep, close and rear" area construct will not be useful if states intend to unlock the potential benefits of data, tempo, AI and other novel ideas and technologies.

The primary way that data and information help to generate and maintain information advantage is through creating temporal and spatial separation on the battlefield; that is the key to reimagining the future of organizing, equipping and operating in the future.

27. For further discussion of this triumvirate, look to: Wayne Hughes, "Two Effects of Firepower: Attrition and Suppression," *Military Operations Research* 1, no. 13 (1995): 30.

Army forces must possess a doctrine that delivers an unambiguous definition of defeat that accounts for the impressive importance of cyber operations, data and tempo pathways—and the continued salience of information-based operations. Threats in an information-dominated future will be networked and will operate off intent, not direct guidance. In turn, militaries will maximize the use of autonomous systems, increasing the speed at which they can operate. Thus, time will become an increasingly important military variable, as a sensor’s identification of a target—whether that be a command post, military formation or individual—to the impact of a strike on that target will likely occur at much faster speeds than in the past. The information dimension will become equally important in this future operating environment.

From a risk perspective, however, information’s transformative potential decreases in what is referred to today as “the close fight.” At a distance, military commanders have time and space to sift through information and move accordingly. AI-driven systems in this space assist in collecting and analyzing battlefield data and in generating recommendations. The goal, then, is to create separation on the battlefield, providing room for better informed reaction rather than having to operate in close combat, where positional warfare and attritional battle can set in. In short, focusing on the close area, instead of on how to expand the battlefield, hurts a commander’s ability to make rational decisions.<sup>28</sup>

In close areas, or area that lack significant amounts of geographical space between belligerents, military commanders and their staff possess very little time because of the proximity to an actor also trying to impose their will. That lack of time, and, as a result, lack of information, causes a combatant to instinctively respond. In doing so, the commander and their staff forgo the informational benefits afforded by geographic distance and time. It therefore follows that in the close area, information is harder to come by, and even much harder to proactively act upon. Army force commanders are therefore better served by information born out of sequential information development instead of late, in-the-moment data procurement. An argument can equally be made that the transformative potential of AI lies not in close combat, but in the information systems associated with conducting data and tempo pathway operations in a data and tempo region (see Figure 3).

This does not mean that AI has no place in close combat; on the contrary, it will likely be harnessed to expedite tactical activity and (theoretically) improve efficiency. A note of caution, however. Neither improved speed nor enhanced efficiency necessarily equate to transformative quality, but rather just marginal improvements on contemporary methods. Moreover, it remains to be seen how faster and more efficient tactical activity will impact war’s general character. There is a distinct possibility that such action, enabled by AI-driven operations, might contribute to wars of attrition.

### *Battlefield Arrayal*

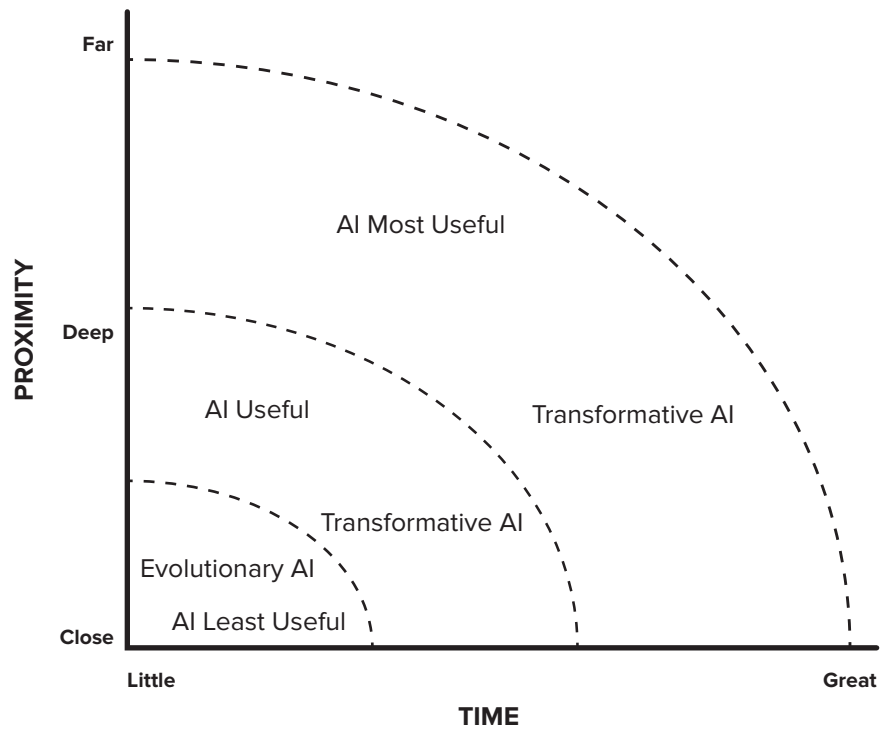
On an AI- and sensor-rich battlefield, a military’s focus should be on avoiding close combat. Information—and situationally dominating the information dimension—can contribute to the conditions that preempt close combat. In fact, military forces should attempt to defeat an opponent well ahead of close contact with land forces. But why the shift away from the traditional close area?

