Updating Defeat Mechanisms

Concepts of victory for contemporary warfare

by Dr. Frank Hoffman

Victory has been an elusive concept in recent history. In Iraq, Afghanistan, as well as in our own doctrine. Military victory is at best a necessary precondition for obtaining assigned political aims—the "better state of peace" in Liddell Hart's terms.[1] At the strategic level, we need to understand how combat operations contribute to a campaign's designated higher political outcomes and how they contribute to a strategy's theory of victory.[2] Battles are not the end by itself as COL Thomas Greenwood has appropriately noted.[3] History suggests that confusing means with ends rarely ensures strategic success.[4] However, strategic success is very unlikely in the face of operational/tactical failure as well.

Thus, there is an appropriate focus in our warfighting doctrine on the operational and tactical levels of warfare and on preparing to fight and win campaigns and battles.[5] That is why I have thoroughly enjoyed the spirited discourse in these pages from Marinus and the authors who have challenged and debated fundamental elements of Maneuver Warfare.

In this article, I connect the ongoing debate with a larger challenge in professional literature as it relates to how we conceptualize securing victory in our doctrine and future warfighting concepts. The opening section briefly notes an emerging debate over weaknesses in Service and joint operating concepts. The subsequent section explores *defeat mechanisms* as the building blocks of testable operating concepts and offers a revised set based off Army and Marine doctrine as a means of improving U.S. force development efforts. Mindful of the need to offer a constructive solution, this framework builds upon maneuver warfare and supports Marinus' insightful recommendations with some alterations.[6]

It is expected that this discussion will contribute to the ongoing discussion here in the *Gazette* but also enhance the development of joint doctrine and warfighting concepts like Joint All-Domain Operations.[7]

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Current Debate

Some issues debated in these pages are also raised elsewhere in professional or academic literature. Several scholars challenge the underlying concepts used in emerging military force development efforts. One Air University professor criticized the underlying history and key tenets of maneuver warfare—in particular the desire to seek moral or cognitive effects. Dr. Heather Venable finds that many maneuver warfare ideas are intellectually shallow and unrealistic:

> Never validated through rigorous historical study, these untested ideas have been removed from context and sprinkled ahistorically throughout U.S. doctrine. Today, they continue to shape emerging multi-domain or joint all-domain operations doctrine, especially in those doctrines' aim to inflict multiple dilemmas on an opponent.[8]

Venable found that some U.S. military concepts are "founded on unrealistic hopes and ahistorical examples that the enemy can be outsmarted and, ultimately, paralyzed" and criticized the introduction of major elements of maneuver warfare morphing into joint concepts. This is ironic since paralysis was central to Air Force theorists like John Warden.[9] Even more ironic, Venable missed the opportunity to criticize the Air Force. The Air Force has also stressed creating paralysis for opponents, noting that "[t]he joint force of 2035 will instead place an adversary on the 'horns of multiple dilemmas' by swiftly applying different strengths to produce multiple approaches."[10] Its latest doctrine stresses

> [a]chieving freedom of action requires convergence across domains that *presents adversary dilemmas* at an operational tempo complicating or negating adversary responses and enabling the joint force to operate inside the adversary's decision-making cycle.[11]

The embrace of dilemmas and paralysis is not limited to just the Army. Signaling the currency of this construct, the U.S. Indo-Pacific Command contends that the U.S. military can shape opponent decisions by "rapidly present-

ing the adversary with *multiple dilemmas*, degrading adversary leadership's sense of control."[12] Our allies in the United Kingdom are proponents of paralysis too, with their latest Integrated Operating Concept. The concept does not clearly define its defeat mechanism, but it clearly states, "We need to create *multiple dilemmas* that unhinge an adversary's understanding, decision-making and execution."[13]

Franz-Stefan Gady, a futures analyst with the prestigious Institute for International Strategic Studies, persuasively criticizes the Army's emphasis on achieving strategic paralysis against major competitors. Like Venable, Gady has found emergent concepts like MDO to be flawed and argues that U.S. doctrinal thinking on future warfighting at the operational level—which focuses on paralyzing an enemy by imposing multiple cognitive dilemmas through maneuver needs to be rethought.[14] Gady has concluded that the proliferation of new intelligence, surveillance, target acquisition, and reconnaissance capabilities makes offensive military operations requiring the maneuver of formations far easier to detect and counter. Overall, Gady's analysis finds that imposing paralysis is likely to be far more challenging in future conventional military campaigns, with a resultant requirement to rely upon attrition against future opponents.

