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Frank Hoffman

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## Defeat Mechanisms in Modern Warfare

Frank Hoffman  
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**ABSTRACT:** This article explores the current debate about service and Joint operating concepts, starting with the Army's multi-domain operations concept. It argues for adaptations to an old operational design technique—defeat mechanisms; updates to Joint and service planning doctrine; and discipline regarding emerging concepts. Rather than debate over attrition versus maneuver, combinations of a suite of defeat mechanisms should be applied to gain victory in the future.

**I**n 2018, the *National Defense Strategy* stressed the importance of creative operational concepts to regenerate a competitive advantage in today's geopolitical context.<sup>1</sup> New Joint and service concepts present an array of new theories and terminology to articulate future modes of warfare and shape tomorrow's capabilities. Recent concepts, such as multi-domain operations (MDO), have been developed to stimulate and guide the design and development of future US military capabilities. A debate in the academic literature has challenged the viability of these service concepts and even long-standing elements central to US military doctrine. At issue is the central basis for gaining victory in warfare, which is critical to Joint and service planning doctrine. Critics challenge the historical foundation of both service and Joint warfighting concepts, especially the shifts to moral and psychological factors, and stress putting more emphasis on attrition and physical destruction.

This essay reviews current conceptual efforts to better posture the US military for success in the emerging era of strategic competition. The opening section briefly examines an emerging debate over weaknesses in service and Joint operating concepts. It summarizes the Army's MDO operating concept and addresses two recent advanced concepts—decision-centric warfare and systems warfare—to underscore the use of cyber-enabled systems to produce advantageous effects at the operational level of war. The assessment section explores a refined suite of defeat mechanisms as the essential building blocks of testable operating concepts and offers a revised set based on Army and Marine doctrine as a means of improving US force development efforts. These mechanisms form the building blocks of a

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1. Thomas G. Mahnken, Grace B. Kim, and Adam Lemon, *Piercing the Fog of Peace: Developing Innovative Operational Concepts for a New Era* (Washington, DC: Center for Strategic and Budgetary Assessments, April 2019); and James Mattis, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge* (Washington, DC: Department of Defense, 2018).

theory of victory that should be central to both operational plans and warfighting concepts.

## Current Debate

Scholars have recently resurrected an old debate about the underlying concepts used in force development efforts. Heather Venable from Air University has noted an increased emphasis on the use of nonkinetic elements in warfare and the desire to seek cognitive effects including paralysis. Venable notes the historical underpinning for claims of paralysis is thin: “Never validated through rigorous historical study, these untested ideas have been removed from context and sprinkled ahistorically throughout US doctrine.”<sup>2</sup>

Normally, airpower advocates endorse seeking strategic paralysis, sometimes entirely by using kinetic means against economic targets.<sup>3</sup> Venable, however, rightfully criticizes maneuver warfare theories and new concepts for having limited historical foundations. Her critique appears more targeted against operational paralysis in nascent Joint operating concepts and the infusion of maneuverist thinking, especially the stated objective of creating dilemmas for the adversary. Yet, the same thinking pervades recent Air Force doctrine.<sup>4</sup>

Other critics, like Franz-Stefan Gady, persuasively criticize the US Army’s emphasis on achieving strategic paralysis against major competitors. Gady argues US doctrinal thinking on future warfighting, which focuses on paralyzing an enemy by imposing multiple cognitive dilemmas through maneuver, needs to be rethought.<sup>5</sup> He concludes that the proliferation of new intelligence, surveillance, target acquisition, and reconnaissance capabilities makes offensive military operations relying on maneuver formations far easier to detect and to counter. Rather than count on maneuvering to create dilemmas, a greater reliance on attrition is more likely to be effective. Finally, he argues the upper hand in cyberspace will go to the defense, and it will impede, if not successfully counter, maneuver in that domain. Moreover, he argues creating and exploiting “windows

2. Heather Venable, “Paralysis in Peer Conflict? The Material versus the Mental in 100 Years of Military Thinking,” *War on the Rocks*, December 1, 2020, <https://warontherocks.com/2020/12/paralysis-in-peer-conflict-the-material-versus-the-mental-in-100-years-of-military-thinking/>; and Michael Kofman, “A Bad Romance: US Operational Concepts Need to Ditch Their Love Affair with Cognitive Paralysis and Make Peace with Attrition,” *Modern War Institute* at West Point, March 31, 2021, <https://mwi.usma.edu/a-bad-romance-us-operational-concepts-need-to-ditch-their-love-affair-with-cognitive-paralysis-and-make-peace-with-attrition/>.

3. On strategic paralysis, see David S. Fadok, “John Boyd and John Warden: Air Power’s Quest for Strategic Paralysis” (thesis, Air University, 1995).

4. US Air Force, *Department of the Air Force Role in Joint All-Domain Operations (JADO)*, Air Force Doctrine Publication (AFDP) 3-99 (Maxwell Air Force Base, AL: Curtis LeMay Center for Doctrine Development and Education, 2020), [https://www.doctrine.af.mil/Portals/61/documents/AFDP\\_3-99/AFDP%203-99%20DAF%20role%20in%20JADO.pdf](https://www.doctrine.af.mil/Portals/61/documents/AFDP_3-99/AFDP%203-99%20DAF%20role%20in%20JADO.pdf).

