

# Decision Advantage and Initiative

## Completing Joint All-Domain Command and Control

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This article defines *decision advantage* and *initiative* in the context of John Boyd's observe, orient, decide, act (OODA) loop and his "Organic Design for Command and Control" (1987) analysis. Boyd's thoughts were far ahead of their day but resonate clearly in the emerging operating environment. The outcome of decision advantage is initiative. Moreover, decision advantage is not only a condition, but also the process needed to operationalize such advantage. Because humans remain key to effective Joint all-domain command and control, planners and strategists must be educated regarding the doctrinal nuances of these critical concepts.<sup>1</sup>

Using the Air Force's conception of decision advantage as a foundation, this article proposes a firmer connection between decision and execution—the "d" and "e" of the planning, decision, and execution process. Decision advantage is rooted in retired US Air Force Colonel John Boyd's conception of command and control as a decision loop, and this article extends his ideas through the concept of initiative. The proposed working definition of initiative and modification to the Air Force's definition of decision advantage completes the concept of Joint all-domain command and control (JADC2). These changes help the Joint Force create a decision-making climate that encourages the education needed to fit situational awareness into the broader understanding and less easily quantifiable swirl of human factors.

### Introduction

*Decision Advantage: The product of situational understanding, the ability to assure and exchange information, make and communicate decisions by maintaining advantages in all domains.*

Air Force Doctrine Publication 3-99, November 19, 2021<sup>2</sup>

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1. The author wishes to thank the early readers, particularly the peer reviewers, for their valuable comments.

2. *The Department of the Air Force Role in Joint All-Domain Operations*, Air Force Doctrine Publication (AFDP) 3-99/Space Force Doctrine Publication (SDP) 3-99 (Maxwell AFB, AL: Curtis LeMay Center for Doctrine Development and Education, November 19, 2021), 4, <https://www.doctrine.af.mil/>.

*Civilian and military leaders make timely decisions at the speed required to outpace adversaries. Decision making requires a common intelligence picture and a shared understanding of global force posture to see operations in real time: identify opportunities to seize the initiative, and identify trade-offs, risk, and opportunity costs. Automation, preplanned responses, and mission command are essential to act at the required speed of relevance.*

Joint Publication 3-0, June 2022<sup>3</sup>

The Department of Defense's embrace of Joint all-domain operations (JADO), formerly multidomain operations, has driven a flurry of developmental and organizational activity sparked by perceived changes in the operating environment and specific near-peer adversary efforts to challenge American security leadership. Command and control is central to all service conceptions of multidomain or all-domain operations. Given the potential for the radical impact of emerging technologies on previous limits to the planning, decision, and execution cycles, this article—an outgrowth of Air University's 2020 JADC2 conference—examines the concept of decision advantage through the lens of Boyd's 1987 briefing, "Organic Design for Command and Control."<sup>4</sup>

While Boyd's irascible character reduced the effectiveness of his efforts to help the defense establishment, his late-1980s writings seem eerily prescient when considering the intent and architecture of JADC2. A study of Boyd's ideas can help the current generation of planners and architects understand the possibilities better.<sup>5</sup>

No matter the technology employed to banish the fog and friction of war, human factors—beliefs, trust, shared vision, identity, knowledge, experience, education and training, and others—are arguably as important to the JADC2 enterprise as are the sensor grid, open-data standards and interchange, mesh connectivity, cloud or edge computing, human-machine teaming, machine learning, or even artificial intelligence (AI). Russia's approaches to the problem suggest Russian planners understand human factors as one of the weakest links or potentially the strongest aspect of the JADC2 enterprise.<sup>6</sup>

This article examines a fundamental tenet that seems to underpin the Defense Department's JADC2 enterprise—Boyd's observe, orient, decide, act (OODA) loop. This article does not challenge the Department's embrace of this decision-making model. Furthermore, while it examines JADC2 doctrine and architectural designs, due to space considerations, this article does not discuss the applicability of the development of doctrine as a practice.

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3. *Joint Campaigns and Operations*, Joint Publication (JP) 3-0 (Washington, DC: Chairman of the Joint Chiefs of Staff, June 2022), IV-5.

4. John Boyd, "Organic Design for Command and Control," Boyd's Work (website), May 1987, <https://static1.squarespace.com/>.

5. Brian R. Price, *Eagles, Falcons & Warthogs: Gen. "Bill" Creech, Col. John Boyd and the Struggle to Remake the Tactical Air Forces in the Wake of Vietnam* (Annapolis, MD: Naval Institute Press, forthcoming); and retired General John Michael "Mike" Loh, USAF, interview conducted by the author, 2017.

6. Ofer Fridman, *Russian "Hybrid Warfare": Resurgence and Politicization* (Oxford, UK: Oxford University Press, 2018).

## **Background**

The concept of a revolution in military affairs is hotly contested. Still, many US military, Ally, and partner planners recognize an ongoing revolution, noted also by Russia and China, that harnesses emerging technologies. These technologies include the sensor-grid, open-architecture data framework, machine learning (“weak” AI), cloud or edge computing, and advanced analytics. Moreover, these technologies threaten to overrun the existing planning, decision, and execution process.<sup>7</sup> Joint all-domain command and control seeks to enable the next generation of decisionmakers with a fundamental advantage, but how this technology will shape future planning, decision, and execution cycles has not yet been precisely articulated.

The decision itself, however, does not provide advantage; rather, the action resulting from the decision—the seizing and maintaining of the initiative—yields advantage. Initiative is an underappreciated concept within the security community, and it is difficult to assess, though it is similar to the concept of momentum in sports.

