Multi-Domain Battle: A Necessary Adaptation of US Military Doctrine

A Monograph

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14. ABSTRACT

In order to support the Presidential directives, Military Assistance Command, Vietnam (MACV) developed the Combined Campaign Plan for 1970. The campaign plan consisted of three major lines of effort in support of withdrawal from Vietnam. The lines of effort were Vietnamization, support of pacification and participation in development programs, and defeat the North Vietnamese Army (NVA) and Vietcong forces. Any military approach developed in support of a flawed policy will not bring about the desired outcome no matter how much effort is made. That is the case here. There could be no military victory. MACV employed operational art to synchronize its actions against North Vietnamese forces in order to stimulate a negotiated settlement and end the conflict. Unfortunately, the South Vietnamese military and government proved inadequate and were unable to take the lead without US support. The execution of the MACV Campaign Plan's lines of effort will demonstrate their effectiveness in support of the national objectives during the directed withdrawal.

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Abstract

Multi-Domain Battle: A Necessary Adaptation of US Military Doctrine, by MAJ Jose L. Liy, USA, 54 pages.

Is multi-domain battle (MDB) a new doctrine or merely a rehash of previous doctrine? If the doctrine is not new, the US Army is potentially wasting time and resources creating new manuals that simply reproduce the doctrine we already have. Additionally, using the same doctrine, but with a different name could confuse the force at a time when it needs doctrinal clarity. On the other hand, if MDB is a radical departure from previous doctrine, the US Army runs the risk of potentially implementing doctrinal concepts that have not been thoroughly examined. Thus, understanding whether MDB is new or not is important in understanding the logic and intent of the new doctrine, what problem it is trying to solve, and how to carry out its implementation.

Field Manual (FM) 3-0: *Operations* notes "…a multi-domain approach to operations is not new. US Army forces have effectively integrated capabilities and synchronized actions in the air, land, and maritime domains for decades." This work then starts with the hypothesis that MDB is not new, because elements of it can be found in previous theory, doctrine, and history.

As criteria, or a standard of judgment or criticism, this monograph will use three MDB concepts found within FM 3-0 due to their prominence within the manual and in other MDB-related speeches and white papers. These three concepts take the form of windows of advantage, convergence, and positions of relative advantage in FM 3-0 and are discussed and defined within. The doctrine also incorporates these three principles into its overall concept of US Army operations ensuring that they are nested US Army doctrine. The examination of each of these components through history, theory, and doctrine enables objective analysis of the MDB concept and reveals whether these concepts are unique to MDB or have been present in the past.

Contents

Acronyms

ADP	Army Doctrine Publication
ADRP	Army Doctrine Reference Publication
AEF	American Expeditionary Forces
AO	Area of Operations
AOC	Army Operating Concept
ATACMS	Army Tactical Missile System
BCE	Before Common Era
CGSC	Command and General Staff College
C2	Command and Control
D-DAY	Deployment Day
EW	Electronic Warfare
FM	Field Manual
HMS	Her Majesty's Ship
IDA	Institute for Defense Analyses
IGO	International Governmental Organization
MDB	Multi-Domain Battle
NGO	Non-Governmental Organization
OE	Operational Environmen

Introduction

In October 2016, former TRADOC Commander General David G. Perkins, spoke to the Command and General Staff College (CGSC) class of 2017. In this speech, Perkins outlined the basic tenets of multi-domain battle (MDB), the most recent concept in US Army doctrine. He explained the need to adapt to changing enemy tactics, described how new technologies like an anti-ship variant of the US Army Tactical Missile System (ATACMS) missile can help the US Army operate in the maritime domain, and emphasized the importance of networking all combat elements across six domains: land, sea, air, space, electromagnetic and cyberspace.[1] Finally, Perkins stressed the evolutionary nature of MDB, which remains somewhere between the conceptual and concrete stages of development.[2]

The speech generated a wide range of reactions from the attendees. Some argued that the new concept did not warrant a revision of current operational doctrine because previous US Army and joint operations doctrine already addressed the problems that the MDB concept attempts to fix. Others argued that MDB—a significant departure from previous practice—represented a dangerously radical shift in understanding the Operational Environment (OE). They also took issue with the US Army's intent to operate in other domains besides land, noting that the US Army already does this. Finally, many worried that the US Army could not meet the requirements of implementing the MDB concept.

Moreover, attendees from other services questioned the US Army's ability to make a significant contribution in other domains. Many inter-service officers worried that this would require the joint force to adopt additional coordination measures, a requirement that would further

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[1] David G. Perkins "Multi-Domain Battle," Presentation at the Command and General Staff College, Ft. Leavenworth, KS, October, 2016.

[2] Sydney J. Freedberg, "From Concept to Combat: Making Multi-Domain Battle Real," *Breaking Defense*, July 26, 2017, accessed March 6, 2018, https://breakingdefense.com/2017/07/from-concept-to-combat-making-multi-domain-battle-real/.

complicate operations and increase the chance of simple mistakes becoming catastrophic events. More cynically minded critics saw MDB as a brazen attempt to divert funds from other services to the US Army to fund weapons systems that could operate in their respective domains. They deemed the US Army's new approach too radical and untested to incorporate in operational doctrine.[3]

Similar sentiments can be found in professional forums both in print and online. Scholars like Conrad Crane, Chief of Historical Services for the US Army Heritage and Education Center, worry that MDB's focus on creating freedom of action by reducing command and control (C2) is not new, and could lead to disaster.[4] Critics including military officers Jon Bott, John Gallagher, Jake Huber, and Josh Powers have argued that the MDB concept serves as a positive contribution to US military doctrine, but its adoption will present significant challenges to integration of the six domains. They argue that MDB is so different from previous doctrinal concepts that it will require mental shift across the Total Force, requiring realignment of training centers and modifications of complicated procurement processes.[5] Kevin M. Woods, Deputy Director of the Joint Advanced Warfighting Division at the Institute for Defense Analyses (IDA) and Colonel Thomas C. Greenwood, USMC (Ret.), Researcher at IDA point out that "proponents agree that the "idea and desire for cross-domain effects is not new" but contend the traditional Service-domain alignments are inadequate for coping with the new security environment."[6] Other critics

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[3] Comments made by students and faculty after listening to Perkins' speech at the Command and General Staff College in October, 2016.

[4] Conrad Crane, "Mission Command and Multi-Domain Battle Don't Mix," *War on the Rocks,* August 23, 2017, accessed March 6, 2018, https://warontherocks.com/2017/08/mission-command-and-multi-domain-battle-dont-mix/.

[5] Jon Bott, John Gallagher, Jake Huber, and Josh Powers, "Multi-Domain Battle: Tactical Implications," *Over the Horizon*, August 28, 2017, accessed March 6, 2018, https://overthehorizonmdos.com/2017/08/28/multi-domain-battle-tactical-implications/.

[6] Kevin M. Woods and Thomas C, Greenwood, "Multidomain Battle: Time for a Campaign of Joint Experimentation," *Joint Force Quarterly* 88, January 9, 2018, accessed 20 April 2018,

object using different logic. For example, Albert Palazzo—a defense expert at the Australian

Defence Force Academy —has argued that the MDB concept needs time to mature before it will

improve the joint force's near-peer challenges. He also noted that history demonstrates the US

Army's ability to adapt to new technologies without changing the conceptual foundation of its

operational doctrine. Palazzo argued that this remains true today because MDB does not bring

anything inherently new to military thinking. Palazzo expressed concern that the focus on peer

threats may lead to adoption of new doctrine that does not prepare the force to meet future

challenges, since MDB does not address the strategic implications of a protracted war.[7]

Furthermore, Anthony Clas warns that emerging technologies in the multi-domain environment

will create ethical dilemmas—especially those caused by the fielding of disruptive technologies,

the operational and strategic implications of dense urban environments on military objectives, and

the roles of leaders and soldiers.[8] Signaling ongoing inter-service rivalry, Air Force Lieutenant

Colonel Mike Pietrucha took a highly negative stance against MDB, arguing that land forces will

never be able to operate across domains.[9]

The critiques thus come from two different positions. On the one hand, critics argue that

MDB is not new, and therefore cannot help the US military adapt to a changing operational

environment (OE). This leads to the view that a new operational doctrine written to incorporate

http://ndupress.ndu.edu/Publications/Article/1411615/multidomain-battle-time-for-a-campaign-of-joint-experimentation/.