Eliminating an adversary before it has the opportunity to fully deploy its forces and capabilities provides a force with several benefits. First, it preserves one’s own forces, supporting their ability to arrive at an objective relatively fresh and not on the cusp of culmination. Second, by obstructing an adversary’s ability to occupy the physical battlespace, a force has greater freedom of action and reaction time. Finally, if done with AI-driven robotic formations, eliminating an adversary well ahead of the battle region minimizes the inevitable death and destruction caused by close combat.

28. Dan Ariely and Dan Zakay, “A Timely Account of the Role of Duration in Decision Making,” *Acta Psychologica* 108 (2001): 196–197.

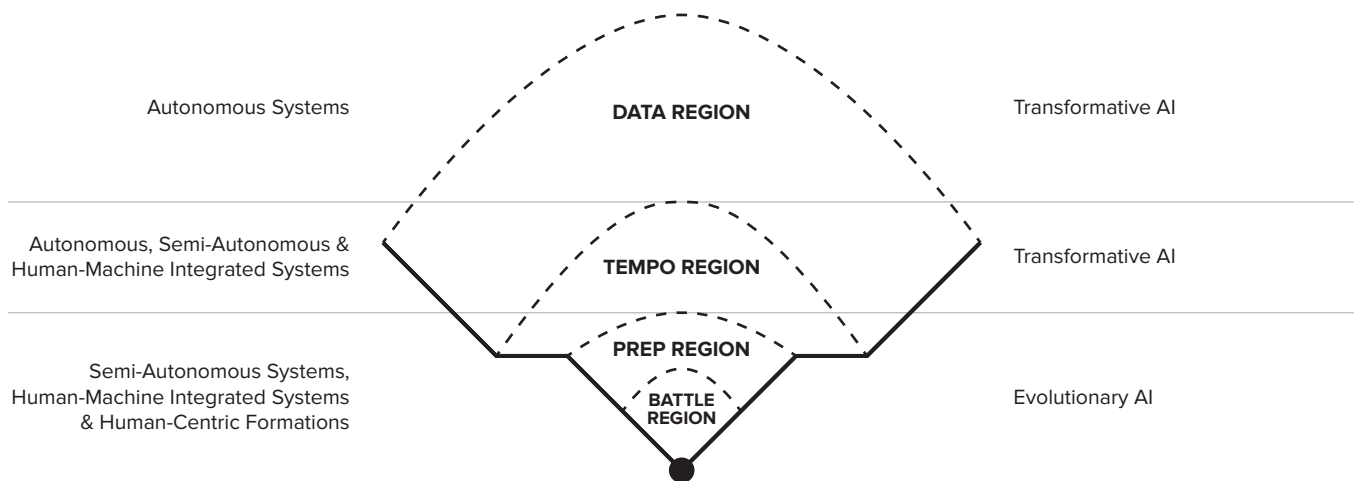


Figure 3  
**AI Battlefield Utility**



This might be achievable by applying a reconfigured battlefield and new, AI-infused Army forces operating forward of traditional close and deep areas. Reconstructing the battlefield into regions might help in this process. From near to far, a useful construct is the battle region, preparation region, tempo region and data region (see Figure 4). Traditional military formations, semi-autonomous systems and HMI formations all operate in the battle region, which can be thought of as the traditional close area. AI in this space will likely be evolutionary as it adds incremental improvement to how land forces and joint forces participate in tactical military operations.