His assessment was reinforced by Michael Kofman, who heads the Russian studies program at CNA, the Department of the Navy's federally funded research arm. A keen student of Russian strategy and military developments, Kofman argues that the U.S. military should embrace attrition and forget its love affair with cognitive paralysis.[15]

These arguments parallel the critics of maneuver warfare in these pages, with one Marine describing the central concept in maneuver warfare a fantasy and Professor Venable and a co-author challenging the basic precept of strength against weakness as well.[16] I agree with Maj Williams' critique of the limits of the attrition versus maneuver debate.[17] That contrivance was an overly simplistic construct in the post-Vietnam era during the introduction of *FMFM 1* some three decades ago. The advocates of maneuver warfare claimed all the positive virtues of operational art and castigated attrition as the artless application of raw force. Richard Simpkin, in *Race to the Swift,* captured the contrast with his snarky swipe at the "addicts of attrition" and the "masters of maneuver."[18] Decades ago, I thought we resolved this misunderstanding and appreciate that attrition plays a necessary role in warfare, including maneuver warfare.[19] It is just about how intelligently and effectively it is applied.[20]

However, judging from Venable, Kofman and Gady, and perhaps a few of the Marine authors, there is a second generation of the apostles of attrition.

Victory in Warfighting Concepts

Current Army doctrine stresses the importance of placing adversary assets at risk across the depth of the battle space to neutralize critical enemy functions and deny them the ability to generate or recover combat power. It also stresses the importance of generating dilemmas for the opponent, so that their commander is forced into making less optimal actions:

> Army forces seize, retain, and exploit the initiative by forcing the enemy to respond to friendly action. By *presenting the enemy multiple dilemmas*, commanders force the enemy to react continuously until the enemy is finally driven into untenable positions. Seizing the initiative pressures enemy commanders into abandoning their preferred options and making costly mistakes.[21]

In its latest concepts, the Army seeks to obtain a capability overmatch" through the convergence of capabilities across domains. In MDO, the central theory of victory/defeat mechanism appears to be convergence, which is 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.[22]

Army forces will create overmatch for the joint force commander of the future by executing and enabling nonlinear operations. Operating in globally contested operations against a numerically superior adversary, the Army creates overmatch by attacking throughout the depth of the battlespace. The latest Chief of Staff white paper clarifies how the Army expects to win in major conflicts. It states that Army forces will defeat land, air, and maritime targets by leveraging its "decision dominance" and integrating sensors and platforms. The envisioned defeat mechanism to prevail and overmatch the enemy's will to resist is the use of simultaneous maneuver, fires, and information assets employed from mobile attack positions.[23]

The Army has used "disintegration" in its doctrine in the past, defined 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.[24] This is a clearer logic and hypothesis of how it reduces the adversary's will or ability to resist.

Marine doctrine has historically been focused on shattering the adversary's cohesion through rapid actions, with the intended outcome of systemic disruption. Marinus remains in support of this triggering mechanism, as do I.

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But, overall, the critics score valid points with respect to current operating concepts. The Army and Air Force (or joint doctrine) should *not* focus on creating multiple dilemmas. Convergence may also need further historical analysis and justification, but past Army concepts like disintegration and its cousin—systems disruption, in Marine doctrine—are both feasible and historically grounded. This is particularly true when understood/applied as the culminating product of an operational approach that employs supporting or enabling defeat mechanisms that are orchestrated over time and space and directed at critical vulnerabilities for specific desired effects.

This discussion leads to a proposed suite of defeat mechanisms to consider for inclusion in joint and Service doctrine today.[25]

Modernizing Defeat Mechanisms

Army doctrine is more explicit regarding the inclusion of defeat mechanisms in operational plans. Army doctrine defines a defeat mechanism as "a method through which friendly forces accomplish their mission against enemy opposition. Army forces at all echelons use combinations of four defeat mechanisms: destroy, dislocate, disintegrate, and isolate."[26] Marine doctrine does not explicitly refer to defeat mechanisms but the terminology is used and understood.[27] The United Kingdom's Army doctrine does not use defeat mechanisms as a doctrinal term but does list key elements, including destruction, dislocation, and disruption, as three ways that land forces attack the moral and physical cohesion of the opponent.[28]

I propose that the Corps evaluate and refine a suite of defeat mechanisms to update its doctrine and to establish some intellectual consistency. Table 1 reflects the defeat mechanisms as building blocks toward operationalizing an operation approach in planning and in crafting concepts. The subsequent columns summarize the principal component of combat power associated with each defeat mechanism as well as the desired effect and specific target most often associated with it. The final row captures what is considered the culminating mechanism, *systems disruption* or disintegration, a product of skillful operational art and orchestration of effects in time and space.