[7] Albert Palazzo, "Multi-Domain Battle: The Echo of the Past," *The Strategy Bridge,* October 11, 2017, accessed March 6, 2018, https://thestrategybridge.org/the-bridge/2017/10/11/multi-domain-battle-the-echo-of-the-past.

[8] Anthony M. Clas, "Commanding in Multi-Domain Formations," *Military Review*, March-April 2018, accessed April 20, 2018, http://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/March-April-2018/Clas-Commanding-Multi-Domain/.

[9] Mike Pietrucha, "No End in Sight to the Army's Dependence on Airpower," *War On the Rocks,* December 13, 2016, accessed August 11, 2017, https://warontherocks.com/2016/12/no-end-in-sight-to-the-armys-dependence-on-airpower/.

the MDB concept would vary little from previous versions and would therefore merely waste resources while insufficiently addressing new problems in the OE. Conversely, some argue that formal adoption of the MDB concept would require the US Army to make radical changes to previous doctrine, ultimately doing more harm than good. Critics in this vein tend to argue that merging domains would erase the inherent advantages of each, while requiring an expensive and complicated adjustment to US military doctrine. The following analysis addresses these concerns to determine whether the MDB concept requires new operational doctrine, what logic and intent would serve as the basis of this new operational doctrine (if needed), what problem it is trying to solve, and how to carry out its implementation.

US Army Field Manual (FM) 3-0: *Operations*, asserts, "a multi-domain approach to operations is not new. US Army forces have effectively integrated capabilities and synchronized actions in the air, land, and maritime domains for decades."[10] Further, FM 3-0 posits "all US Army operations are multi-domain operations, and all battles are multi-domain battles."[11] This begs the question why, if the MDB concept applies to all operations—past, present, and future— it requires significant changes to US Army doctrine. Examining this research question through the perspectives of theory, doctrine, and history lends support to the assertion in FM 3-0 that MDB is not a new concept, because elements of it can be found in the past as well as the present.

Three MDB concepts found within FM 3-0 (2017) serve as criteria to test the thesis, because of their prominence within the US Army's current operational doctrine and in other MDB related speeches and white papers.[12] These three criteria—windows of advantage,

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[10] US Department of the Army, Field Manual (FM) 3-0, *Operations* (Washington, DC: Government Printing Office, 2017), 1-6.

[11] Ibid., 1-17.

[12] *Dictionary.com*, "criteria," accessed March 13, 2018, http://www.dictionary.com/browse/criteria.

convergence, and positions of relative advantage—are drawn from FM 3-0 and various white papers that address this new concept. Current US Army operations doctrine incorporates these criteria into its overall concept of US Army operations, ensuring that they are nested in US Army doctrine.[13] Analyzing history, theory, and doctrine using these criteria demonstrates that these components have been present in the past and therefore do not require a significant revision of US Army doctrine.

This work demonstrates the presence of the three components of windows of advantage, convergence, and positions of relative advantage in history, theory, and doctrine to answer whether MDB is new or old. The first section focuses on defining MDB and explaining its development and its components to create shared understanding and establish a benchmark from which to compare to theory, history, and doctrine. The second section compares the components of MDB to timeless principles found in theory to reveal how the principles of MDB are grounded in military theoretical traditions. Section three examines how different militaries used the theoretical concepts behind the principles of multi domain battle to create doctrine, illustrating cases in which various militaries have woven MDB into doctrine. Finally, section four shows how the principles of MDB found in theory and doctrine influences various historical campaigns to show how military leaders used the principles of MDB in the past. Together these chapters demonstrate that the principles of MDB are not new, and can be found in theory, doctrine, and history.

Multi-Domain Battle

This section provides an overview of the origins of MDB doctrine and defines its major concepts to create shared understanding and establish a benchmark from which to compare to theory, history, and doctrine. As of the time of this writing, MDB remains under development.

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[13] US Army, FM 3-0 (2017), 1-6, 1-17 – 1-19.

The US Army has produced multiple white papers on the concept, but only in FM 3-0, dated October 6, 2017, does the term MDB appear in official doctrine. The following pages describe the organizational development of MDB, the current operational environment that led to its creation, and the main concepts or ideas necessary to create a shared understanding of MDB. This will enable a comparison of current MDB concepts with earlier concepts in theory, history, and doctrine to demonstrate that the MDB concept is not new.

Background

The origins of what is currently called MDB can be traced to a speech given by Deputy Secretary of Defense Bob Work at the US Army War College on April 8, 2015. In his speech, Mr. Work urged the US Army to develop AirLand Battle 2.0 to cope with problems the US Army may face in twenty-first-century warfare, and to create solutions to these problems. Mr. Work specifically highlighted the challenges the US Army would face gaining access to contested areas of operations due to enemy anti-access and area denial capabilities. Through this speech, Work spurred the creation of MDB.[14]

Later, in the fall of 2016 General David G. Perkins, former commanding general of TRADOC, gave a series of presentations introducing MDB as a theoretical framework. Notably, on October 3, 2016, he started to use the word "domain" when he told an audience that currently "all domains are contested" and that "no domain can dominate."[15] The next day he formally introduced MDB. In this speech, General Perkins identified how the US Army planned to adapt to the changing operational environment. He went on to discuss AirLand battle, describe its

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[14] Kelly McCoy, "The Road to Multi-Domain Battle: An Origin Story," *Modern War Institute at West Point,* October 27, 2017, accessed March 18, 2018, https://www.mwi.usma.edu/road-multi-domain-battle-origin-story/.

[15] Association of the United States Army, "TRADOC Chief: 'No Single Domain Can Dominate," *AUSA.org,* October 03, 2016, accessed March 18, 2018, https://www.ausa.org/news/tradoc-chief-%E2%80%98no-single-domain-can-dominate%E2%80%99.

weaknesses, and explain how MDB retained the effective parts of AirLand battle while adding

new concepts to cover its weaknesses. Specifically, General Perkins, like many personnel in the

US military, was concerned with enemy forces' ability to conduct cross-domain operations, and

US forces' ability to counter them. Senior representatives from the US Navy, US Air Force, and

the multinational community were also present to speak on behalf of multi-domain cooperation.[16]

In a speech given in November 2016, General Perkins stressed his view that the future US Army

could not expect to achieve *superiority* in any domain besides land, and therefore must create

multi-domain solutions like units that can conduct fires across multiple domains.[17]

In 2017, the US Army released a series of publications aimed at informing the public and

generating discussion about the MDB concept. One of these, a four-page white paper dated

February 24, 2017 titled "Multi-Domain Battle: Combined Arms for the 21st Century" re-

introduced many of the concepts mentioned by Perkins in his October 2016 speech at CGSC. The

US Army also released a larger draft document titled: "Multi-Domain Battle: Evolution of

Combined Arms for the 21st Century 2025-2040" the following October. This document includes

more detailed descriptions of the many concepts that make up MDB. In the foreword, Perkins

outlined the multiple challenges facing US forces and explained how MDB builds on the US

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[16] Association of the United States Army, "CMF: Multi-Domain Battle: Ensuring Joint Force Freedom of Action in Future War," *AUSA.org,* October 04, 2016, accessed March 18, 2018, https://www.ausa.org/events/ausa-annual-meeting-exposition-2016/sessions/cmf-multi-domain-battle-ensuring-joint-force?page=6.

[17] Superiority combines three terms as defined in current US military doctrine: air superiority, maritime superiority, and cyberspace superiority. Note that superiority applies to a given time and place and need not be permanent or widespread throughout a domain. Superiority is therefore distinct from supremacy, or the degree of superiority in a domain that renders the opposing force incapable of effective interference. US Department of Defense, "Joint Operational Access Concept (JOAC)," *defense.gov,* January 17, 2012, accessed March 29, 2018, https://www.defense.gov/Portals/1/Documents /pubs/JOAC_Jan%202012_Signed.pdf, 15; David G. Perkins, "Multi-Domain Battle: Joint Combined Arms Concept for the 21st Century," Association of the US Army, November 14, 2016, accessed March 18, 2018, https://www.ausa.org/articles/multi-domain-battle-joint-combined-arms-concept-21st-century.