The problem of linking decision to action gives rise to a debate between military planners: is decision advantage a condition resulting partially from information advantage, training, education, and other factors within the human domain, or does it represent the process necessary to realize expected benefits? In fact, considering both concepts is essential in formulating a comprehensive doctrinal definition of decision advantage. No amount of situational awareness will substitute for understanding by junior or senior leaders. Furthermore, even perfectly executed operations may fail if they operate under a flawed strategy, arguably as was done in Afghanistan.

## **Foundations for Defining Decision Advantage**

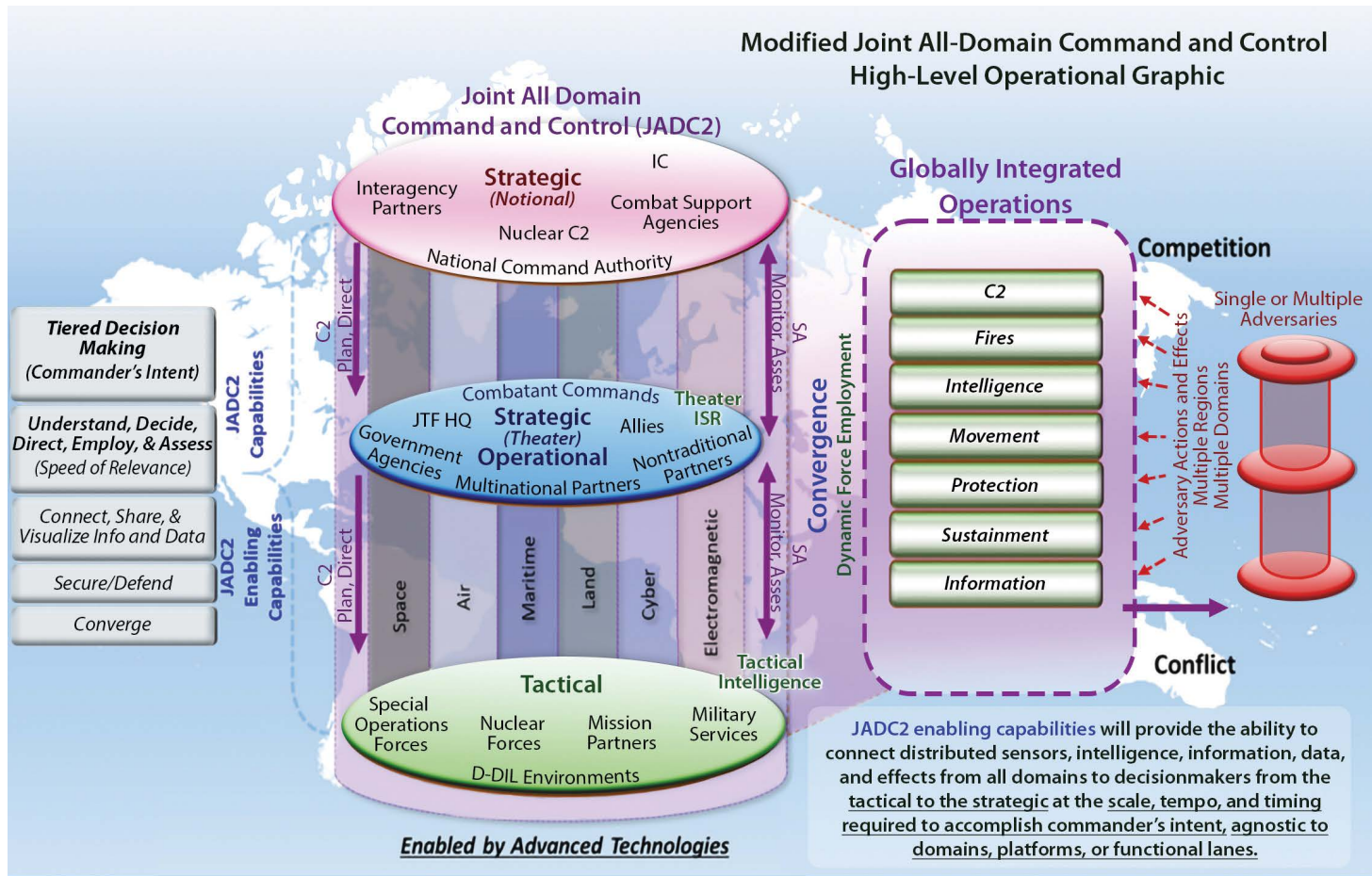
While senior leadership adopted the terms information advantage and decision advantage to capture the hoped-for benefits of the JADO approach, for some years, decision advantage stubbornly eluded a DoD definition. The concept of decision advantage was hinted at in unclassified JADC2 and multidomain operations/JADO documents, but it was not clearly defined, despite the fact the JADC2 enterprise’s entire purpose is “the art and science of decision-making and the ability to translate those decisions into action, leveraging capabilities across all domains and with mission partners to achieve an operational advantage in both competition and conflict.”<sup>8</sup> Finally, in November 2021, the Air Force published its definition.<sup>9</sup>

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7. Joseph R. Biden Jr., *U.S. National Security Strategy* (Washington, DC: White House, October 2022), <https://www.whitehouse.gov/>; and State Council Information Office of the People’s Republic of China, *China’s National Defense in the New Era* (Beijing: State Council Information Office, July 2019), <http://www.chinadaily.com.cn/>.