This proposed framework uses *destruction* vice attrition as a firepower-based defeat mechanism to eliminate the physical assets of the adversary.[29] This more clearly defines the purpose and avoids the temporal dimension and the historical baggage attendant to strategies of attrition or long-term exhaustion. Attrition, better depicted as physical destruction, is generally well recognized to be a necessary but rarely sufficient component in warfare.[30] Some reduction of adversary capability is often required, and it will produce a cognitive impact as well when it is combined with surprise and the seizing of the initiative. Applied with due attention to the opponent's critical vulnerabilities, it should induce the opponent to recognize that continuation of the campaign is going to make the eventual outcome ever more costly.

Dislocation is a product of maneuver and creates a positional and temporal advantage by making the location/defenses of the adversary less useful or irrelevant.[31] It may force the opponent to move and expose his forces or face defeat in detail by firepower later. However, its ultimate effect is to deprive the opposing commander of the initiative and any advantage initially held. Two other proposed defeat mechanism, *disorientation* and *degradation,* are envisioned. The injection of disinformation or corruption of an adversary command and control (C2) system with spoofed data could be a function of *disorientation*. Other passive forms of deception and decoys might also be considered. The latter describes a reduced level of situational awareness or lower level of functionality in C2 and intelligence, surveillance, reconnaissance systems. This degradation could be a kinetic attack or involve cyber operations as a form of combat power as suggested by Arquilla and Ronfeldt.[32]

Degradation captures effects that are probably temporary against a competitor with competent technological agility, who can reconstitute and adapt C2 systems over time. This mechanism reduces the adversary's understanding or orientation in Boyd's conception, slows his operating cycle and ability to adapt. This mechanism is included to maximize our understanding of how information serves as a source of combat power in modern warfare.[33]

The only distinction I make here from Marinus' article is between enabling mechanisms and the culminating defeat mechanism of Systems Disruption.

These building blocks are the underlying rationale behind the concept or

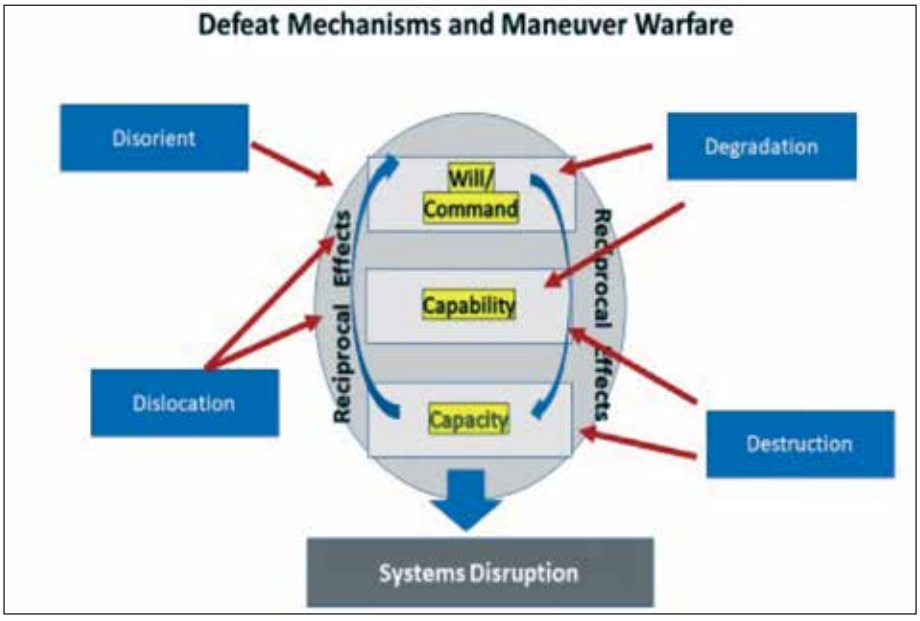
Enabling Defeat-Mechanisms	Component of combat power.	Desired effect.	Targets.
Destruction	Firepower.	Attrition of capacity.	Physical resources, forces and platforms.
Dislocation	Maneuver.	Terrestrial and temporal positional advantage.	Cognitive state of theater or operational commanders.
Degradation	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.
Disorientation	Cyber or other information systems.	Delay decision-making and C2 capacity.	Commanders at all levels via C2 systems.
Culminating Mechanism			
Systems Disruption/ Disintegration	Cumulative by Combinations.	Cascading effects that disrupt the opponent's ability to respond.	Cohesion and effective control of adversary forces.

