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.[1] 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.[2] 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.

> The integration of cyber warfare, artificial intelligence and autonomous systems can provide the U.S. Army with a significant information advantage.
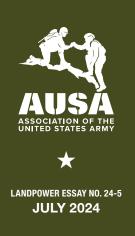
This report provides a primer on how to seize the advantage in the information dimension. It does not restate the existing joint or Army doctrinal approach to the subject; rather, it explores theoretical concepts, providing novel ways to incorporate cyber, AI and autonomous and semi-autonomous systems 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

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."[3] Operating in this dimension can take many forces. 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."[4] 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.[5] 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."[6]

The Army attempts to achieve information advantage through five levers.[7] 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.[8] 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.[9]

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?[10] 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.[11] 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.[12] 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.