8. JADC2 Cross-Functional Team, “Joint All-Domain Command and Control (JADC2) High Level Operational Graphic (OV-1),” version 1.0, briefing slide 4, Air Combat Command Headquarters (HQ), August 2020.

9. AFDP 3-99/SDP 3-99.



**Figure 1. Modified JADC2 high-level operational graphic**

Some may conclude JADC2 is decision advantage. The above definition offers useful connectivity across the continuum of conflict, though it does not expressly connect the concept to JADC2's technical architecture. This definition also appears on a key 2020 Air Combat Command graphic summary of JADC2 (fig. 1), where the mission to "blunt the enemy's advance with overwhelming decision superiority" is assigned, but again without defining what decision advantage means.<sup>10</sup>

The JADC2 conception is an architecture for delivering superior situational awareness. Understanding JADC2 requires at the very least deep domain, and ideally, cross-domain knowledge, reflecting key perspectives that collide and interact to create context.

Within the US military, human-machine synergy augments the decision-making process. Army multidomain operations doctrine notes that "man-machine interfaces, enabled by artificial intelligence and high-speed data processing, improve human decision-making in both speed and accuracy."<sup>11</sup> *The U.S. Army in Multi-Domain Operations 2028*, US Army Training and Doctrine Command (TRADOC) Pamphlet 525-3-1, emphasizes attacks against the opponent's intelligence, surveillance, and reconnaissance complex: "In conjunction with partners and the Joint Force, Army forces counter the adversary's reconnaissance and conduct deception to create uncertainty within an adversary's decision making process." It further notes, "Demonstrated capabilities in competition undermine the adversary's information warfare operations and generate complexity and uncertainty in their decision making process."<sup>12</sup>

This is similar to Russia's approach, which aims to inject ambiguity into the decision cycle to create maneuver space. It also resembles China's approach to decision-making, where "systems destruction warfare" is conducted to deny key information and cause paralysis.<sup>13</sup>

While the Army pamphlet does not define or use the term decision advantage, it does use decisive spaces, which it defines as "locations in time and space (physical, virtual, and cognitive) where the full optimization of the employment of cross-domain capabilities generates a marked advantage over an enemy and greatly influences the outcome of an operation."<sup>14</sup> This appears to be an adaptation of the familiar concept of decisive points,

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10. Air Combat Command HQ, "JADC2 Overview" briefing, undated, slide 6.

11. *The U.S. Army in Multi-Domain Operations 2028*, US Army Training and Doctrine Command (TRADOC) Pamphlet 525-3-1 (Fort Eustis, VA: TRADOC, December 6, 2018), 20, <https://adminpubs.tradoc.army.mil/>.

12. TRADOC Pamphlet 525-3-1, 31.

13. David Kilcullen, *The Dragons and the Snakes: How the Rest Learned to Fight the Rest* (Oxford, UK: Oxford University Press, 2020); Charles K. Bartles, "Recommendations for Intelligence Staffs Concerning Russian and New Generation Warfare," *Military Intelligence*, October–December 2017, 11; Fridman, *Russian "Hybrid Warfare"*; and Li Yousheng, Li Yeng, and Wang Yongha, eds., *Lectures on the Science of Joint Campaigns* (Beijing: Military Science Press, 2012), 74.

14. TRADOC Pamphlet 525-3-1, 20.

and it parallels the Chinese conception of selecting key points in the opponent's system and designing a countersystem to oppose it.<sup>15</sup>

TRADOC 525-3-1 also discusses predictive sustainment operations:

Precision logistics is enabled by: a sustainment enterprise resource planning *decision support system* (emphasis added) with predictive analysis tools and the ability to resupply without request and/or redirect supplies based on priority; a real-time common operating picture viewable by commanders and logisticians at echelon.<sup>16</sup>

Such a system would be absolutely necessary to support agile combat employment or other forms of dynamic force employment.

Finally, the Army's integrated employment operations seek to orchestrate "information related capabilities (IRC) in concert with other lines of operations to influence, deceive, disrupt, corrupt, or usurp the decision making of enemies and adversaries while protecting our own" as well as to influence the enemy's and population's will to fight.<sup>17</sup> TRADOC 525-3-1 emphasizes the degradation of enemy decision-making capacity and suggests protecting similar US capability. In the TRADOC 525-3-1 conception, the advantage is won chiefly by attacking enemy cognition rather than building a superior process and information environment.

Former Army Futures Command Commander General John M. Murray articulated the clearest Army expression of decision advantage when he referenced former Army Chief of Staff General James McConville's use of the term decision dominance in a March 2021 interview: "This is a developing definition, but right now, [decision dominance] is the ability for a commander to sense, understand, decide, act and assess faster and more effectively than any adversary."<sup>18</sup> Murray's conception is strikingly close to Boyd's OODA loop.

Approaching the definition from the perspective of intelligence, another analysis observes that available, suitably analyzed, and protected intelligence "can provide a decision advantage so the decision-maker is better informed and understands more aspects of an issue in ways that would not be possible without the intelligence" and that "this decision advantage can be especially critical when adversaries or competitors do not possess the same insights or do not know what the opposing decision-maker does."<sup>19</sup>

Drawn from the Intelligence Community, this conception of decision advantage has many strengths. In the comparison of the decisionmaker to their opponent, being "better

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15. Antoine-Henri de Jomini, *The Art of War*, trans. W. P. Craighill and G. H. Mendell (Westport, CT: Greenwood Press, 1862), 80; and *Joint Planning*, JP 5-0 (Washington, DC: CJCS, December 1, 2020), <https://www.jcs.mil/>.