5. Franz-Stefan Gady, “Manoeuvre versus Attrition in US Military Operations,” *Survival* 63, no. 4 (August–September 2021): 131–48.

of superiority” following penetration or paralysis—a core tenet of MDO—is more difficult to achieve in conventional military operations and in the cyber domain. Overall, Gady’s assessment counters the efficacy of MDO, as imposing paralysis in the physical domains will be far more challenging in future conventional military campaigns.

These critics share a strong emphasis on the physical and materiel aspects of armed conflict and a distinct skepticism about any moral, psychological, or cognitive sphere in warfare. Although Carl von Clausewitz, J. F. C. Fuller, and T. E. Lawrence are undoubtedly spinning in their graves, Gady’s arguments about the growing difficulty of conducting maneuver cannot be easily dismissed. Yet, the same was true at the Battle of Gettysburg in 1863 and the First Battle of the Somme in 1916, and military forces evolved their doctrine and tactics. The same type of evolution will be needed today. The key question for today’s service chiefs and concept writers is determining what organizational, conceptual, and technological changes should coevolve to best advance multi-domain operations to gain victory in the emerging operational environment? What strategies and sources of combat power will promote military effectiveness in this decade? The debate is an old polar distinction and presents a false dichotomy between the physical destruction via attrition or via maneuver, the latter of which is more efficient and broadly defined. As Brigadier General Huba Wass de Czege argued nearly four decades ago, the real world lies between—and you need both.<sup>6</sup>

The progenitor of this long-standing debate is the British military analyst Basil Henry Liddell Hart.<sup>7</sup> Attrition lost its appeal in the trenches of World War I, and Liddell Hart’s studies were shaped by his own searing experiences in that conflict. He advocated indirect approaches to gain success, and he contended strategists should strive to think about paralyzing opponents. Liddell Hart asserted, “[I]n all decisive campaigns, the dislocation of the enemy’s psychological and physical balance has been the vital prelude to his overthrow.”<sup>8</sup> At a higher plane, he argued the ultimate aim was to bring pressure on a government, “so that the sword drops from a paralysed hand.”<sup>9</sup> His own visceral combat

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6. Huba Wass de Czege, “Army Doctrinal Reform,” in *The Defense Reform Debate: Issues and Analysis*, ed. Asa A. Clark IV et al. (Baltimore: Johns Hopkins University Press, 1984), 103.

7. B. H. Liddell Hart, *Strategy*, 2nd revised ed. (New York: Meridian, 1991), 5–6; Richard M. Swain, “B. H. Liddell Hart and the Creation of a Theory of War, 1919–1933,” *Armed Forces & Society* 17, no. 1 (Fall 1990): 35–51; and Azar Gat, *A History of Military Thought: From the Enlightenment to the Cold War* (New York: Oxford University Press, 2001), 645–95.

8. B. H. Liddell Hart, *The Memoirs of Captain Liddell Hart*, vol. 1 (London: Cassell, 1967), 162–63.

9. Liddell Hart, *Strategy*, 212.

experience informed his desire to ensure Great Britain avoided the same grinding attrition in the next war.

Attrition as a strategy, with its attendant costs, was further criticized after Vietnam. Both the US Army and Marine Corps developed new doctrines, seeking to put the jungles and highlands of Southeast Asia behind them. The AirLand Battle concept sought to leverage new technologies, especially deep attack and precision strike, integrated with effective mechanized forces.<sup>10</sup> The Marines began a long debate over what they called maneuver warfare, in which the writings of Vietnam veterans were prominent. Air Force Colonel John Boyd provided a very influential intellectual foundation for these ideas among Marines.<sup>11</sup> Boyd's thinking stressed moral and cognitive elements that were muted in US military theory. But he also emphasized the moral, cognitive, and physical dimensions of war were interrelated and interactive.<sup>12</sup> Advocates of maneuver warfare claimed all positive virtues of operational art and castigated attrition as the artless application of raw force. Richard Simpkin reflected this mindset in *Race to the Swift: Thoughts on Twenty-First Century Warfare*, with his pejorative jab at the "addicts of attrition" in contrast to the astute *masters of maneuver*.<sup>13</sup> Today modern-day apostles of attrition are fighting back.

Yet, serious historians recognize the debate between attrition and maneuver as a specious argument, since a strategy of attrition may be a necessary approach under specific circumstances.<sup>14</sup> Attrition, better described as physical destruction, is necessary but rarely sufficient component in warfare.<sup>15</sup> Some reduction of adversary capability is required, not just to reduce physical assets but also to produce the psychological shock of lost advantage or a surprise that induces the opponent to recognize the continuation of the campaign is going to make the outcome ever more costly. The velocity and combinations of force set up the conditions for victory, not one form or another.

The real issue is the construction of operational concepts or plans that have a historically demonstrated or testable theory of victory. Critics have

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10. Benjamin M. Jensen, *Forging the Sword: Doctrinal Change in the U.S. Army* (Stanford, CA: Stanford University Press, 2016), 74–86.

11. On Boyd's thinking, see Frans P. B. Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd* (New York: Routledge, 2006); and Antulio J. Echevarria II, *War's Logic: Strategic Thought and the American Way of War* (New York: Cambridge University Press, 2021), 169–92.

12. Echevarria, *War's Logic*, 177.

13. Richard E. Simpkin, *Race to the Swift: Thoughts on Twenty-First Century Warfare* (London: Brassey's Defence Publishers, 2000), 181.