Army Operating Concept (AOC) to meet future peer and near-peer challenges.[18] Finally, in

October 2017, the US Army released FM 3-0: *Operations*. This update of the manual added

eighteen new pages of MDB-related doctrine to the existing doctrinal framework. Specifically,

FM 3-0 describes the contemporary threat environment with specific recent and historical

examples, and adds sections outlining the incorporation of new domains such as cyber and

information operations.

These speeches and documents created an initial doctrinal foundation, but as General

Perkins argued in 2016, "multi-domain battle will require a new generation of innovative mission

command solutions in doctrine, organization and training across the joint force."[19]

Why Multi-Domain Battle was Created

US Army Strategist Kelly McCoy has argued that MDB began as an attempt to counter

the proliferation of anti-access & area denial systems by near peer adversaries.[20] The white paper

titled "Multi-Domain Battle: Combined Arms for the 21st Century" reflects this view, noting that

near-peer adversaries will take advantage of modernized integrated air defenses and long-range

precision strike capabilities to conduct limited-objective operations and counter-joint-force

response. These integrated air defense networks complicate joint operations because hidden,

lethal, and dispersed air defenses can allow the enemy to establish air superiority from the ground

and take away an essential condition for effective joint force operations. Further complicating

matters, in the anticipated future operational environment, advanced integrated air defenses also

protect enemy surface-to-surface missile capabilities, which enable enemy deep strikes on

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[18] TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," October, 2017, accessed March 18, 2018, http://www.tradoc.army.mil/multidomainbattle/docs/DRAFT_MDBconcept.pdf, 5-6.

[19] David G. Perkins, "Multi-Domain Battle: Joint Combined Arms Concept for the 21st Century," *AUSA.org*, November 14, 2016, accessed March 18, 2018, https://www.ausa.org/articles/multi-domain-battle-joint-combined-arms.

[20] McCoy, "The Road to Multi-Domain: An Origin Story."

friendly assets without reliance on aircraft. Improved ballistic and cruise missiles in growing numbers threaten C2 nodes as well as maneuver on land, at sea, and in the air.[21] The writers of "Multi-Domain Battle: Combined Arms for the 21st Century" argued that MDB could meet these challenges through ready and resilient combat forces capable of outmaneuvering adversaries physically and cognitively through the extension of combined arms across all domains.[22]

In "Multi-Domain Battle: Combined Arms for the 21st Century," the authors also challenge the notion that joint forces can rely on assured access to the space, cyber, and electromagnetic domains. It warns that access to these domains is critical for the synchronization needed for joint operations. It is this same synchronization, the paper argues, that potential adversaries will attempt to disrupt. The paper notes potential adversaries have been studying joint capabilities and developing ways of breaking joint interdependence. In describing this, the authors chose to italicize the following quote by D. E. Johnson: "Enemy capabilities now threaten Joint Force interdependence, which turns long-assumed strengths into weaknesses."[23] Similarly, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," published in October 2017, posits that the emerging operational environment will see superiority contested in all domains, have increased lethality, be more complex, and feature situations in which adversaries challenge deterrence.[24] At the same time, the document notes that US forces must prepare to operate in environments that are expanded in time, domains, geography, and actors. In these environments, adversaries can converge their assets due to their inherent advantages, and seemingly at the same time compress the environment as the joint force must defend against

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[21] TRADOC, "Multi-Domain Battle: Combined Arms for the 21st Century," February 24, 2017, accessed March 18, 2018, www.tradoc.army.mil/MultiDomainBattle/docs/MDB_WhitePaper.pdf, 2.

[22] Ibid., 4.

[23] Ibid., 1-2.

[24] TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 5-6.

attacks from virtually anywhere in the world.[25] In other words, the US must cover a wider

geographic area that plays to enemy advantages, while having to defend the joint force from

attacks that could come from anywhere.

Based on these challenges, "Multi-Domain Battle: Evolution of Combined Arms for the

21st Century 2025-2040" frames the main military problem for US forces as:

> How will US ground forces, as part of the Joint Force and with partners, deter and defeat
> increasingly capable peer adversaries intent on fracturing allied and Joint Force cohesion
> in competition and armed conflict?[26]

This problem statement and the challenges outlined in "Multi-Domain Battle: Combined Arms

for the 21st Century" are concerned with adversaries that will attempt to disrupt joint force

cohesiveness.

FM 3-0 also describes the challenges MDB addresses. The publication mentions the

proliferation of anti-access & area denial systems, and enemy intentions to disrupt the joint force.

Additionally, it elaborates on the challenges being faced in the space, information environment,

cyberspace, and electro-magnetic domains.[27] The manual expects enemy forces to use these

domains to attempt to defeat US forces through preclusion, isolation, use of sanctuaries, and

systems warfare.[28] These concepts are important because they further highlight how adversaries

may use multiple domains to deny the Joint Force freedom of maneuver, and break cohesion.

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[25] TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 7.

[26] Ibid., 21.

[27] US Army, FM 3-0 (2017), 1-6 – 1-9.

[28] *Preclusion* is using multiple domains to deny access to the joint force. *Isolation* is using multiple domains, especially domains in the extended battlefield to break down joint force cohesion to defeat it in detail. *Sanctuary* refers to the use of innate advantages to keep enemy forces out of reach of joint force influence. *Systems warfare* enables peer and near-peer threats to understand, identify, and isolate critical subsystems or components that give opposing forces the capabilities necessary to accomplish their mission. Ibid., 1-11.

All three publications, taken together with speeches by General Perkins, allude to an emerging operational environment in which adversaries will challenge the joint force in all available domains. Their intent is to neutralize joint force advantages by challenging the Joint force's ability to synchronize operations over multiple domains. The MDB concepts proposed are an attempt to answer these challenges.

Key Concepts of Multi-Domain Battle

This section focuses on the main concepts that make up MDB as it appears in FM 3-0, and the conceptual white papers. FM 3-0 describes the concept of the *multi-domain extended battlefield*, asserting "a multi-domain approach to operations is not new. US Army forces have effectively integrated capabilities and synchronized actions in the air, land, and maritime domains for decades."[29] The manual adds the space, information environment, and cyber & electro-magnetic domains to the list of domains in which the US Army must integrate its capabilities to gain or challenge superiority.[30]

FM 3-0 states that all US Army operations are multi-domain operations, and ties US Army operations to joint operations with the following paragraph:

> Army forces may be required to conduct operations across multiple domains to gain freedom of action for other members of the joint force. Examples of these operations include neutralizing enemy integrated air defenses or long-range surface-to-surface fires systems, denying enemy access to an AO, disrupting enemy C2, protecting friendly networks, conducting tactical deception, or disrupting an enemy's ability to conduct information warfare.[31]

This paragraph emphasizes the US Army's role in joint operations, and the expansion of its operational reach to support other domains. In addition, FM 3-0 notes that all joint operations are

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[29] US Army, FM 3-0 (2017), 1-6.

[30] Ibid., 1-6 – 1-8.

[31] Ibid., 1-18.

multi-domain. The presence of joint operations, or operations that include multiple domains in theory, history, and doctrine can be used to determine if the ideas behind MDB are new or merely an evolution of previous principles.[32]

Convergence

Convergence was introduced in "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040." This section explores the definition of convergence, arguing that it is an evolution of combined arms warfare (not a revolution) and that military forces always make use of convergence to achieve a purpose or aim.

TRADOC's "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040" defines convergence as "the integration of capabilities across domains, environments, and functions in time and physical space to achieve a purpose."[33] Furthermore, FM 3-0 asserts that planners must consider all the domains, including new ones like cyber and space, when seeking to converge effects cross-domain.[34] Convergence seeks to *integrate,* which means "to form, coordinate, or blend into a functioning or unified whole."[35] Combined arms has long required just this sort of integration of diverse units and capabilities into a functioning whole.