Figure 4  
**Battlefield Arrayal**



The preparation region is somewhat like the traditional deep area, but, like the battle region, Army forces will also consist of semi-autonomous systems, HMI formations and human-centric units. However, Army forces use the preparation region to a) dislocate an adversary and b) lure an adversary into positions of relative weakness on the physical terrain. This happens if a military is not successful defeating an adversary in the tempo region.

In the tempo region, Army forces attempt to win an emerging conflict before it has the time to grow into something worse. Information advantage and dominance are critical enablers to make this happen. In this region, Army commanders might rely predominately on autonomous systems, semi-autonomous systems and HMI robotic formations to fulfill their commander's intent. Cutting a conflict off at the knees is accomplished by negating a hostile force's ability to attack by defeating or destroying four key features: (1) their ability to understand, (2) their means to advance, (3) their ability to operate efficiently and (4) their ability to win. Simultaneously, protecting those four features for oneself is of equal importance.

If leveraged correctly, AI-enabled military formations should be used to defeat adversaries in the tempo region to sidestep the opponent's ability to mass (whether practically or theoretically) for perilous combat in the preparation or battle region. In fact, AI-enabled robotic formations should be programmed with the intent of destroying an opposing enemy land or joint force within the areas where the data region and tempo regions intersect. These robotic formations, free of the fear of human casualties, will allow militaries to aggressively cull data and to identify and eliminate a strategic competitor's warfighting capabilities while simultaneously protecting those same features of one's own forces.

Forward-thinking Army forces that could accomplish these tasks might include mobile robotic strike forces, mobile robotic tempo forces and mobile robotic data forces. These formations could be filled with autonomous and semi-autonomous systems, sensors, air defense systems, data transmission, formation facsimiles, generative sustainment, self-sufficient power generation—and strike capabilities that operate untethered from human-based forces and are therefore able to operate at an increased pace, providing increased time and information for policymakers and senior military leaders who are struggling with how to win a specific conflict.

Although already mentioned, some key areas in which information might be transformative as it pertains to seizing the initiative in the information dimension include: (1) further refinement on how to manipulate data and tempo in the data, tempo and preparation regions, (2) mobile information-seeking and self-protected organizations (autonomous, semi-autonomous and HMI), (3) mobile formations capable of realistic deception and effective spoofing, (4) mobile formations possessing the capabilities required to operate in multiple domains, at depth, and to create multiple angles for the purposes of reconnaissance and (5) finding ways to make these formations cheap and attainable, without sacrificing superior functionality.

### **Conclusion: Recommendations for Seizing the Information Initiative**

There are five basic recommendations that the Army might pursue to seize the initiative in the information domain for modern and future battlefields.

First, recognize that, moving forward in time, the information and the information dimension is no longer the status quo realm of information and information operations. If properly harnessed, information can provide significant decisionmaking advantage. By viewing information through the lens of data and tempo pathways, Army forces can proactively account for how to obtain information advantage and situational information dominance. Consequently, Army forces can eliminate a hostile force from the battlefield before it is capable or ready to put its own forces in the field.

Second, because the status quo is no longer acceptable, the Army must develop new doctrines, forces and doctrine to address the reality of war and warfare. Moreover, things such as the transparent battlefield necessitate the change.

Third, eliminating an adversary's ability to suck Army forces into close combat is the key for avoiding positional warfare and wars of attrition in the future. This is not to say that long-range strikes are necessarily the answer, but rather, just that the Army must figure out how to avoid close battle while still eliminating an adversary army from the battlefield. Forward operating data and tempo forces, capable of delivering deadly and destructive effects in exceedingly close range, are one way to surmount this problem.

Finally, operating from clear and easily understood models regarding information advantage, information dominance and operating in the information dimension are important because they allow Soldiers to understand how and where they fit into the process. Overly ambiguous terms, phrases and graphics are not helpful for Army forces who are looking to seize the initiative in the information dimension and to compete on transparent battlefields. We must collectively sharpen the language, concepts and models we use to explain relevant military concepts. Failure to do so can and might well lead to future military defeats.



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