14. On attrition, see Carter Malkasian, *A History of Modern Wars of Attrition* (Westport, CT: Praeger Publishers, 2002); and Cathal J. Nolan, *The Allure of Battle: A History of How Wars Have Been Won and Lost* (New York: Oxford University Press, 2017).

15. Lamar Tooke, "Blending Maneuver and Attrition," *Military Review* 80, no. 2 (March–April 2000): 10–11; and J. Boone Bartholomees Jr., "The Issue of Attrition," *Parameters* 40, no. 1 (Spring 2010): 5–19, <https://press.armywarcollege.edu/parameters/vol40/iss1/1/>.

challenged the vital component of major concepts, and with reason. Plans or concepts should be built upon a theory of victory based on the application of a set of defeat mechanisms.<sup>16</sup> These mechanisms form the requisite building blocks upon which we can construct a hypothesis for obtaining victory.

### Possible Defeat Mechanisms

Army doctrine defines a defeat mechanism as “a method through which friendly forces accomplish their missions against enemy opposition. Army forces at all echelons use combinations of four defeat mechanisms: destroy, dislocate, disintegrate, and isolate.”<sup>17</sup> While US Marine doctrine does not explicitly refer to defeat mechanisms, the terminology is commonly used and understood in discussions.<sup>18</sup> The United Kingdom’s army doctrine does not employ defeat mechanisms as a term, but lists destruction, dislocation, and disruption as three ways land forces attack the moral and physical cohesion of the opponent.<sup>19</sup>

A possible suite of defeat mechanisms is depicted in figure 1. This matrix contrasts the means and desired effects of various mechanisms, offers an initial categorization schema, and accepts current Army doctrine except for dropping isolation in favor of disorientation and degradation. These two mechanisms seem highly relevant in an age of pervasive intelligence, surveillance, reconnaissance, and highly connected command and control (C2) systems.

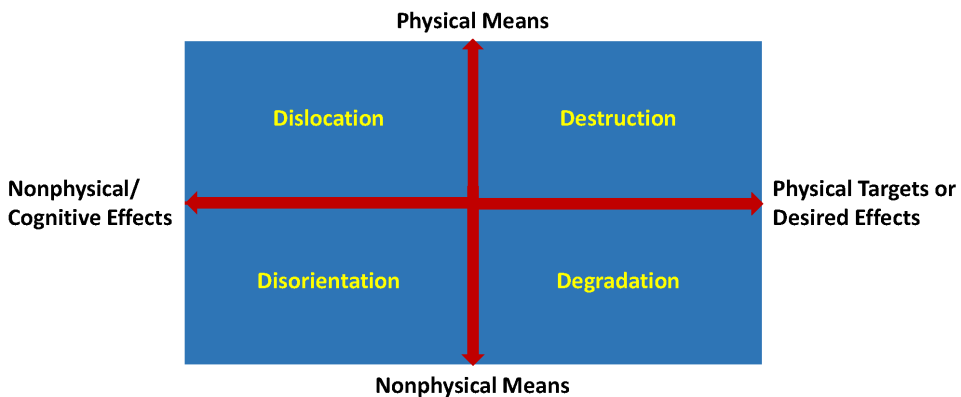


Figure 1. Defeat/victory mechanisms

While this proposed set of mechanisms only modestly adapts the Army’s doctrine, it avoids the paralysis- and dilemma-creating elements in MDO

16. See Brad Roberts, *On Theories of Victory, Red and Blue*, Livermore Papers on Global Security No. 7 (Livermore, CA: Lawrence Livermore National Laboratory Center for Global Research, June 2020).

17. Army Field Manual (FM) 3-0, *Operations* (Arlington, VA: US Army, 2017), 1-21–1-22.

18. Marinus, “Defeat Mechanisms,” *Marine Corps Gazette* 105, no. 7 (July 2021): 101–6.

19. UK Army, *Land Operations*, UK Army Doctrinal Publication AC 71940 (Bristol, UK: British Ministry of Defence, 2017), 5–5.

and could be used to enhance Joint doctrine. These mechanisms should not be considered common terms. Instead, they need to be defined precisely and employed consistently within the profession's doctrinal and conceptual discourse.

Dislocation is a product of maneuver and creates a positional and temporal advantage by making the location and/or defenses of one's adversaries irrelevant or less useful.<sup>20</sup> It may force the opponents to move and expose their forces to attack or face being surrounded or isolated from support. Its ultimate effect is to deprive opposing commanders of the initiative and any advantage they initially held. Destruction is self explanatory.

In addition to these concepts, two other proposed defeat mechanisms—disorientation and degradation—are possible. One function of disorientation could include the injection of disinformation into, or corruption of, an adversary's command and control systems with spoofed data. Passive forms of deception and decoys might also be useful.

Degradation describes a reduced level of situational awareness or lower level of functionality in C2 and intelligence, surveillance, and reconnaissance systems. As suggested by John Arquilla, David Ronfeldt, and others, degradation could be the product of a kinetic attack or involve cyber operations.<sup>21</sup> It captures effects that are probably temporary against a competitor with competent technological agility, who can reconstitute and adapt C2 systems over time. In Boyd's conception, this mechanism reduces the understanding or orientation of one's adversaries and slows their operating cycles and abilities to adapt. It provides an edge at the operational level of war.