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[32] US Army, FM 3-0 (2017), 1-17.

[33] Convergence is used twice in FM 3-0, but not defined. For the purposes of this monograph the definition from "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040" is used instead. The uses of the term convergence in FM 3-0 conform to the definition in the white paper. US Army, FM 3-0 (2017), 1-6, 1-29, 1-50; TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 25.

[34] US Army, FM 3-0 (2017), 1-6.

[35] *Merriam-Webster.com,* "Integrate," accessed March 21, 2018, https://www.merriam-webster.com/dictionary/integrate.

Thus, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040" supports the assertion that convergence is an evolution of combined arms.[36] According to military historian Jonathan M. House, combined arms is the idea that different combat arms and weapons systems must be used in concert to maximize the survival and combat effectiveness of the others.[37] Convergence is an evolution of combined arms because it combines combat arms in different domains with other elements of national power, like electronic warfare, offensive and defensive cyber space operations, and cognitive actions such as information operations.[38]

Finally, US Army forces employ convergence to achieve a specific purpose.[39] As noted in "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040":

> Friendly forces achieve victory through convergence by employing multiple combinations of cross-domain operations that create physical, virtual, and cognitive windows of advantage to enable cross domain maneuver and fires to achieve objectives.[40]

Thus, convergence should create *windows of advantage* that, when acted upon, will eventually lead to victory.

Windows of Advantage

"Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040" defines windows of advantage as

> converging capabilities in time and space in selected domains and environments to enable commanders to gain localized control or physical, virtual, and/or cognitive influence over

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[36] TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 4.

[37] Jonathan M. House, *Combined Arms Warfare in the Twentieth Century* (Lawrence, KS: University Press of Kansas, 2001), 4-5.

[38] US Army, FM 3-0 (2017), 1-6 – 1-9.

[39] TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 29.

[40] Ibid., 3.

a specified area to prevent its use by an enemy or to create conditions necessary for successful friendly operations.[41]

This definition has two parts. First, it talks about converging capabilities. This, per the definition of convergence, refers to integrating different actions in time and space for a purpose. The second part is the purpose, to deny use of a specified area to the enemy or to create conditions for successful operations. Thus, a window of advantage is a set of favorable conditions created through convergence. It should also be noted that windows of advantage are temporal in nature or are fixed in time. This is because window is defined as "a period regarded as highly favorable for initiating or completing something."[42] The use of the word window shows that the favorable conditions US forces seek are contained within a specific window or set period.

As described in "Multi-Domain Battle: Combined Arms for the 21st Century," one of the three components of MDB is creating and exploiting these windows of advantage, or exploiting the conditions created by convergence.[43] Exploit is defined as "to use or manipulate for one's advantage."[44] From this, one can conclude that MDB doctrine guides commanders to use convergence to create favorable conditions that they can then use for follow on operations.

Joint force dominance of an area through convergence creates maneuver space for the joint force to exploit in pursuit of its objective.[45] Thus, convergence creates opportunities, or

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[41] FM 3-0 does not formally define windows of opportunity, but refers instead to windows of advantage, as used in the white paper when describing exploitation of opportunities. US Army, FM 3-0 (2017), 1-19; TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 79.

[42] *Dictionary.com,* "Window," accessed March 21, 2018, http://www.dictionary.com/browse /window?s=t.

[43] TRADOC, "Multi-Domain Battle: Combined Arms for the 21st Century," 4.

[44] *Vocabulary.com,* "Exploit," accessed March 21, 2018, https://www.vocabulary.com/dictionary /exploit.

[45] TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 3.

windows of advantage, for the joint force, which if properly exploited can eventually lead to the successful accomplishment of objectives.

Positions of Relative Advantage

Another concept FM 3-0 refers to is *positions of relative advantage*. FM 3-0 uses the ADRP 3-0 definition:

> A location or the establishment of a favorable condition within the area of operations that provides the commander with temporary freedom of action to enhance combat power over an enemy or influence the enemy to accept risk and move to a position of disadvantage.[46]

FM 3-0 notes that positions of relative advantage can occur across all domains and provide units with opportunities to exploit. The manual points out that friendly forces and enemy forces are constantly seeking these positions.[47] This doctrinal concept shares much in common with windows of advantage. Both seek to set favorable conditions, or an advantage. Where they differ is that position can be defined as "condition with reference to place; location; situation" or as a "status or standing."[48] This refers to both the physical and qualitative nature of a position of advantage. A position of advantage may refer to a physical location, which provides a commander with freedom of action, or a disposition or set of favorable conditions that a force holds over an area.

While discussing the contemporary operational environment, FM 3-0 describes a peer threat as "an adversary or enemy with capabilities and capacity to oppose US forces across multiple domains world-wide or in a specific region where they enjoy a position of relative

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[46] US Department of the Army, Army Doctrine Publication (ADP) 3-0, *Unified Land Operations* (Washington, DC: Government Printing Office, October 2011), glossary-14.

[47] US Army, FM 3-0 (2017), 1-18.

[48] *Dictionary.com,* "position," accessed March 21, 2018, http://www.dictionary.com/browse/position?s=t.

advantage."[49] This suggests that potential near peer threats will not only seek positions of relative advantage, but will already have positions of advantage of their own at the start of a conflict, which must be overcome.

How the Three Concepts Inter-relate

When the principles of convergence, windows of advantage, and positions of relative advantage are combined, we can see that the MDB concepts outline an approach for conducting multi-domain operations. First leaders must recognize that friendly and enemy forces will continuously seek to establish their own positions of relative advantage.[50] It is also highly likely that the enemy will already have a significant number of positions of relative advantage at the start of the conflict.[51] Current and potential positions of advantage for the friendly force should be considered as objectives, or at least as planning considerations. The exploitation of current friendly positions can be used to provide freedom of maneuver.[52] Commanders can use this freedom maneuver to plan future operations.

The convergence of military, lethal and nonlethal capabilities across domains, environments, and functions sets the conditions for windows of advantage to open. These windows appear during situations in which friendly forces or capabilities have freedom of action to accomplish missions.[53] Windows of advantage create opportunity for maneuver which, in

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[49] US Army, FM 3-0 (2017), 1-9.

[50] Ibid., 1-18.

[51] Ibid., 1-9.

[52] Ibid., 1-18 – 1-19.

[53] TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 25.

keeping with the logic of MDB, lead to positions of advantage and can create new opportunities for convergence. Windows of advantage can be used to capture positions of advantage.[54]

The greater the number of positions of advantage a commander can generate, the increased number of potential dilemmas that commander can present to an enemy. It is the exploitation of positions of advantage through maneuver, which deters, defeats, or destroys an enemy.[55] The convergence, windows of advantage, and positions of relative advantage operate together each enabling the execution of the others until victory is achieved. The presence of these three concepts in theory, history and doctrine shows that MDB is not new, but an evolution of timeless principles.

Concepts of Multi-Domain Battle in Theory

Variations of the three concepts of convergence, windows of advantage, and positions of relative advantage have been present in military theory in some form or another throughout history. The terms used to describe them may have changed over time, but the concepts are present in several influential works. This chapter examines the presence of these principles amongst some major theorists to show how the principles being integrated into MDB today were already a part of military theory traditions. Their presence shows the theoretical foundation behind MDB is not new, but an evolution from previous principles.

Publius Flavius Vegetius Renatus

Among the earliest military theorists to describe concepts like those found in MDB was Vegetius, a patrician and reformer of the Roman military around the 4th century CE.[56] Writing

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[54] [54] TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 62.

[55] US Army, FM 3-0 (2017), 1-19.