Table 1. Defeat mechanisms and projected effects.

operational plan. The need for applying multiple mechanisms, orchestrated across time and space, is sometimes overlooked. It is entirely feasible that a singular mechanism, like destruction, could suffice in some contexts. Yet, it is more likely that some combination of mechanisms will be needed to deny the opponent's strategy aims and force a resolution on favorable terms. The reciprocal effects of the mechanisms is drawn from insights of an Israeli scholar.[34] In major contests with a peer competitor, success is going to require such combinational efforts and flexibility, as LtCol Nate Lauterbach and Dr. Venable have argued.[35] The correct combination and orchestration of these mechanisms is what makes operational art so useful but also intellectually demanding.

The incorporation of the disorientation/degradation mechanisms is intended to ensure the incorporation of physical and non-kinetic means of degrading the adversary's C2 functions. There are two major concepts postulated by U.S. think tanks to promote "Systems Warfare" or what one team calls Decision-Centric Warfare.[36] These proposed concepts stress non-kinetic means for disorienting and disrupting the adversary's system, in a way that is consistent with maneuver warfare theory. They embrace understanding the adversary as a system and reflect Chinese ideas about systems confrontation and the battle over operational systems vice attrition. These concepts do incorporate attrition, including what Bryan Clark calls virtual attrition and former Deputy Secretary of Defense Robert Work frames as "invisible strikes." These advocates pick up arguments made a generation ago about winning in the 21st century requiring mastery of battle network competitions and the potential for disruption, over salvos of cannon rounds or missiles.[37]

Systems disruption is the end product or military objective, which is only achieved by creative combinations of some mix of the four defeat mechanisms.[38] This term is adapted from Marine doctrine, which incorporated the idea of thinking of the opponent as a system and seeks not an erosion of an enemy's defenses but *to penetrate the enemy system* and tear it apart.[39] Systems disruption should be achievable, especially by a modern combined arms force.



The synergistic relationships of defeat mechanisms in manuever warfare. *(Figure provided by author.)*

Combinations of fires, maneuver, and cyber-attack 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. At the operational level, systems disruption captures the desired effects we seek, as well as the transitory character of most cyber-based weapons.[40] Clearly, the modern MAGTF can bring these to bear to achieve systems disruption or disintegration as part of a naval or joint force. Using these terms clearly and consistently will facilitate dialogue and understanding of plans and the testing of proposed operating concepts.

At the operational level of war, systems disruption as the result of a deliberate combination of defeat mechanisms appears more plausible to this age than simply "decision dominance" or the much-acclaimed effect of paralysis or multiple dilemmas.

The enabling mechanisms in Table 1 fails to illustrate the reciprocal interaction of the defeat mechanisms as they relate to the moral/cognitive and physical spheres of warfare.[41] Figure 1 below offers a schematic depiction. While the defeat mechanisms have a principal purpose against a dimension of the adversary's combat power (capabilities, capacity/size, and the commander's will/command functions), they also have reciprocal and amplifying effects as losses mount, battle functions diminish, and the commander's ability to react is eroded.

My defined suite of enabling mechanisms is offered as a start point. A different set of success mechanisms for strategic contexts or missions that do not center on major combat operations could be developed.[42]

This framework incorporates both offense and defense as well as the material and the moral/cognitive elements of warfare. The attrition-centric arguments challenge a critical element of *MCDP 1* and the influence of the late COL John Boyd.[43] Boyd's work should not be considered historically shallow and his emphasis on how the interactive nature of the moral, cognitive, and physical dimensions of war is well grounded in military history.[44] To ignore the human and non-kinetic

elements of warfare, to accentuate the materiel and kinetic tools against peer competitors, is more a fantasy than a realistic look at war as a human phenomenon or the sheer scale of our most challenging competitor in Asia.

Destruction (or attrition if you must) will have a place in many contexts in warfare. The destructive sword (by air and ground and at sea) will certainly be applied with purpose and violence when needed. However, fire and maneuver will be joined by non-kinetic tools that disrupt/disintegrate the cohesion and effectiveness of our opponents and generate a decided edge that allows us to prevail. Our doctrine can and should reflect their complementary interaction across domains.