This study now turns to what Army force developers and the Washington think-tank community are proposing in various operating concepts and how well they postulate an adequate theory of victory.

## Key Concepts

Current US Army doctrine stresses the importance of gaining the initiative and leveraging it to attain advantage. The Army concludes its ability to place adversary assets at risk across the depth of the battle space can neutralize critical enemy functions and deny an opponent the ability to generate combat power. It also stresses the importance of generating dilemmas for one's opponents so they cannot execute counter responses. Creating dilemmas can

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20. Robert R. Leonhard, *The Art of Maneuver: Maneuver-Warfare Theory and AirLand Battle* (Novato, CA: Presidio Press, 1991).

21. John Arquilla and David Ronfeldt, eds., *In Athena's Camp: Preparing for Conflict in the Information Age* (Santa Monica, CA: RAND Corporation, 1997), 2.



have causal consequences for opposing commanders. As reflected in current Army doctrine, the combination of taking the initiative and presenting the enemy with multiple dilemmas forces enemy commanders to be reactive, drives them into untenable positions, and presses them into making costly mistakes.<sup>22</sup>

In contrast with present doctrine, the Army's conceptual thinking about the future focuses on obtaining a capability overmatch through convergence and/or integration of capabilities—including nonkinetic ones—across multiple domains. The central defeat mechanism is not clear, but appears to be a new concept called “convergence,” defined as “the rapid and continuous integration of capabilities in all domains, the [electromagnetic spectrum] EMS, and information environment that optimizes effects to overmatch the enemy through cross-domain synergy and multiple forms of attack all enabled by mission command and disciplined initiative.”<sup>23</sup> According to this definition, convergence best describes what is being done by the Army but does not describe the impact on the adversary.

The US Army has used disintegration in past doctrine, defining it as “breaking the coherence of the enemy's system by destroying or disrupting its subcomponents (such as command and control means, intelligence collection, critical nodes, etc.), degrading its ability to conduct operations while leading to a rapid collapse of the enemy's capabilities or will to fight.”<sup>24</sup> We find a clearer logic in this statement, as well as a hypothesis on how to reduce the adversary's will or capacity to resist. Generating multiple dilemmas and inducing mistakes is a less clear causal argument for a successful defeat mechanism.

Multi-domain operations has received its share of criticism from various Army strategic and operational artists. For example, longtime Army thought leader Wass de Czege argues MDO's dilemma-centric theory of victory needs a more robust logic.<sup>25</sup> His overall assessment is correct. When the Army moved from AirLand Battle to multi-domain battle, clear thinking and historical analysis diminished as concept writers wrestled with new tools and technologies.

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22. US Army, *Operations*, Army Doctrinal Publication (ADP) 3-0 (Washington, DC: US Army, 2019), 2-4-2-5.

23. US Army Training and Doctrine Command (TRADOC), *The U.S. Army in Multi-Domain Operations 2028*, TRADOC Pamphlet 525-3-1 (Washington, DC: US Army TRADOC, 2018), vii.

24. TRADOC Pamphlet 525-3-1 (2018), vii.

25. Huba Wass de Czege, *Commentary on “The US Army in Multi-Domain Operations 2028”* (Carlisle, PA: Strategic Studies Institute, 2020), 10-11, <https://publications.armywarcollege.edu/pubs/3726.pdf>.



Others find the notion of dominance to be vague.<sup>26</sup> In short, many Army strategists believe MDO requires more clarity.

The Joint warfighting community is also striving to define how to formulate a theory of victory in its concepts and doctrine. Some major combatant commands and at least one other service have embraced the creation of dilemmas as the ultimate objective. The US Indo-Pacific Command contends the US military can shape opponent decisions by “rapidly presenting the adversary with multiple dilemmas, degrading adversary leadership’s sense of control.”<sup>27</sup> The Air Force also argues in its latest doctrine, “The joint force of 2035 will instead place an adversary on the ‘horns of multiple dilemmas’ by swiftly applying different strengths to produce multiple approaches.”<sup>28</sup> Our allies appear to have agreed on dilemma generation as well. The United Kingdom’s integrated operating concept states, “We need to create multiple dilemmas that unhinge a rival’s understanding, decision-making and execution.”<sup>29</sup>

## Competing Alternatives

Two competing concepts have been offered to advance the development of an overarching Joint warfighting concept. One is decision-centric warfare (DCW), developed by Bryan Clark and a team of associates who claim attrition is obsolete. They argue a need now exists for novel “. . . metrics for military success in this world where it’s not about attrition anymore. It’s much more about decision-making and creating dilemmas for an enemy.”<sup>30</sup> In Clark’s view, the Department of Defense should “embrace a new theory of victory and operational concepts that focus on making faster and better decisions than adversaries, rather than attrition.”<sup>31</sup> This approach is in line with what the Chief of Staff of the Army calls decision dominance.<sup>32</sup> Clark’s solution enables faster and more effective decisions by US commanders, while simultaneously degrading the quality and speed of adversary decision making. Decision-centric warfare exploits emerging technologies

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26. Amos C. Fox, *Getting Multi-Domain Operations Right: Two Critical Flaws in the U.S. Army’s Multi-Domain Operations Concept*, Land Warfare Paper No. 133 (Arlington, VA: Association of the United States Army, 2020).