16. TRADOC Pamphlet 525-3-1, B-1.

17. TRADOC Pamphlet 525-3-1, C-9, fn 49.

18. Sydney J. Freedberg Jr., "Army's New Aim is 'Decision Dominance,'" *Breaking Defense*, March 17, 2021, <https://breakingdefense.com/>.

19. John MacGaffin and Peter Oleson, "Decision Advantage, Decision Confidence," *Intelligencer: Journal of US Intelligence Studies* 21, no. 3 (Fall-Winter 2015), 41, <https://www.afio.com/>.

informed” and “understanding more aspects of an issue” are fundamental. These conditions speak to the quality of information and context, leading to superior understanding.

In discussing JADC2 and the Global Information Dominance Exercise in 2021, US Northern Command officials argued “the new artificial intelligence will instantly pull together all sorts of data to give commanders a clear picture of the battlefield, enabling good, fast decisions.”<sup>20</sup> Of this capability, these officials noted that “the key here is that the AI system—not a slow human as in the past—will rapidly provide and constantly upgrade best options to ensure a high probability of intercept.” A recent US Northern Command J8 JADC2 development lead, explained,

The human now can have more time and more options to be able to make a decision. . . . [The idea is to provide] an earlier and better understanding about what competitors are doing . . . this tool allows us to be able to see: what are competitors doing on a day-to-day basis, at their airfields, at their command and control facilities, at the places that they would be operating from for their maritime operations.<sup>21</sup>

In 2020, then Commander of US Northern Command General Terrence O’Shaughnessy stated, “[JADC2] is going to inform our decision-makers, it’s going to help them make decisions that, like playing chess, are thinking two or three moves downstream. It’s going to give decision-makers, at the speed of relevance, the ability to make really complex decisions.”<sup>22</sup>

## **Boyd’s OODA Loop, Organic C2, and the Concept of Initiative**

A review of Boyd’s OODA loop, a key foundational concept underpinning JADC2, reveals the aspects of the proposed notion of decision advantage not captured in existing doctrinal and operational documents. The OODA loop decision-cycle concept lies at the core of the JADC2 and JADO vision and architecture documents, with the assumption that acting faster and with more complete information is necessary and inevitable, given technological developments.<sup>23</sup> This assumption was challenged by Boyd.

The problems of ambiguity, initiative, and decision captured and commanded the attention of Boyd in the late twentieth century. While some of Boyd’s accomplishments may be overstated, his enduring contribution has shifted strategists, planners, and operators from mass-based to tempo- and disruption-based conceptions of war, conflict, and

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20. Theresa Hitchens, “Exclusive: NORTHCOM Developing, Testing AI Tools to Implement JADC2,” *Breaking Defense*, March 5, 2021, <https://breakingdefense.com/>.

21. Hitchens.

22. Theresa Hitchens, “The Key to All-Domain Warfare Is ‘Predictive Analysis,’ Gen. O’Shaughnessy,” *Breaking Defense*, May 5, 2020, <https://breakingdefense.com/>.

23. Frans Osinga, “The Enemy as a Complex, Adaptive System: John Boyd and Airpower in the Post-modern Era,” in *Airpower Reborn: The Strategic Concepts of John Warden and John Boyd*, ed. John Andreas Olsen (Annapolis, MD: Naval Institute Press, 2015).

competition.<sup>24</sup> These ideas are even more relevant in today's hyper-paced technological innovation environment. Boyd was early—perhaps a little too early—to the mark. Still, his work holds considerable insight applicable to today's environment where ambiguity is the weapon of choice for US near-peer opponents.

The widespread acceptance of the simplified OODA loop model for decision-making attests to the pervasive acceptance of Boyd's compelling heuristic. In military, business, and strategic writing, the term decision cycle is often synonymous with OODA. In figure 1, formulated by all major DoD stakeholders, the cycle is rendered as “understand, decide, direct, employ, assess.” Within the JADC2 literature, the OODA idea serves as a core foundation, a set of assumptions that should be carefully examined.

Throughout his Air Force career, Boyd contributed significantly to fighter tactics instruction and to the realization and engineering of maneuverability in fighter design through his energy maneuverability theory, developed with mathematician Tom Christie. Post-career, he developed his core ideas, incorporating notions of complex, adaptive systems now reflected in DoD doctrine. Boyd approached conflict more broadly through his manifold iterations of the “Patterns of Conflict” briefing and a series of other less titanic but insightful, if densely packed, works.<sup>25</sup>

While “Patterns” has received much attention, one of his lesser-known 1987 briefings, “Organic Design for Command and Control,” defined the OODA loop as it is commonly used today.<sup>26</sup> In “Organic Design,” Boyd articulated his vision. The intent was not only to operate faster but also to create the circumstances that would lead to confusion and paralysis for the opponent, to “operate inside the adversary's observation-orientation-decision-action loops to enmesh the adversary in a world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic chaos . . . and/or fold the adversary back inside himself so that he cannot cope with events/efforts as they unfold.”<sup>27</sup> The second part, “and/or fold the adversary back inside of himself so that he cannot cope with events/efforts as they unfold,” is very close to the Russian concept of reflexive control and to the Chinese approach of breaking down system links to isolate aspects of that system, such that individual parts become less than the sum of whole.<sup>28</sup>

Boyd went on to underscore the critical nature of social, intellectual, and cultural aspects of command and control, concluding that the cohesion provided by “genetic heritage,

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24. Price, *Eagles, Falcons & Warthogs*; Ian T. Brown, *A New Conception of War: John Boyd, the U.S. Marines, and Maneuver Warfare* (Quantico, VA: Marine Corps University Press, 2018), ch. 4; and Robert Coram's *Boyd: The Fighter Pilot Who Changed the Art of War* (Boston: Back Bay Books, 2004).