[56] *Encyclopedia Britannica*, "Vegetius: Roman Military Author," April 3, 2018, accessed April 9, 2018, https://www.britannica.com/biography/Vegetius.

about the Roman Legions, he described the differences between types of Roman troops, and their optimal placement in combat formation. He described how each combination of weapon and armor sought to achieve different effects on the opposing army, and how their coordination and correct placement is necessary. Every troop had a specific purpose: the light troops did the bulk of the fighting, while missile troops thinned out the enemy, heavy troops served as a reserve, and cavalry practiced pursuits. According to Vegetius, "by these precautions and dispositions the legion was victorious without danger, or if the contrary happened, was preserved without any considerable loss."[57] Vegetius' description of multiple troop types being arranged to fit a specific purpose is similar to the definition of convergence, which is "integrating capabilities…in time and physical space to achieve a purpose."[58] His use of cavalry for pursuits shows an understanding of exploiting the windows of advantage that other units like infantry and missile troops create.

Julian S. Corbett

This section expands on the ways in which Corbett's ideas contributed to the three principles of MDB. Emphasis will be placed on his claim that the maritime domain can affect other domains, because this indicates that Corbett recognized how domains can affect each other. Corbett's work sets the theoretical foundation that allows capabilities within one domain to set the conditions or to serve as the main effort in others.

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[57] Flavius Vegetius Renatus, *The Military Institutions of the Romans (De Re Militari),* trans., John Clarke (London: W. Griffin, 1767), accessed March 19, 2018, http://www.digitalattic.org/home/war/vegetius/index.php#b209.

[58] TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 25.

Unlike his predecessor Mahan, who described sea power as the *sine qua non* of national greatness, Corbett wrote that conflicts occur on land, but can be influenced from the sea.[59] FM 3-0 quotes him as saying:

> Since men live upon the land and not upon the sea, great issues between nations at war have always been decided—except in the rarest of cases—either by what your army can do against your enemy's territory and national life, or else by fear of what the fleet makes it possible for your army to do.[60]

This quote highlights the historical interrelation between domains. It highlights the need to arrange both naval and ground actions in pursuit of a joint objective.

Corbett also addressed the multi-domain notion of positions of relative advantage. In his writing, he applied Clausewitz's principles of the defense to show how a relatively weaker country can use the maritime domain as a position of relative advantage to prevail. Clausewitz argued that the defense is stronger because it is "easier to hold ground than take it. It follows that defense is easier than attack, assuming both sides have equal means."[61] Corbett expanded on the idea of the defense being stronger than the attack by arguing that in the maritime domain not only is defense stronger, but a navy of lesser means conducting defensive operations can prevail against a larger force.[62]

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[59] According to Mahan, "sea power was the *sine qua non* of national greatness, since maritime nations needed command of the sea to protect their international trade. Thus, Mahan believed that maritime nations needed fleets of capital ships capable of fighting and winning decisive battles that left the victor with command of the sea and the vanquished without the means to contest it." *Sine qua non*: something indispensable or essential. William R. Sprance, "The Russo-Japanese War: The Emergence of Japanese Imperial Power," *Journal of Military and Strategic Studies* 6, no. 3 (Winter 2004): 2; *Merriam-Webster.com,* "Sine qua non," accessed March 23, 2018, https://www.merriam-webster.com /dictionary/sine%20qua%20non.

[60] US Army, FM 3-0 (2017), 1-6.

[61] Carl Von Clausewitz, *On War,* ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 357.

[62] Julian S. Corbett, "Some Principles of Maritime Strategy," in *Roots of Strategy Book 4*, ed. David Jablonsky (Mechanicsburg, PA: Stackpole Books, 1999), 246-247.

A purely land defensive strategy focuses on getting a superior opponent to exhaust their strength by attacking the defender's fortified positions. After the attacker is exhausted, the defender can counterattack to drive the aggressor away. This would deny the aggressor their objective, which according to Clausewitz should be to capture land.[63] Corbett argued that strength of arms wins these conflicts.[64] On the other hand, in conflicts where the naval and land domain are present, Corbett argued that a weak military power can succeed by using the naval domain to secure its home defense and isolate its territorial object.[65] In the maritime domain, a weaker power can use mobility to avoid decisive combat while contesting control of the domain. This is done by harassing the enemy, continually occupying his attention to prevent enemy forces from exercising control at any time and place.[66] Preventing control allows the much smaller navy to isolate its objective. Corbett credited victory in conflicts like the British conquest of Canada, and the capture of Havana in the Mexican American War to the victor's ability to isolate their objective. From this, Corbett deduced that the outcome of such conflicts resulted not from the strength of the belligerents, but from their ability to bring this strength to bear on their opponents.[67]

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[63] Julian S. Corbett, "Some Principles of Maritime Strategy," in *Roots of Strategy Book 4*, ed. David Jablonsky (Mechanicsburg, PA: Stackpole Books, 1999), 202.

[64] Corbett argued that this type of conflict will often be unlimited. He stressed this point in keeping with his assertion that strength of arms wins unlimited land conflicts. Julian S. Corbett, "Some Principles of Maritime Strategy," in *Roots of Strategy Book 4*, ed. David Jablonsky (Mechanicsburg, PA: Stackpole Books, 1999), 201-205.

[65] Corbett believed that most territorial objectives where the maritime domain was involved were far enough away that a nation would not resort to unlimited war. In these conflicts, a weaker nation could use the maritime domain to isolate its objective until its opponent decided the conflict was not worth the costs. Corbett, "Some Principles of Maritime Strategy," 201-206.

[66] Ibid., 248.

[67] Ibid., 205.

Corbett's example of a small defensive naval fleet isolating the land domain shares much in common with actions in MDB that deny the enemy positions of relative advantage. Contesting the maritime domain denies the enemy a position from which to launch amphibious operations or resupply forces, thus restricting their ability to maneuver from a position of relative advantage.

Heinz Guderian

> Historian Matthew Cooper has argued that German General Heinz Guderian
>
> revolutionized theoretical thinking in Germany on the use of Armor. By 1929 he had evolved the idea of strategic penetration by armored forces and had become convinced that tanks working on their own or in conjunction with infantry could never achieve decisive importance…what was needed were armored divisions which would include the supporting arms needed to allow the tanks to fight to full effect.[68]

Guderian described the armored division as a unit that is neither isolated from other arms, nor tied to working in conjunction to infantry. He asserted that their unique capabilities of speed and protection allow mechanized formations to accomplish tasks that no other combat arm can accomplish.[69] Guderian advocated for the unique capabilities of the armored formation to be used as part of a larger operation that included both units in the air and on the ground, where each arm played a unique role in setting conditions for the others.[70] The coordination of different arms over space and time for the achievement of a joint purpose shares much in common with the concept of convergence.

Guderian also recognized positions of relative advantage and windows of advantage. Guderian's use of armor to attack enemy industrial centers, military centers, and transportation networks illustrated his continuous effort to achieve positions of relative advantage. This indicates Guderian understood that denying these centers to the enemy limits their future ability

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[68] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (Lanham, MD: Scarborough House, 1990), 143.

[69] Ibid.*,* 144.

[70] Ibid.*,* 143-144.

to generate combat power out of them.[71] He also sought in each attack to set the conditions for exploitation by other arms.[72] This is akin to windows of advantage. Guderian advocated the use of concepts like convergence, windows of advantage, and positions of relative advantage in the integration of armored and air units into the German Army, illustrating an early theoretical approach to what the US Army now calls MDB.

William Mitchell

Mitchell was one of the first to realize how the air domain can interact with the other domains. He argued that while a friendly air force can be used to stop a hostile one, it can also be used to attack enemy shipping at sea.[73] Here again a past military theorist described how efforts can be converged from multiple domains for a common goal. Mitchell went on to describe how, thanks to innovations on land, no naval operation can occur without the support of air power.[74] This implies that all the domains must work together. At the same time, Mitchell argued that the advantages of aircraft would lead to battles fought solely in the air, as air forces sought control of this domain to enable future operations on land and sea. Mitchell proposed to make the Army Air Corps an independent arm, removing it from the control of non-flying officers. That is not to say that under Mitchell's proposal the air forces would only worry about the air domain. Once air dominance is achieved, the domain can be used to launch attacks onto the ground and maritime domains.[75] Like Corbett, Mitchell shows how multiple domains can interrelate, and their efforts can be coordinated over space and time for a singular purpose. Also, like Corbett, control of the

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[71] Cooper, *The German Army,* 143.