27. Terrence J. O’Shaughnessy, Matthew D. Strohmeier, and Christopher D. Forrest, “Strategic Shaping: Expanding the Competitive Space,” *Joint Force Quarterly* 90, no. 3 (3rd Quarter 2018): 11.

28. US Air Force, *Air Force Future Operating Concept: A View of the Air Force in 2035* (Washington, DC: US Air Force, 2015), 7.

29. UK Ministry of Defence, *Integrated Operating Concept* (London: UK Ministry of Defence, 2021), 10.

30. Bryan Clark, “Analyzing New Military Technology,” interview by Tom Temin, Federal News Network, July 30, 2021, <https://federalnewsnetwork.com/defense-news/2020/07/analyzing-new-military-technology/>.

31. Bryan Clark, Dan Patt, and Harrison Schramm, *Mosaic Warfare: Exploiting Artificial Intelligence and Autonomous Systems to Implement Decision-Centric Operations* (Washington, DC: Center for Strategic and Budgetary Assessment, 2020), iii; and Bryan Clark, Dan Patt, and Timothy A. Walton, *Implementing Decision-Centric Warfare: Elevating Command and Control to Gain an Optionality Advantage* (Washington, DC: Hudson Institute, 2021).

32. US Army, *Army Multi-Domain Transformation: Ready to Win in Competition and Conflict*, Chief of Staff Paper (CSP) 1 (Washington, DC: US Army, 2021), 8.

such as AI, autonomous systems, and man-machine collaborations used to extend the reach, competency, and endurance of human operators. As with maneuver warfare, the core metrics of this approach would be the number of distinct dilemmas presented to the adversary and the speed with which they are imposed.<sup>33</sup>

Here again we see the emphasis on dilemma generation as a means of confusing and paralyzing opponents. This approach, however, is not simply nonmateriel; physical destruction is embedded in the concept. Some dilemmas will be created by threatening physical destruction and materiel costs. As Clark amplified in a follow-on inquiry:

*We see attrition is an essential element, in the form of destruction and degradation, to achieve dislocation and disorientation. In some cases an enemy system or unit has to be destroyed or damaged to degrade enemy decision-making. More importantly, though, the enemy has to fear losses.*<sup>34</sup>

To enable decision-centric warfare, the concept leverages destruction, distributed formations, dynamic aggregation and disaggregation of forces, marked reductions in signature, and counter-C2 intelligence, surveillance, and reconnaissance actions designed to offer an effective response or confound adversary understanding of our operations. Clark argues for a relative advantage in cognitive capacity and decision making, with enablers for protecting friendly C2 systems and leveraging the same technologies to attack, distort, and degrade the decision making of opposing commanders.

## Systems Warfare

Former Deputy Secretary of Defense Robert Work developed a Joint warfighting concept he called “systems warfare,” drawn from his extensive study of warfighting concepts. The central idea of his concept is Joint forces should aim to field battle networks that “operate better and faster than adversary operational systems, and ones that cannot be destroyed like the battle networks used today.”<sup>35</sup> The concept builds upon the mature and now diffused precision-strike competition and explores new competitive pressures, such as exploiting today’s emerging seventh military revolution of autonomy and human augmentation as well as vulnerabilities generated

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33. Clark, Patt, and Walton, *Implementing Decision-Centric Warfare*, 23.

34. Bryan Clark, correspondence with author, September 30, 2021.

35. Robert O. Work, “A Joint Warfighting Concept for Systems Warfare,” Center for a New American Security, December 17, 2020, <https://www.cnas.org/publications/commentary/a-joint-warfighting-concept-for-systems-warfare>.

by the Information Age.<sup>36</sup> As Work notes, “The ability to out-range an enemy has become far more difficult with the development of invisible system strike capabilities such as cyber, counter-AI, and electronic warfare.”<sup>37</sup> His concept reinforces the importance of information-strike capabilities as an element of combat power. The battle networks, rather than the major platforms, are the key weapons systems and they confront each other directly via long-distance virtual strikes.

Like DCW, Work promotes the development of capabilities such as human-machine battle networks to exploit AI-enabled autonomy at scale. He contends these human-directed and algorithm-enhanced networks will lead consistently to better decisions that are made and acted upon faster than any opponent. Like Clark’s DCW, systems warfare has both an offensive and defensive character. Not only will systems warfare give the Joint force a decisive advantage in its own OODA cycle, its networks would also work directly against their opponent’s battle networks via cyberattack.<sup>38</sup> The concept underscores the need to identify critical nodes or systems as part of the enemy order of battle to strike at and attrit the adversary’s command functions.

Work incorporates the attrition and/or destruction of other components of the adversary’s forces and explicitly includes attrition from firepower into his concept, with the qualification that:

*. . . the object of these fires is not about the annihilation of the enemy force, but of disrupting and destroying the inner workings of the opposing system of systems. The specific targets chosen are those that, if destroyed, will allow the Joint Force to gradually gain an information and decision advantage in a systems confrontation.*<sup>39</sup>

Thus, disruption and destruction are the primary defeat mechanisms of this concept, in search of an information advantage we can exploit. Yet, the human element is not ignored in systems warfare. In fact, the concept

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36. F. G. Hoffman, “Will War’s Nature Change in the Seventh Military Revolution?,” *Parameters* 47, no. 4 (Winter 2017–18).