All in all, the critics should be applauded for forcing us to refine our thinking and ensure that maneuver warfare remains applicable to the emerging environment. They are right to note distinctions by domain when it comes to the benefits of firepower and destruction. Yet, we should understand the limited validity of a single approach posed by some apostles of attrition.

Conclusion

Success in war remains complex and all too rare. Dramatic battle victories cannot correct defective policy and flawed strategy.[45] But sound strategy presumes that the professional military can deliver desired outcomes in operational and tactical terms. Warfare, the conduct of war, is always evolving per *MCDP 1.* There are enduring continuities, but we will not fight in the coming era the way we fought in Beirut, Operation Desert Storm, or Iraqi Freedom. The future requires that we wield both sword *and* shield to blind, confound, and defeat future adversaries.

Maneuver Warfare remains a valuable approach to modern conflict across the continuum of conflict, but first we need to drop the overly simplistic attrition vs maneuver labels and embrace a more holistic approach that includes the reciprocal interaction of sources of combat power to achieve victory in modern warfare. That should preclude the hedgehog mentality that some sense. Ultimately, I strongly agree with Marinus that "thinking through how we expect our actions to trigger defeat in the enemy is a crucial part of the art and science of war."[46]

Notes

1. B.H. Liddell Hart, *Strategy, Second Ed*, (New York, NY: Praeger Publishers, 1967).

2. Frank Hoffman, "The Missing Element in Crafting National Strategy: A Theory of Success," *Joint Force Quarterly*, (Washington, DC: National Defense University Press, 2d Quarter 2020).

3. Col Thomas C. Greenwood, USMC (Ret.), "The Elusive Quest for Victory in War," *Proceedings,* (Annapolis, MD: U.S. Naval Institute Press, October 2021).

4. On Theory of Victory, see Brad Roberts, "On Theories of Victory, Red and Blue," (Livermore, CA: Lawrence Livermore Lab, Center for Global Research, June 2020).

5. I accept the point raised by Marinus Era Novum, "Continuing the Dialogue, Strategy and Maneuver Warfare," *Marine Corps Gazette*, (Quantico, VA: May 2021), that Marine doctrine has to connect strategy to operations. However, I find that *Strategy* and *Campaigning* do that satisfactorily across a range of conflicts even if they are nested under *MCDP 1.*

6. Marinus, "Defeat Mechanisms," *Marine Corps Gazette,* (Quantico, VA: July 2021).

7. Colin Clark, "General Hyten on the New American Way of War, All Domain Operations," *Breaking Defense,* (February 2020), available at https://breakingdefense.com.

8. Heather Venable, "Paralysis in Peer Conflict? The Material Versus the Mental in 100 Years of Military Thinking," *War on the Rocks*, (December 2021), available at https://warontherocks.com.

9. On air power enthusiasm for strategic paralysis, David S. Fadok, "John Boyd and John Warden, Airpower's Quest for Strategic Paralysis," (Maxwell, AL: School of Advanced Airpower Studies, February 1995).

10. Headquarters Department of the Air Force, *Air Force Future Operating Concept,* (Washington, DC: 2015).

11. Air Force Doctrine Publication (AFDP) 3-99, *Department of the Air Force Role in Joint All-Domain Operations*, Curtis LeMay Center for Doctrine Development and Education, 2020.

12. Terrence J. O'Shaugnessy, Matthew D. Strohmeyer, and Christopher D. Forrest, "Strategic Shaping: Expanding the Competitive Space," *Joint Force Quarterly*, (Washington, DC: National Defense University Press, 3rd Quarter, 2018).

13. Ministry of Defence, *Integrated Operating Concept 2025*, (London, UK, 2021).

14. Franz-Stefan Gady, "Manoeuvre versus Attrition in US Military Operations," *Survival*, (Milton Park: Taylor and Francis, August/September 2021).

15. Michael Kofman, "A Bad Romance: US Operational Concepts Need to Ditch Their Love Affair with Cognitive Paralysis and Make Peace with Attrition," Modern Warfare Institute, (March 2021), available at https://mwi.usma.edu.

16. Thaddeus Drake, "The Fantasy of MCDP 1," *Marine Corps Gazette*, (Quantico, VA: October 2020).

17. MAJ Joseph Williams, "Mindlessness in Maneuver Warfare," *Marine Corps Gazette*, (Quantico, VA: August 2021)

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

19. For a thorough examination of attrition in modern warfare see Carter Malkasian, *A History of Modern Wars of Attrition,* (Westport, CT: Praeger, 2002); and Cathal Nolan, *The Allure of Battle: A History of How Wars Have Been Won and Lost,* (Oxford: Oxford University Press, 2017).