25. John Boyd, “Patterns of Conflict,” Boyd's Work, December 1986, <https://static1.squarespace.com/>.

26. Stephen Robinson, *The Blind Strategist: John Boyd and the American Way of War* (Dunedin, NZ: Exisle Publishing, 2021).

27. Boyd, “Organic Design,” slide 7.

28. Keir Giles, James Sherr, and Anthony Seaboyer, *Russian Reflexive Control* (Kingston, Ontario: Royal Military College of Canada, 2017), <https://www.researchgate.net/>; and Timothy Thomas, “Russia's Reflexive Control Theory and the Military,” *Journal of Slavic Military Studies* 17, no. 2 (August 2004), <https://www.tandfonline.com/>.



previous experiences, and unfolding circumstances” helped create a picture of the environment based on filters.<sup>29</sup> Filters come from the human experience—tangible and intangible elements that shape observation and orientation. In turn, human factors are powerful contributors to winning through the decision cycle process. Boyd argued that this process is command and control: “the process of observation-orientation-decision-action represents what takes place during the command-and-control process—which means that the OODA loop can be thought of as being the C&C loop.”<sup>30</sup>

The JADC2 architecture and concepts reflect developments that seek a dramatic increase in the operational tempo and, simultaneously, of complexity. This not only shortens the cycle but also compresses it toward what has been called an “OODA point,” the point at which the speed and complexity of data sources become too much for humans to handle.<sup>31</sup> Operators, therefore, are increasingly compelled to rely on human-machine teaming, machine learning, and ultimately, AI. Consequently, near-peer competitors China and Russia pursue their approaches to getting inside the US planning, decision, and execution cycle.<sup>32</sup>

The clear compression of decision-cycle potential in near-term competition and conflict is important, but this conception may be incomplete. Frans Osinga, a longtime student of Boyd’s thought, carefully argued the OODA loop has often been misconstrued if aligned purely with time.

The comprehensive overview of Boyd’s work shows that the OODA loop represents and means more than a decision process, and the model contains more elements for victory than information superiority and speed. . . . The first misconception . . . concerns the element of speed. The rapid OODA looping idea suggests a focus on speed of decision-making, and ‘out-looping’ the opponent by going through consecutive OODA cycles faster.<sup>33</sup>

Phrased this way, Osinga could be discussing JADC2’s core assumptions that the computing/data architecture, as proposed, leaves much out—particularly the human dimension, sometimes termed the human domain.<sup>34</sup> These elements are necessary to account for the adversary’s intentional degradation of the system, disinformation, and ambiguity-seeking delays.

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29. Boyd, “Organic Design,” slide 13.

30. Boyd, slide 26.

31. Jeffrey M. Reilly, “OODA Point: The Need for an Airman’s Approach to Operational Design,” working paper (Maxwell AFB, AL: Air Command and Staff College, November 20, 2020).

32. Lester W. Grau and Charles K. Bartles, *The Russian Way of War: Force Structure, Tactics and Modernization of the Russian Global Forces* (Fort Leavenworth, KS: Foreign Military Studies Office, 2017); and Andrew Scobell et al., *China’s Grand Strategy: Trends, Trajectories, and Long-Term Competition* (Santa Monica, CA: RAND Corporation, 2020), <https://www.rand.org/>.

33. Frans P. B. Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd* (New York: Routledge, 2007), 235.

34. Julie Janson, “OTH Video Primer 1: The Human Domain,” *Over the Horizon*, February 2, 2018, <https://othjournal.com/>.

Boyd's work failed to grasp and support the potential benefit of leveraging sensor and computer technology to dramatically improve situational awareness—as with the Air Force's Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN), airborne early warning and control system (AWACS) E-3 Sentry, and E-8C Joint Surveillance Target Attack Radar System (Joint STARS). It seems clear his dismissal of the post-Vietnam version of the sensor network overcorrected.<sup>35</sup> Few Americans in the post-Vietnam world, or even the post-9/11 battlefields, would easily go to war without these platforms or their forthcoming replacements, despite challenges to their survivability in a near-peer operating environment. Nonetheless, the human factors Boyd proposed in his “alternate vision” for “organic” command and control deserve another look, particularly in light of Russian and Chinese efforts to aggressively inject ambiguity into the competition and conflict environments, or to deny access to the electromagnetic spectrum, countering the clarity sought in JADC2.

The corpus of Boyd's work developed this theme over almost 20 years. In “Organic Design,” he noted failures with contemporary command and control in operations, with the evacuation of Saigon (1975) and with Desert One (1980):

The institutional response for overcoming these fiascos is more and better sensors, more communications, more and better computers, more and better display devices, more satellites, more and better fusion centers, etc.—all tied into one giant fully informed, fully capable C&C system. This way of thinking emphasizes hardware as the solution. . . .

I think there is a different way—a way that emphasizes the implicit nature of human beings. . . .

[We] need insight and vision. . . . focus and direction. . . . adaptability. . . . [and] security.<sup>36</sup>

Boyd's conception of post-Vietnam efforts to overcome fog and friction resembles today's sensor grid, data architecture, and emphasis on cloud/edge computing. While Boyd clearly missed the substantial benefits provided through situational awareness when the command-and-control system operates—as has been demonstrated with air and sensing operations over Afghanistan, Iraq, Syria, and elsewhere—his point about the power of human beings, the human domain—must not be overlooked as the Defense Department attempts to build a robust, capable, and agile JADC2 system.