37. Work, “Systems Warfare.”

38. Osinga, *Science, Strategy and War*, 189–231.

39. Work, “Systems Warfare.”

assumes the operational system with the best people and better (algorithmic) processes will be at an advantage and outperform the adversary.<sup>40</sup>

## Assessment

The strength in both systems warfare and decision-centric warfare lies in their ability to exploit the expected benefits of AI-enabled cyber operations. The application of AI-enhanced decision support systems or autonomous weapons in military operations is a potential game changer.<sup>41</sup> These capabilities will be relevant to improved fires and enhanced maneuver. AI-driven robotic swarms offer a step change in maneuver capability that can operationalize a form of maneuver that overwhelms defenses in conventional military operations.<sup>42</sup> The dislocation that such maneuvers can cause should be significant, and the kinetic effectiveness of simple drone attacks in recent conflicts is suggestive of what the future holds.<sup>43</sup> These concepts seek to gain and hold a competitive edge in AI/machine learning. Of course, AI will be a double-edged sword.<sup>44</sup> Artificial intelligence will both sharpen the sword and also mandate (and hopefully provide) a strong shield and thick deception filter.<sup>45</sup> Joint force development efforts must urgently come to grips with exactly how to best employ and defend against these new technologies.

Systems warfare and DCW both exploit what European scholars call the synthetic element of modern warfare, which some scholars expect will alter warfare.<sup>46</sup> Decision-centric warfare stresses the integration of human thinking and machine speed—exploiting the best of human direction, directly or indirectly, while still maximizing rapid decision making. This thinking is consistent with assertions from recent scholarship arguing “the combination of the synthetic and the human is giving birth to new ways of war.”<sup>47</sup> Systems warfare disrupts, degrades, or destroys an adversary’s major command and control systems at the operational level and includes more traditional firepower directed at key nodes and critical vulnerabilities.

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40. Work, “Systems Warfare.”

41. Kenneth Payne, *I Warbot: The Dawn of Artificially Intelligent Conflict* (London: Hurst, 2021). For a critical examination, see Sam J. Tangredi and Greg Galdorisi, eds., *AI at War: How Big Data, Artificial Intelligence, and Machine Learning Are Changing Naval Warfare* (Annapolis, MD: Naval Institute Press, 2021).

42. John Arquilla and David Ronfeldt, *Swarming & the Future of Combat* (Santa Monica, CA: RAND/National Defense Research Institute, 2000).

43. Franz-Stefan Gady and Alexander Stronell, “What the Nagorno-Karabakh Conflict Revealed about the Future of Warfighting,” International Institute for Strategic Studies, *Expert Commentary* (blog), November 23, 2020, <https://www.iiss.org/blogs/analysis/2020/11/nagorno-karabakh-and-the-future-of-war>.

44. National Intelligence Council (NIC), *Global Trends 2040: A More Contested World* (Washington, DC: NIC, March 2021), 67.

45. See the recommendations of the National Security Commission on Artificial Intelligence (NSCAI), *Final Report* (Arlington, VA: NSCAI, 2021), <https://www.nsc.ai.gov/2021-final-report/>.

46. See introduction in Rob Johnson, Martijn Kitzen, and Tim Sweijts, eds., *The Conduct of War in the 21st Century: Kinetic, Connected and Synthetic* (New York: Routledge, 2021).

47. See conclusion in Johnson, Kitzen, and Sweijts, *Conduct of War*, 300.

While both systems warfare and DCW merit serious consideration by Joint force developers and policy officials, each approach could benefit from more historical analysis and a clearly stated theory of victory. At present, they offer assertions of operational advantage that have merit given the role of battle networks in modern forces. The value of AI in making better and faster decisions in an adversarial context remains speculative. However, it is worthwhile to posit AI as a desired capability in a future operating concept for validation in both gaming and experimentation.

### Modernizing Defeat Mechanisms

Having examined the inherent theories of victory and their related defeat mechanisms in current concepts, this section explores how to update these mechanisms and obtain a common lexicon for their utilization in concepts and doctrine. In the past, such mechanisms represented the building blocks of operations by which commanders plan to apply combat power for specific desired effects and targets. While Joint and Marine doctrines are silent on defeat mechanisms, US Army doctrine reflects their potential.<sup>48</sup> Joint planning doctrine, however, does frame a relationship between desired military objectives and effects and tasks.<sup>49</sup> Since defeat mechanisms offer concrete ways of describing how such effects are created, they could be incorporated within existing Joint doctrine to facilitate the development of distinctive courses of action and tie desired outcomes to effects, effects to tasks, and then tasks to component commanders.

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48. Jerry Lynes, retired US Marine Corps colonel, correspondence with author, June 19, 2021.

49. Joint Chiefs of Staff (JCS), *Joint Planning*, Joint Publication (JP) 5-0 (Washington, DC: JCS, 2017), IV-27.

**Table 1. Defeat mechanisms and projected effects**

Defeat Mechanisms	Components of Combat Power	Desired Effects	Targets	Culminating Mechanism
<b>Destruction</b>	Firepower	Attrition of capacity	Physical resources, forces, and platforms	Systems disruption/ disintegration
<b>Dislocation</b>	Maneuver	Terrestrial and temporal positional advantage	Cognitive state of theater or operational commanders	
<b>Degradation</b>	Primarily information/ cyber/EMS  Can be achieved kinetically or by cyber weapons	Seeks to slow or diminish cognitive tasks, decision making, and control capacity	Operational capacity of selective adversary networks/ systems  Attacks links between elements of battle systems	
<b>Disorientation</b>	Cyber or other information systems	Delay decision making and C2 capacity	Commanders at all levels via C2 systems	

Table 1's first column reflects the defeat mechanisms introduced at the beginning of the article. The subsequent columns summarize the principal component of combat power associated with each defeat mechanism, the desired effect, and specific target most often associated with it. The final column captures what is considered the culminating mechanism—either systems disruption or disintegration, a product of skillful operational art and orchestration of effects in time and space.