20. Craig Tucker, "False Prophets: The Myth of Maneuver Warfare and the Inadequacies of *FMFM-1 Warfighting*," (Ft. Leavenworth, KS: Command and Staff College, 1995), Richard D. Hooker, ed. *Maneuver Warfare: An Anthology,* (Novato, CA: Presidio, 1993); and Wilf Owens, "The Manoeuvre Warfare Fraud," *Small Wars Journal,* (September 2008), available at *https://smallwarsjournal.com.*

21. Department of the Army, *Army Doctrinal Publication 3-0, Operations*, (Washington, DC:2019).

22. U.S. Army, *TP 525-3-1, The U.S. Army in Multi-Domain Operations 2028,* (Ft. Eustis, VA, Training and Doctrine Command 2018).

23. GEN James C. McConville, U.S. Army, *Army Multi-Domain Transformation Ready to Win in Competition and Conflict Chief of Staff Paper #1,* (Washington, DC: Department of the Army, March 2021).

24. Ibid.

25. Originally presented in Frank Hoffman, "Defeat Mechanisms in Modern Warfare," *Parameters* Vol. 51, no. 4, (Carlisle, PA: Winter, 2021–22).

26. Headquarters Department of the Army, *Field Manual 3-0, Operations*, (Washington, DC:2017).

27. "Defeat Mechanisms."

28. UK Army, *Land Operations*, *Army Doctrinal Publication AC 71940*, (London: March 2017).

29. There is a difference that some overlook between attrition as a mode/method of warfare, and attrition or firepower as an operational/combat function. As Venable and Lauterbach noted, the Corps' new concepts liked EABO reflect an appreciation for the role of destruction in maritime warfare. Heather Venable and LtCol Nate Lauterbach, "Between a Rock and a Hard Place," *Marine Corps Gazette*, (Quantico VA: January 2021).

30. Huba Wass de Czege, "Army Doctrinal Reform" in Asa Clarke, et al, eds., *The Defense Reform Debate: Issues and Analysis,* (Baltimore, MD: Johns Hopkins University Press, 1984).

31. I am using a narrower approach to dislocation than the four (positional, functional, temporal and moral) defined by Robert R. Leonhard, *The Art of Maneuver Warfare: Maneuver Warfare Theory and AirLand Battle,* (Novata, CA: Presidio, 1991).

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

33. John Arquilla, *Bitskrieg, The New Challenge of Cyberwarfare,* (Cambridge, UK: Polity Press, 2021).

34. On the reciprocal effects of multiple mechanisms, see Eado Hecht, "Defeat Mechanisms, The Rationale Behind the Strategy," *Military Strategy Magazine,* (Tel Aviv: IJ Infinity Group, Ltd, 2014).

35. LtCol Nate Lauterbach and Heather Venable, "Why Attack Weakness, A Reconsideration of Maneuver and Attrition," *Marine Corps Gazette,* (Quantico, VA: September 2021).

36. These concepts are presented in Robert O Work, "A Joint Concept for Systems Warfare," Center for a New American Security, (December 2020), available at https://www.cnas.org; Bryan Clark, *Mosiac Warfare: Exploiting Artificial Intelligence and Autonomous Systems to Implement Decision-Centric Operations*, (Washington, DC: Center for Strategic and Budgetary Assessment 2020); 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).

37. 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).

38. This article focuses more narrowly on systems disruption than Marine doctrine states per *MCDP 1.*

39. *MCDP 1.*

40. Max Smeets, "A Matter of Time: On the Transitory Nature of Cyberweapons," *Journal of Strategic Studies* Vol. 41, no. 1–2, (2018).

41. On this point, which would be consistent with Boyd, see the chart in Eado Hecht, "Defeat Mechanisms."

42. A nod to Col Greenwood's arguments about the loaded connotations of victory and defeat.

43. On Boyd's thinking see Frans Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd,* (Oxford: Routledge, 2006). On Boyd's sense of how the elements interact, see Antulio J. Echevarria, Jr., *War's Logic: Strategic Thought and the American Way of War,* (New York, NY: Cambridge University Press, 2021).

44. *War's Logic.* See also On Boyd's impact 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).

45. Williamson Murray and Mark Grimsley, "Introduction," Williamson Murray, MacGregor Knox and Alvin Bernstein, eds., *The Making of Strategy, Rulers, States and War,* (New York, NY: Cambridge University Press, 1995).

46. "Defeat Mechanisms."

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