Extrapolating from Carl von Clausewitz, Boyd concluded,

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35. Price, *Eagles, Falcons, and Warthogs*.

36. Boyd, “Organic Design,” slides 3–4.

The atmosphere of war is friction.

Friction is generated and magnified by menace, ambiguity, deception, rapidity, uncertainty, mistrust, etc.

Friction is diminished by implicit understanding, trust, cooperation, simplicity, focus, etc.

In this sense, variety and rapidity tend to magnify friction, while harmony and initiative tend to diminish friction.<sup>37</sup>

The JADO approach grasps many of these aspects, seeking to reduce fog and friction through pervasive sensor, data resiliency, and edge computing—creating confusion by simultaneous action in multiple domains, getting inside the opponent’s OODA loop. But the current descriptions of JADC2 still emphasize speed and information dominance. They do not yet seem to embrace the service culture or human changes necessary to realize the full potential of the JADC2 concept or perhaps more urgently to guard against the opponent’s efforts to create ambiguity, confusion, disorder, isolation, and delay, if not paralysis. The approaches taken by China and Russia noted above aim to dislodge the US decision cycle, particularly during the critical orientation phase.

Boyd defined orientation as the crucial step within the OODA loop. He wrote that “orientation is the *schwerpunkt*”—or center of gravity—and it “represents images, views, or impressions of the world shaped by genetic heritage, cultural tradition, previous experiences, and unfolding circumstances.”<sup>38</sup> In other words, the hard-data view of the world produced by JADO’s information advantage network will be filtered by staff and decision-makers based on their shared and unique perspectives.

Participants’ ability to achieve unity of effort will require shared experience, culture, and trust. In Boyd’s phrasing, “orientation is an interactive process of many-sided implicit cross-referencing projections, empathies, correlations, and rejections that are shaped by and shape the interplay of genetic heritage, previous experiences, and unfolding circumstances.”<sup>39</sup> More provocatively, he offers a decentralized view of command and control, favoring leadership in place of command and appreciation (monitoring) in place of control. Boyd emphasized the power of coordinated, “harmonic” decentralization, and stated that “appreciation and leadership offer more appropriate and richer means than C&C for shaping and adapting to circumstances.”<sup>40</sup>

Boyd clearly understood the purpose of driving action at and through the adversary’s decision cycle was to create confusion, disorder, and paralysis. It is worth restating that

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37. Boyd, slide 8.

38. Boyd, slides 16 and 13.

39. Boyd, slide 15.

40. Boyd, slide 32.

the human factors, including beliefs, trust, shared vision and identity, knowledge, experience, education, and training, are as important to the JADC2 enterprise as the sensor grid, open-data standards and interchange, mesh connectivity, cloud/edge computing, human-machine teaming, machine learning, or even AI—if it ever fully develops. Human factors will be the weakest links and the strongest aspects of the JADC2 enterprise.

## **The Concept of Initiative**

Key human factors govern the concept of initiative. Initiative, or driving the action, is foundational to competition and conflict through the OODA model. Within military circles especially, there is sometimes a belief that taking an action—any action—is better than ceding the initiative to the opponent.

Initiative is discussed extensively in the newest version of Joint Publication 3-0, *Joint Campaigns and Operations*. In the section on Joint functions, initiative is mentioned six times, connected expressly with command and control, the concept of mission command, and sustainment.<sup>41</sup> Appendix A is associated with the principle of offensive Joint operations—“the purpose of an offensive is to seize, retain, and exploit the initiative”—but initiative itself is not defined.<sup>42</sup>

One concern with associating initiative with offense is that initiative can also be associated with defense and invitation: if one invites the opponent to take an action, and they do, the opponent has the initiative even in defense. This might seem to be offense masking as defense, but the strict usage associating initiative with offense creates a false expectation among staff officers and commanders that offense equals initiative.

The concept of initiative as understood apart from the DoD lexicon is useful in defining what is sought through decision advantage. JP 3-0 mentions initiative nearly 40 times and is discussed as an operational phase—“exploit the initiative to achieve operational-level objectives.”<sup>43</sup> Specifically, “the deployment of forces associated with seizing the initiative may have a deterrent effect sufficient to dissuade an enemy from conducting further operations, returning the [operating environment] to a more stable state.”<sup>44</sup>

Further, initiative is closely associated with offensive in the principles of Joint operations: “Offensive operations are how a military force seizes and holds the initiative while maintaining freedom of action and achieving meaningful objectives.”<sup>45</sup> It is not the decision itself that is important but the initiative and control the decision can afford.

A useful definition of initiative is found in the *Oxford English Dictionary*: “to take the lead, make the first step, originate some action,” and “the power, right or function of initiating something, hence, to possess or have the initiative,” and “to drive or force . . . by

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41. JP 3-0, III-5 (x3), III-14, III-41, III-48.

42. JP 3-0, A-1.

43. JP 3-0, VII-27.

44. JP 3-0, IV-15.

45. JP 3-0, A-1.

some impulsive power.”<sup>46</sup> The concept of initiative connects decision-making with action. The force compels the opponent to restart the OODA cycle, costing time and sowing doubt, confusion, ambiguity, mistrust, and the other detractors from confidence, certainty, clarity, and trust that Boyd identified. Thus, this article offers the following working definition for initiative: Initiative is the impulsive power resulting from timely decision and action, enabling freedom of maneuver while constraining an opponent’s options.