These building blocks provide the underlying rationale behind a good concept or operational plan. The need to apply multiple mechanisms, orchestrated across time and space, is often overlooked. It is possible but

unlikely a single mechanism, including destruction, would suffice. It is more likely some combination of mechanisms will be employed to deny the opponent's strategic aims and force a resolution on favorable terms. In major contests with a peer competitor, plans will require such combinational efforts and the reciprocal effects of the mechanisms.<sup>50</sup> The correct combination and orchestration of these mechanisms is what makes operational art so potent and demanding. At present, Joint doctrine lacks the terminology to define and apply these mechanisms as components of operational design, though US Army doctrine acknowledges them.

Systems disruption is only achieved by creative combinations of some mix of the four defeat mechanisms. This term is adapted from Marine doctrine, which incorporates the idea of thinking of the opponent as a system. The doctrine argued against a slow erosion of an enemy's defenses and sought to penetrate the enemy system and tear it apart. It goes on to note "firepower is central to maneuver warfare."<sup>51</sup> Yet, that firepower is used to "contribute to the enemy's systemic disruption."<sup>52</sup> The systems approach is useful, but "systemic" implies a larger breakdown or collapse akin to strategic paralysis and should be avoided. This approach is likely an overreach for a Joint operational concept, especially for conflict against a large-scale peer.

The Army has used disintegration, the process of losing cohesion or strength, as a Joint concept as far back as the early 2000s.<sup>53</sup> The concept is analogous to systems disruption and superior to paralysis or dilemma creation. Both terms remain viable for doctrine and concept development. Both the Army and Marine Corps have organic firepower and maneuver capabilities, and each service has developed capabilities for information/cyber operations that can execute systems confrontation/destruction at the operational and tactical levels. Thus, their ability to degrade and disorient is considerable. Clearly, the Joint force can bring these mechanisms to bear to achieve systems disruption or disintegration. Using these terms

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50. Eado Hecht, "Defeat Mechanisms: The Rationale behind the Strategy," *Military Strategy* 4, no. 2 (Fall 2014), 24–30.

51. US Marine Corps (USMC), *Warfighting*, Marine Corps Doctrinal Publication (MCDP) 1 (Washington, DC: USMC, 1997), 4–4.

52. On Boyd, see Ian T. Brown, *A New Conception of War: John Boyd, the U.S. Marines, and Maneuver Warfare* (Quantico, VA: Marine Corps University Press, 2018).

53. Douglas J. DeLancey, *Adopting the Brigadier General (Retired) Huba Wass de Czege Model of Defeat Mechanisms Based on Historical Evidence and Current Need* (Fort Leavenworth, KS: School of Advanced Military Studies, 2001); and US Joint Forces Command, *Major Combat Operations Joint Operating Concept*, Version 2.0 (Washington, DC: Department of Defense, 2006), 11.



clearly and consistently will facilitate dialogue, the increased understanding of plans, and the testing of proposed operating concepts.

Regrettably, the table fails to present the reciprocal interaction of the defeat mechanisms as they relate to the moral, cognitive, and physical spheres of warfare.<sup>54</sup> The drafters of MDO understand this interaction in the call for cross-domain applications. The critics ignore an extensive body of military history regarding psychological/cognitive impacts and instead stress physical attrition. Obviously, there are physical and kinetic components to warfare, but they generate cognitive and psychological effects as well as materiel losses. As anyone who has been punched in the nose realizes, physical events also have moral/cognitive impacts.

The systems warfare concept is the most complete presentation for achieving systems disruption at the operational level. Its strong focus on systems and networks, however, should not be interpreted by modern-day apostles of attrition as underplaying the necessity for destruction to minimize the opponent's ability to operate against us. Additionally, this concept leverages information as an instrument of combat power by including the destruction of systems and networks via *invisible strike* from offensive computer/cyber operations. The Joint force must also incorporate firepower and maneuver, including the eventual fielding of autonomous and augmented systems that will produce greater discrimination and speed in strike operations. These abilities will be necessary for future contests, particularly in missile defense and cyber systems, and in generating destruction of materiel and critical systems.