[72] Ibid.*,* 143-144.

[73] William Mitchell, "Winged Defense: The Development and Possibilities of Modern Air Power-Economic and Military," in *Roots of Strategy Book 4*, ed. David Jablonsky (Mechanicsburg, PA: Stackpole Books, 1999), 423.

[74] Ibid., 427-428.

[75] Ibid., 435-437.

air domain creates a position of relative advantage, and a corresponding window of opportunity from which to drive future operations.

Multi-Domain Battle in US Doctrine

ADP 1-01, *Doctrine Primer* defines *Army Doctrine* as "fundamental principles, with supporting tactics, techniques, procedures, and terms and symbols, used for the conduct of operations and which the operating force, and elements of the institutional US Army that directly support operations, guide their actions in support of national objectives. It is authoritative but requires judgment in application."[76] This means that doctrine is composed of principles, which the force considers to be authoritative and fundamental in the conduct of operations. If MDB is not new, but an evolution, then similar principles should be present in previous doctrine. This section of this monograph identifies the presence of the three principles of windows of advantage, convergence, and positions of advantage in the history of US Army and Joint doctrine from World War I to today to show how MDB is not new to US doctrine.

World War I Doctrine

New technologies in the latter stages of the American Civil War forced militaries to reconsider their doctrine leading up to World War I. Increases in the lethality of weapons, increased efficiency brought about by rail, coal propulsion, and the telegraph forever changed the way in which militaries maneuvered and practiced combined arms. The Confederate Army adapted the use of artillery for the defense and developed improved trenches and defensive works. Meanwhile the Union Army abandoned Jominian battle and focused on the psychological

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[76] US Department of the Army, Army Doctrine Publication (ADP) 1-01, Doctrine Primer (Washington, DC: Government Printing Office, 2014), 1-2.

and economic aspects of war as shown by Sherman's march to the sea.[77] This changed American

doctrinal thinking leading up to World War I.

When the US Army Expeditionary Forces (AEF) entered World War I, the US Army was

a constabulary force of only 127,151 soldiers, and the National Guard had 181,620 members—

most inactive or on limited, unpaid duty. Both the country and the US Army were unprepared for

the coming war. Rather than focusing on what doctrinal framework to use for the conflict, the US

Army focused on raising a large force and creating the infrastructure necessary to support it.[78]

Making matters worse, the War Department staff had made little progress in designing a formal

training program for modern war.[79] The US military would have to find a way to train and

educate its forces rapidly. Historian Jim Garamone has written,

> One solution offered by the Europeans, known as amalgamation, would have the United
> States insert its men directly into existing British and French units at the company level.
> Europeans argued that amalgamation would compensate for the inexperience of
> American officers and non-commissioned officers as well as American lack of familiarity
> with modern staff arrangements and technologies like aviation, armor, and heavy
> artillery. American troops would thereby be commanded at the tactical level by American
> junior officers, but the operational and strategic direction of American forces would be
> handled by more experienced Europeans.[80]

This solution was wildly unpopular both domestically and politically.

> Some Americans looked at the enormous casualty levels on the western front and
> recoiled against the thought of their young men being used as cannon fodder by European
> generals. Pershing contended that the Europeans had become too tied to trench warfare;

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[77] Francis S. Jones, "Analysis and Comparisons of the Ideas and Later Influences of Henri Jomini and Carl Von Clausewitz" (master's thesis, Air Command and Staff College Air University, 1985), 20-22.

[78] Jim Garamone, "World War I: Building the American Military," April 3, 2017, accessed March 20, 2018, https://www.army.mil/article/185229/world_war_i_building_the_american_military.

[79] Kenney E. Hamburger, *Learning Lessons in the American Expeditionary Forces* (Washington DC: United States Army Center of Military History, 1997), accessed March 20, 2018, http://www.au.af. mil/au/awc/awcgate/ww1/aef-wwi.htm, 9.

[80] Jim Garamone, "Pershing's Decision: How the United States Fought its First Modern Coalition War," December 10, 2010, accessed March 20, 2018, https://www.army.mil/article/49291/ pershings_decision_how_the_united_states_fought_its_first_modern_coalition_war.

his "open warfare" doctrine, he argued, would restore mobility to warfare by emphasizing American aggressiveness and marksmanship.[81]

The battles that took place between the European powers had devolved into static, trench warfare in which commanders aligned their forces against each other to maximize firepower on their opponent.[82]

AEF commander General John Pershing tried to break the stalemate new technologies had created by reintroducing maneuver through the doctrine of open warfare, but not everyone agreed with his ideas. His most vocal and influential critic was I Corps Commander Hunter Liggett who felt that while open warfare's maneuver concepts were necessary, they were unsuitable for the theater.[83] He eventually convinced Pershing to accept a mix of trench and maneuver warfare. According to military historian Richard Steward,

> Liggett retooled and remodeled the First Army. He took particular care in retraining his infantry and artillery. Some infantry received special training in techniques for attacking strong points, while the rest were trained to bypass these defenses. Artillery batteries laid out supporting plans to use interdicting fires to isolate infantry objectives and to conduct counterbattery fires against German artillery. In his commanders Liggett instilled the need to maximize supporting fires and gas to suppress enemy defenses.[84]

This change to the open warfare doctrine is reminiscent of convergence because it involved maneuvering a variety of units across the battlefield to best use their capabilities. By understanding which strong points to avoid, and which strong points to attack and capture from the enemy, Liggett denied the enemy key positions that the new FM 3-0 describes as positions of

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[81] Garamone, "Pershing's Decision."

[82] Daniel E. Worthington, "Ligget, Hunter," *International Encyclopedia of the First World War,* October 8, 2014, accessed March 20, 2018, https://encyclopedia.1914-1918-online.net/article /liggett_hunter.

[83] Ibid.

[84] Richard W. Stewart, ed., *American Military History Volume II: The United States Army in A Global Era, 1917-2003,* (Washington DC: US Army Center of Military History, 2005), ch 1, accessed March 20, 2018, https://history.army.mil/books/AMH-V2/AMH%20V2/chapter1.htm, 47.

relative advantage. Staffs trained in this doctrine at the Command and General Staff College, at Fort Leavenworth or, after arrival in France, at the short staff officer's course in Langres coordinated fires in four phases to support the movement of the infantry throughout the depth and breadth of the battlefield.[85] This integration of capabilities over time and space had all the hallmarks of today's concept of convergence. The doctrine advocated by Pershing and Liggett had its origins at the US Army's Command and General Staff College where it was taught to a large portion of its officers. These officers later held key staff positions in Pershing's AEF.[86] While the rest of the world returned to firepower based doctrines to deal with the advent of the machine gun, American forces used techniques very much like the three principles of convergence, positions of relative advantage, and windows of advantage in MDB to break through the stalemate that Industrial Age weapons produced.

World War II Doctrine

This section shows how the concepts of MDB are not new based on the adaptation, transformation, and consolidation of World War I lessons into doctrine during the interwar period. US Army doctrine, both before and during World War II, reflected the ideas of the theorists that created its foundation and tried to solve the problems that led to the meat grinder of World War I. At the Command and General Staff College, returning combat veterans revamped the curriculum with the lessons of World War I, but mostly confirmed that the doctrine being trained at the school was correct.[87] In addition, returning officers recognized that the requirement of an expeditionary force to move troops and material across oceans, and eventually the air,

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[85] Peter J. Schifferle, *America's School for War: Fort Leavenworth Education and Victory in World War II* (Lawrence, KS: University Press of Kansas, 2010), 13-14.

[86] Mark C. Bender, *Watershed at Leavenworth: Dwight D. Eisenhower and the Command and General Staff School* (Fort Leavenworth KS: Combat Studies Institute, 1990), 28.

[87] Ibid.*,* 30.

would require new doctrine and techniques that planners had developed during both World Wars.[88] The improvement of air technologies and the wide geographic scope of World War II meant that commanders would have to arrange the domains of air, land, sea, and the electromagnetic spectrum over space and time in order to achieve convergence.