The goal of competitive or conflict-based decision-making is to drive the action, forcing or inviting the opponent to respond; acting as the subject of action rather than being the object; and by action, compelling the opponent to reobserve, reorient, redecide, and react. Initiative is a zero-sum, binary resource; one or the other combatants may possess it, but both cannot have it simultaneously. It is possible, however, that neither has it, and there can be a difference in perception versus reality. One can believe they have the initiative when they do not.

The initiative can be clearly felt in a game of chess, Go, or a single-combat fight. If one feels compelled to make a given move when one would clearly prefer to make another, the opponent holds the initiative as the driver of that action. If the situation is reversed, the adversary loses freedom of action and is forced to react rather than acting as they would like.

This concept extrapolates to the tactical, operational, and strategic levels. It is part of the reason the study of strategy games, martial arts, or military and political history is useful for building military domain expertise; through experience, one identifies patterns that can distill order from chaos, building the confidence that enables decision, in turn conveying the initiative. Any definition of decision advantage should include the intent to capture and retain the initiative.

## **Decision Advantage: Condition versus Process**


One argument that has plagued military planners is whether decision advantage represents a condition or a process. The condition view argues decision advantage is a state, a blend of understanding aided by technology that enables decision. The process view argues the condition is meaningless if not connected to a means of achieving it, the concrete methods through which understanding will be turned into plans and action.

For some years, graduates of the Joint All-Domain Strategist (formerly Multi-Domain Operations Strategist) program at Air Command and Staff College have learned to augment the Joint planning process through threat-informed decision-support matrices. By anticipating the information necessary to drive a decision point at the operational or strategic level, such matrices frame the collection of the commander’s critical information requirements, analyze and clearly present risk, and connect the decision into an operational or strategic design. Even using a manual process, the development and use of decision-support matrices, while staff-intensive, enables faster and more informed decision-making in the moment.

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46. *Oxford English Dictionary*, compact ed. (Oxford, UK: Oxford University Press, 1971), s.v. “initiative.”

Decision Advantage and Initiative

COA 1: Phase 1 PREPARE						
Decision Point	NAI/TAI	Event	Decision Required	Decision Criteria	Assets Available	CJTF Actions
Turn Land Component Forces to the Azerbaijani Border  		LC forces move to border for NW Iraq Land Exercise (D-1)	Supreme Leader declares C-Day  LC authorized to deploy	Phase 0 (Shaping) Complete  Homeland Defense Capability Green	<b>Air</b> - ISR <b>Maritime</b> - ISR; SPOD defense <b>SOF</b> - ISR; IO <b>Land</b> - Exercise posturing units; Force Pro <b>EMS</b> - Jx (Dominance of spectrum req'd) <b>Space</b> - NTM	Deploy LC to AZJ border  Begin IO campaign  IADS to highest readiness
Assumptions		Assumed Response		CCIRs		
Provide unambiguous warning to US and AZJ  No ground force opposition from US  ISR collection by US and other nations		AZJ press release denouncing forces moving toward its border  High alert status AZJ defence forces  Possible US airstrike on deployed forces		PIR - Readiness posture of US & AZJ - Status of GOAZ - Status of key AZJ infrastructure  FFIR - IADS posture/alert/readiness level		
Risk	Impact on Mission	Probability of Occurrence	Mitigation		Residual Risk after Mitigation	
Turning LC forces to the AZJ border tips off our plan to the US and AZJ	Shortens timeline for our action prior to interference by the US	Moderate	Est history of land exercise on IZ border during Phase 0  Well-publicized exercise in press  Plant intel about exercise legitimacy for US		Low	
Not turning LC forces to the AZJ border denies ready posture for incursion into AZJ	Dramatically slows timeline and forces a change in the overall plan	High	None		High	

**Figure 2. Decision support matrix for an exercise in the Air Command and Staff College Joint All-Domain Strategist program**

Through automation, under the JADC2 architecture, it should be possible to largely automate the collection and presentation of decision-support matrices as crafted by the staff, including changes needed to dynamically create new force and resource alignments, enabling significantly faster decisions and operationally relevant action.

For this idea's supporters, creating an automated system around the known decision framework operationalizes the concept of decision advantage. In a sense, the process view

captures the requirement for the connection of action from decision discussed above as initiative. Decision advantage is thus the condition of holding an advantage. Yet without a process, such advantage is meaningless as it does not translate into a seizure of the initiative.

## **Defining Decision Advantage**

Given the nature of the OODA-loop concept emphasizing human factors, the speed and informational advantage, and the centrality of the concept of initiative, this article proposes a definition for decision advantage. The first part defines decision advantage itself, while the second part sets JADC2 within the context of the OODA concept and human factors, as noted through an adversary's operational approaches: Decision advantage is having access to and recognizing the right information at the right time (information advantage), enabling timely decisions that are transformed into action, and seizing or retaining the initiative.

The US Air Force recently released Air Force Doctrine Publication 3-99/Space Force Doctrine Publication 3-99, *Department of the Air Force Role in Joint All-Domain Operations*, which defines decision advantage as “the product of situational understanding, the ability to assure and exchange information, make and communicate decisions by maintaining advantages in all domains.”<sup>47</sup> This definition has much to recommend it. It emphasizes understanding over awareness. Unlike the author's proposal, it emphasizes the centrality of communications and connects decision-making to the need to communicate it. Yet it also proposes the need to maintain advantages in all domains, which may prove impossible in practice—though undoubtedly, this would be a welcome circumstance were it to be somehow attained.