At the operational level of war, systems disruption or disintegration should be seen as the result of a deliberate combination of defeat mechanisms. This approach appears more plausible and relevant to this era than the much-acclaimed effect of *strategic paralysis* or cognitive dilemmas. Combinations of fires, maneuver, and cyberattack can generate cascading effects against selected vulnerabilities that severely disrupt the opposing force's ability to respond effectively. Degrading C2 systems and disorienting the information received by decision making via deception or disinformation further complicates the adversary's adaptation and responses. The opposing commander's ability to understand, assess, and adapt in reaction to these thrusts will be slow and ineffective. To adapt Liddell Hart's conception, the desired effect is not that "the sword drops from a paralysed hand," but that the sword cannot be wielded in a coherent

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54. Consistent with Boyd. See the chart in Hecht, "Defeat Mechanisms," 25.

and lethal manner.<sup>55</sup> At the operational level, systems disruption captures the desired and achievable effects we seek and the transitory character of most cyber-based weapons.<sup>56</sup>

Fire, maneuver, and information remain enduring elements in today's character of war. But they are increasingly connected and interactive. Modern warfighting concepts should reflect this reality, as should doctrine and operational art. The future requires a force capable of wielding both sword and shield to blind, confound, and defeat future adversaries. We need to weave and defend networks, while unraveling our opponent's at the same time. The destructive sword—by air, ground, and sea—will certainly be applied with purpose and violence when needed. Fire and maneuver, however, will be joined by operational C2 systems that link them and facilitate cross-domain applications that disintegrate the effectiveness of our opponents—and generate a decided edge for the Joint force. For these reasons, refining the thinking and application of defeat mechanisms represents a crucial aspect of operational art now and for the emerging age.

In sum, this assessment suggests critics have some valid points. The Army and Air Force—and by implication, Joint all-domain operations—should not be focused on the creation of multiple dilemmas or strategic paralysis as their end states. Yet, critics seem to believe physical actions only have physical effects. Fire and maneuver, physical and cognitive/moral forces—all interact in battle. There is little evidence in history of success that depends solely on one method, especially among major states. Disintegration or systems disruption become feasible when sought as the culminating product of an operational approach that employs and sequences multiple defeat mechanisms, orchestrated over time and space and directed at critical vulnerabilities.

## Conclusion

Speaking at a change of command ceremony in Hawaii, Secretary of Defense Lloyd Austin correctly observed, “The way we’ll fight the next major war is going to look very different from the way we fought the last ones . . . In this young century, we need to understand faster, decide faster, and act faster. Our new computing power isn’t an academic exercise.”<sup>57</sup> Every age, Clausewitz reminds us, has its own peculiar forms

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55. Liddell Hart, *Strategy*, 212.

56. Max Smeets, “A Matter of Time: On the Transitory Nature of Cyberweapons,” *Journal of Strategic Studies* 41, no. 1–2 (2018): 6–32.

57. Lloyd Austin, “Secretary of Defense Remarks for the U.S. INDOPACOM Change of Command,” US Department of Defense, April 30, 2021, <https://www.defense.gov/News/Speeches/Speech/Article/2592093/secretary-of-defense-remarks-for-the-us-indopacom-change-of-command/>.

of warfare.<sup>58</sup> The emerging age will evolve its own peculiar mode, one that responds to political, social, and technological changes. Anticipating future adversaries will be difficult but necessary.

The disruptive impact of new technologies makes what Peter Paret called the cognitive challenge of war harder to address.<sup>59</sup> Gady properly assesses that maneuver will be challenged in an age of ubiquitous surveillance. Victory will not come about as simply as the by-product of creating dilemmas for our opponent. Instead, victory will be the result of careful orchestration of several types of explicitly defined defeat mechanisms tailored to the mission and circumstances. Winning in the twenty-first century will require the layered combination of kinetic and nonkinetic capabilities, more than Gady's suggestion for an updated version of France's "methodical battle."<sup>60</sup> To succeed, we must master battle network competitions that weave the physical and psychological elements together.<sup>61</sup>

History favors institutions that examine their operating methods and continuously refine their future visions of warfare.<sup>62</sup> There is a touch of speculation in these visions, and we need to encourage debate on the merits of unproven methods and respect the prospects of agency by our opponents.<sup>63</sup> Critics of emerging US concepts provide an invaluable service in bringing attention to the need for critical validation. To reiterate, we should drop the simplistic attrition versus maneuver debate and seek a more holistic understanding of warfare, one that reflects the reciprocal interaction of multiple sources of combat power. US military doctrine should adopt combinations of interactive tools and effects, using both firepower and maneuver to gain victory, which is what MDO and the emerging Joint warfighting concept seek. As Austin observed, this approach is not an academic exercise.

For the last 30 years, since Operation Desert Storm, the military defeat of opponents could be assumed by virtue of our overwhelming dominance in military power. Our officer corps has taken this assumption for granted their entire professional lives. That fact appears to have diluted operational doctrine and clouded concept development. It is time for US officers

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58. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1987), 593.

59. Peter Paret, *The Cognitive Challenge of War: Prussia 1806* (Princeton, NJ: Princeton University Press, 2009).

60. Gady, "Manoeuvre vs Attrition," 143.

61. John Stillion and Bryan Clark, *What It Takes to Win: Succeeding in 21st Century Battle Network Competitions* (Washington, DC: Center for Strategic and Budgetary Assessments, 2015).

62. Williamson Murray and Allan R. Millett, eds., *Military Innovation in the Interwar Period* (New York: Cambridge University Press, 1996), 604–14.

63. Lawrence Freedman, *The Future of War: A History* (New York: Public Affairs, 2017), 287.

to gain an understanding of how to beat adversaries decisively in the twenty-first century.

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Frank Hoffman

Dr. Frank Hoffman is a distinguished research fellow at the National Defense University in Washington, DC. His latest book, *Mars Adapting: Military Change under Fire*, was published this year.