The US Navy had a powerful fleet during the interwar period, but it consisted of a hodgepodge collection of vessels with many weaknesses across the fleet, and no common doctrine to unify them.[89] According to Hone:

> The Navy's initial efforts to rectify this deficiency focused on maneuver and aggressive offensive action to control the course of battle. Between the Washington Treaty of 1922 and the London Treaty of 1930, the Navy's doctrine developed to emphasize these two elements. Fluid maneuver would ensure that the Navy's ships would operate as a cohesive unit in battle, and a determined offensive would keep the enemy off balance.[90]

This new naval doctrine incorporated convergence much like the US Army incorporated it in World War I. Both adapted their doctrine and force structure to be able to maneuver different types of forces to knock the enemy off balance and defeat it.

Similarly, in the 1920's, the theories of Douhet and Mitchell led to the creation of strategic bombing doctrine within the US Army Air Corps. While Douhet advocated for a firepower-based conflict in which both countries bombed each other until one surrenders, budgetary constraints led "the US Army Air Corps Tactical School [to advocate] only the precision bombing of an enemy nations' vital centers—its factories, power sources, transportation

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[88] Schifferle, *America's School for War*, 10.

[89] Trent Hone, "Building a Doctrine: U. S. Naval Tactics and Battle Plans in the Interwar Period," *International Journal of Naval History* Vol 1, no. 2 (October 2002): 2, accessed March 20, 2018, http://www.ijnhonline.org/wp-content/uploads/2012/01/hone_doctrine-in-the-usn_-rev10-02.pdf.

[90] Ibid.

and raw materials."[91] This approach shows evidence of convergence. In this approach, formations using new technology can be maneuvered and concentrated on targets that would knock the enemy off balance. Capabilities were converged to deny the Germans use of their industrial centers, which were positions of relative advantage. Eventually, the doctrine also evolved to create windows of advantage for the other domains. This happened when bomber command, after repeated failures in its strategic bombing campaigns, changed its strategy and doctrine to engage and defeat the Luftwaffe.[92] The defeat of German air support by the US Army Air Corps (Army Air Forces after March, 1942), and the bombing of key targets created the window of advantage needed for the successful execution of the D-Day landings.[93] Allied victory in World War II came from adapting doctrine to include all the domains in operations.

On the ground, interwar period doctrine concerned itself with the role of the tank in relation to the rest of the force. Early doctrine limited the tank to infantry support and eschewed the creation of anti-tank capabilities, since its writers believed that other systems like artillery would sufficiently counter enemy armor.[94] This early armor doctrine revealed aspects of convergence, but it also had important differences. For example, tanks acted merely as support to advancing infantry, and not as a potential maneuver element of their own. Rather than being used as support for the infantry, armor needed to be adapted into its own element to achieve the combined arms effect that is now evolving into convergence. In this vein, Heinz Guderian fully adapted German doctrine to use convergence through "the use of massed panzer divisions to

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[91] Brian T. Carey, "Operation Pointblank: Evolution of Allied Air Doctrine During World War II," June 12, 2006, accessed March 20, 2018, www.historynet.com/operation-pointblank-evolution-of-allied-air-doctrine-during-world-war-ii.htm.

[92] Carey, "Operation Pointblank".

[93] Ibid.

[94] Christopher R. Gabel, "Seek, Strike, and Destroy: U.S. Army Tank Destroyer Doctrine in World War II," *Leavenworth Papers* No. 12 (September 1985):4, accessed March 20, 2018, http://www.dtic.mil/dtic/tr/fulltext/u2/a532138.pdf.

strike at strategic objectives deep in the enemy rear."[95] Attacking the enemy rear allowed the

Germans to disrupt Allied supply, and could today be seen as denying the Allies positions of

relative advantage. This gave the Germans further opportunities to exploit which one could see

today as opening windows of relative advantage for follow-on attacks. It would not be until they

saw the success of German tanks and doctrine that the Allies would adapt their armored

equipment and doctrine.[96] The Germans used principles much like convergence, positions of

relative advantage, and windows of advantage in their tank doctrine, forcing the Allies to adapt.

All three of the examples above show how each of the services tried to use doctrine that

included ideas like convergence, but as Lieutenant Colonel Barlow pointed out in his review of

World War II inter service rivalry, the services did not have formal guidance that integrated them

together.[97] Each service's doctrine directed it to plan operations exclusively within its own

domain. While the next section shows that US forces did act across multiple domains in World

War II, the doctrine of the time did not fully support MDB-like concepts. Specifically, in the

Pacific theater lack of any formal guidance on how to integrate land, air, and sea led to a five-

week delay in assigning C2 relationships in the theater. The weeks lost had to be bought back in

blood later, because the enemy used them to capture and fortify the Admiralty Islands, Buka,

Bougainville, Lae, and Salamaua.[98] While World War II demonstrated that joint and combined

operations had become imperative, signaling a requirement for a formal mechanism for joint

management and planning, the doctrine necessary to codify this would not be created until after

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[95] Gabel, "Seek, Strike, and Destroy," 4.

[96] Norwich University, "World War II Tanks Used In Battle," July 2016, accessed March 20, 2018, https://graduate.norwich.edu/resources-mmh/articles-mmh/world-war-ii-tanks-used-in-battle/.

[97] Jason B. Barlow, "Interservice Rivalry in the Pacific," *Joint Force Quarterly* (Spring 1994): 77, accessed March 20, 2018, www.dtic.mil/get-tr-doc/pdf?AD=ADA528913.

[98] Ibid.

World War II.[99] To create this mechanism, The US Congress passed the National Security Act of 1947. This act created the Secretary of Defense, the Department of Defense, and subordinated the Army, the Navy, and Air Force under them.[100]

AirLand Battle

While the National Security act of 1947 organized the services to bring together their domains at the strategic level, a new doctrine was needed to integrate multiple domains at the operational and tactical levels. In 1982, the US Army's answer to this dilemma was AirLand Battle.[101] The AirLand Battle concept of integrated battle uses a unified approach that involves joint operations, combined arms, unity of effort, and the possible use of tactical nuclear, chemical, and biological weapons.[102] In this doctrine, battles are fought in a coordinated fashion along the lines of a clearly designated main effort.[103] Maximum force is brought to bear upon a single objective. AirLand battle integrates the air domain and long-range fires through *deep battle*. In Deep battle fast moving air assets conduct missions to destroy, interdict, and disrupt enemy forces. After they complete these missions they can be redirected to close air support. The doctrine's use of multiple domains to strike at targets in both the main battle area and the deep battle area is akin to convergence. The use of air assets to dislodge enemies from entrenched positions in the rear and disrupt enemy C2 is also reminiscent to using convergence to dislodge enemy forces from positions of relative advantage. The concepts of Integrated Battle and Deep

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[99] Association of the United States Army, *Goldwater-Nichols Department of Defense Reorganization Act of 1986: Its Impact on the Army, A Primer* (Arlington, VA: Association of the US Army, 1988), 2.

[100] Ibid., 2.

[101] Douglas W. Skinner, *Air Land Battle Doctrine* (Alexandria, VA: Center for Naval Analyses, September, 1988) www.dtic.mil/dtic/tr/fulltext/u2/a202888.pdf (accessed August 11, 2017), 2.

[102] Ibid., 16.

[103] Ibid.*,* 17.

Battle, and by extension the principles of MDB, were used in Desert Storm when US Air Force Colonel Warden, head of the Checkmate planning group, advocated for a plan that would use the Air Force as a third dimension maneuver element capable of striking deep, and throwing Iraqi forces off balance.[104] This resulted in deep coordinated attacks to destroy Iraqi air defenses, which in turn allowed the Air Force to attack enemy armored formations and command positions.[105] These attacks dislodged the enemy from its positions of relative advantage and created a window of advantage for ground forces. Thirty-eight days of carefully planned deep attacks resulted in a three-week ground offensive being resolved in four days.[106] Arguably, the Desert Storm experience showed how AirLand Battle doctrine could be used successfully to integrate all forces, deny the enemy advantages, and create opportunities to exploit. The three principles of MDB draw inspiration from this doctrine.