The Air Force definition, however, still lacks the central element that underscores the importance of decision advantage—the conveyance of initiative. A modification of the service definition to more firmly connect decision and initiative could read as follows: The product of situational understanding, the ability to assure and exchange information, and make and communicate decisions to seize or retain the advantage in key domains.

With either definition, decision advantage is supported by superior understanding, confidence, and trust that overcomes ambiguity and creates clarity. Decision seizes and retains the initiative concerning an adversary or competitor, forcing reobservation and re-orientation, delaying their decision, and ultimately denying their ability to act or even retain cohesion. Meanwhile, decision advantage seeks to maximize friendly freedom of action, unity, and the ability to steer (the adversary) toward decisions, objectives, and end-states favorable to the United States, expressed in some Russian literature as reflexive control.<sup>48</sup>

Superior understanding flows from relevant knowledge, experience, appropriate intellectual tools, education, and training; confidence flows from a clarity of understanding,

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47. AFDP 3-99/SDP 3-99, 4.

48. Timothy L. Thomas, “Russia's Reflexive Control Theory and the Military,” *Journal of Slavic Military Studies* 17 (2004), <https://doi.org/>.

vision, purpose, authorities, and objectives—or things that are known. Trust stands against the unknown by supporting risk through established relationships. The antithesis of decision advantage may thus be paralysis—the inability to orient, decide, and act.

David Epstein has recently and persuasively argued cross-domain and multidomain knowledge—as in academic domains, not necessarily doctrinal warfighting domains—could be valuable in solving wicked problems in a specialized world.<sup>49</sup> If Epstein is correct, education that is broad and deep is necessary to transfer knowledge across domains and find solutions to problems that seem intractable to specialists. Moreover, the inherent limitations of AI known today suggest adaptability and flexibility are the keys to defeating the relatively narrow but lightning-fast machine judgment.<sup>50</sup>

Epstein's argument that cross-domain knowledge is a powerful weapon when facing debilitating ambiguity parallels the military conception of multidomain or all-domain operations as key to achieving an advantage over the adversary. In both views, knowledge or awareness of information from outside a single domain can yield important advantages.

The contrast between the small-unit innovation of Ukrainian forces and the centralized plodding of Russian forces is instructive. Armed with a technological edge and fueled by a passionate desire to defend their homes, Ukrainian civilians and military members have innovated with technology and tactics on the fly, flummoxing their Russian opponents. Technology such as the M142 High-Mobility Artillery Rocket System, American intelligence, surveillance, and reconnaissance, the Javelin missile, and drones have enabled Ukrainian forces to be considerably more agile and capable at long range. The technologies alone are not flummoxing the Russian military, but perhaps the innovation pace coupled with these technologies is.

Similarly, educational breadth may help guard against paralysis, enabling rapid synthesis and resolution of a wicked problem on the fly. This will be necessary, given that the injection of ambiguity and false information will most certainly adversely affect supporting machine calculation and human judgment, leaving humans to fill the gap. Quality education, coupled with training, will be needed to counter the difficulties of purposefully injected ambiguity and the resulting fog and friction as subsystems are attacked and collapse.

In the quest to modernize and harness the potential of emerging technologies, the weakest and strongest points of the JADC2 system will be the human operators and the organizations they operate. Decisionmakers at all levels, however, still need to understand information presented at near-machine speed—they must have situational awareness. Perspective, bias, culture, identity, and other factors give information meaning and provide

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49. David Epstein, *Range: While Generalists Triumph in a Specialized World* (New York: Riverhead Books, 2019).

50. Chinese State Council, "Full Translation: China's 'New Generation Artificial Intelligence Development Plan' [2017]," trans. Graham Webster et al., New America Foundation (website), August 1, 2017, <https://www.newamerica.org/>; and Scott W. Harold, *Defeat: Not Merely Compete: China's View of Its Military Aerospace Goals and Requirements in Relation to the United States* (Santa Monica, CA: RAND Corporation, 2018), 2, <https://www.rand.org/>.



another set of lenses through which combat information will pass. Education is one counter to stultifying organizational narrowness, a personal bias that may persist even when JADC2 is realized, in whatever form it takes.

## **Conclusion**

Joint all-domain operations seek decision advantage, leveraging all-domain information advantage, created through the sensor grid, cloud- or edge-advanced analytics, and resilient, open-data connectivity in support of mission-command-based planning, decision, and execution cycles that must be faster, smarter, and more robust than those of the opponents. Yet a key concept embedded in the JADC2 published architecture—Boyd’s OODA loop—is frequently misunderstood to focus solely on the speed of decision. Boyd also called out the quality of information, noting the whole point of competition in conflict is to inject a barrage of input to disorient the opponent. Further, recent efforts to define decision advantage miss the importance of linking action to decision—the seizing and maintaining of initiative—which is not the same as offense.

Even if JADC2 is successful, today’s emerging opponents seek to reduce America’s present and near future battlefield advantages through misinformation, misdirection, and selectively attacking elements of the United States’ command-and-control systems to create pause, indecision, degradation, and, ultimately, paralysis.

Moreover, human factors that these attacks target are the same ones that, even in a perfect operating environment with near-perfect situational awareness, may distort understanding and lead to poor and ineffective—or even disastrous—decisions. At the same time, humans process changing information more rapidly than machines or organizational systems that embed centralized, machine-like qualities—as with the Russians. If thinkers like Epstein are correct, the human elements of a JADC2 system will be the key weakness and strength of the whole enterprise. This consideration of human breadth could complement JADC2’s machine-processed depth to reveal some of what is hidden through the fog and friction of war. ✈️

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