History

The MDB principles of convergence, positions of relative advantage, and windows of advantage are demonstrable throughout history in some form or another. As technology improved and the operational environment changed, leaders guided modernization efforts to create strong military organizations. Some of the most pivotal battlefield innovations throughout history began as peacetime innovations. Inventions like the telegraph, the steamship, the locomotive, and even the bayonet began as peaceful tools that military innovators adapted to the battlefield. As they incorporated new capabilities, armies learned to integrate military arms in a combined arms approach. This reveals a historical continuity—an approach to combat that shared much in

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[104] Edward C. Mann, *Thunder and Lightning: Desert Storm and the Airpower Debates* (Maxwell Air Force Base, AL: Air University Press, April 1995), http://www.dtic.mil/dtic/tr/fulltext/u2/a421939.pdf (accessed August 12, 2017), 112.

[105] Ibid., 117-119.

[106] Ibid., 122.

common with convergence, and achieved deadly results.[107] This section explores examples of past military leaders who incorporated new technologies and doctrines to achieve their objectives, illustrating that the principles of MDB are present throughout military history.

Ancient History

One can see the use of multiple domains in history as far back as the wars of the Greeks. Nearly a millennium after the decline of the Bronze Age civilizations, the Hellenic peoples of Greece begun expanding. The Greeks used advancements in naval technology to explore, colonize, and conquer their environment. As historian of ancient Greece Mark Cartwright notes:

> Some states such as Athens, Aegina, Corinth, and Rhodes amassed fleets of warships, most commonly the trireme, which could allow these states to forge lucrative trading partnerships and deposit troops on foreign territory and so establish and protect colonies. They could even block enemy harbours and launch amphibious landings. The biggest fleet was at Athens, which could amass up to 200 triremes at its peak, and which allowed the city to build and maintain a Mediterranean-wide empire.[108]

The ability to conduct naval, amphibious, and land operations allowed the Greeks to practice a style of warfare with similarities to convergence. This style was used to great effect during the Peloponnesian War where the Athenians defeated the invading Spartans by barely contesting the land domain and achieving supremacy in the naval domain. Following Pericles' strategy, the Athenians avoided unfavorable ground combat with superior Spartan infantry and relied on strong fortifications to hold key terrain. The Athenians then used their naval superiority to maneuver their forces to favorable ground, encouraging the Spartans to accept combat on ground that favored the Greeks.[109] As historian Thomas Martin points out,

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[107] Mark Strauss, "Ten Inventions That Inadvertently Transformed Warfare," September 18, 2010, accessed March 22, 2018, https://www.smithsonianmag.com/history/ten-inventions-that-inadvertently-transformed-warfare-62212258/.

[108] Mark Cartwright, "Ancient Greek Warfare," *Ancient History Encyclopedia,* May 17, 2013, accessed March 22, 2018, https://www.ancient.eu/Egyptian_Warfare/.

[109] Thomas R. Martin, "Athenian strategy in the Peloponnesian War," *An Overview of Classical Greek History from Mycenae to Alexander,* 1996, accessed March 22, 2018, http://www.perseus.tufts.edu/

Like aircraft in modern warfare before the invention of radar warning systems, Athenian warships could swoop down unexpectedly on their enemies before they could prepare to defend themselves. This two-pronged strategy, which Pericles devised for Athens, was therefore simple: avoid set battles with the Spartan infantry even if it ravaged Athenian territory but attack Spartan territory from the sea. In the end, he predicted, the superior resources of Athens in money and men would enable it to win a war of attrition.[110]

This use of two different domains serves as an example of convergence. The Athenians formed a naval blockade around the island of Sphacteria, creating a window of opportunity for Athenian ground forces to defeat the Spartan garrison on the ground.[111] This event shows how two domains practicing convergence can create the window of advantage needed to make an operation successful. The naval blockade of Sphacteria illustrates how one domain contesting a position of relative advantage can set the conditions or create a window of advantage in another. The strategy was so effective that after Spartan losses at Sphacteria and Laconia, the Spartans attempted to negotiate for peace.[112]

The Colonial Era

Historians often give Swedish King Gustavus Adolphus credit for being the first to integrate infantry, cavalry, and artillery into an effective fighting force in the early 17th century.[113] As technology evolved and created new ways of fighting, operational artists adjusted their integration of these new arms into their campaigns. This section examines the effects of these innovations during the American Revolution.

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[110] Martin, "Athenian strategy in the Peloponnesian War."

[111] Thucydides, *The Landmark Thucydides*, ed. Robert B. Strassler (New York: Free Press, 1996), 244.

[112] Ibid., 244.

[113] Gunther E. Rothenberg, "Maurice of Nassau, Gustavus Adolphus, Raimondo Montecuccoli, and the 'Military Revolution' of the Seventeenth Century," in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed. Peter Paret (Princeton, NJ: Princeton University Press, 1986), 48.

By the time the American Revolution began, Adolphus' combined arms innovations were ingrained into European style militaries. The British used a mix of infantry, artillery, and cavalry units equipped with the innovations of the day.[114] Similarly, the Americans heavily integrated infantry and artillery, while using cavalry to gather intelligence.[115] What makes this conflict stand out in the study of MDB in history is the integration of waterborne arms into operations by both the American rebels and the British.

From the beginning of the New York campaign, the British used the maritime domain to control positions of relative advantage to enable maneuver. On July 1, 1776, British vessels moved close to the low coast of Long Island and started preparations for landing. This caused the Americans to move from New York to Brooklyn in response. The British took advantage of the opportunity to attack American forces while out of position by sailing to Staten Island on the opposite side of the Hudson and conducting an unopposed amphibious landing.[116] The speed of the British vessels allowed them to outmaneuver the Americans as they repositioned on foot. The British continued to use their mobility to harass American forces in multiple locations around New York. On July 12, 1776, two British vessels, the *Phoenix* and the *Rose,* navigated up the Hudson River and back, bypassing Washington's coastal defenses.[117] The British understood the significance of this as revealed by an account from a member of Admiral Howe's staff in which he described how British ships could sail uncontested and use the maritime domain to cut American supply lines.[118] These constant tactical actions over a wide geographic area forced the Americans to spread their defenses thin. On August 22, the British used their naval arm to

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[114] David H. Fischer, *Washington's Crossing* (New York: Oxford University Press, 2004), 35-38.

[115] Ibid.*,* 374, 279.

[116] Ibid.*,* 32.

[117] Bruce Bliven, *Battle for Manhattan* (New York: Henry Holt and Company, 1956), 14-15.

[118] John J. Gallagher, *The Battle of Brooklyn 1776* (New York: Sarpedon, 1995), 63.

concentrate their forces on thinly spread out American troops on Long Island. British warships opened fire on American beach positions, while infantry loaded their landing barges. The retreat of a thin screen of American pickets allowed the British barges to land ashore nearly uncontested.[119] Like Pericles' use of Athenian naval strength, the combined use of naval and ground arms allowed the British to outmaneuver the Americans for the rest of the siege of New York. Here one can see a convergence of naval and amphibious forces by the British.

In the same vein, the Americans controlled the waters of the Delaware with the Pennsylvania Navy, a flotilla of thirteen riverine vessels, each with a large cannon that could outrange any other weapon in the Delaware valley. Washington used his waterborne arm to move across the Delaware, while at the same time denying the British the ability to do so.[120] The riverine fleet denied freedom of movement to the British as is seen when it repelled the *Roebuck* and the *Liverpool.*[121] In addition, the small fleet's firepower made it difficult for British forces to garrison near the river.[122] Denying the British these advantageous positions would later give Washington the window of advantage he needed to complete his crossing of the Delaware. In this instance, the Pennsylvania Navy helped to conduct amphibious operations by carrying Washington's Army and providing marines.[123] In both cases, converging naval actions with ground actions in the overall operational plan allowed each commander to maneuver his forces and provided each general the advantage they needed for success.

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[119] Fischer, *Washington's Crossing,* 90.

[120] Ibid.*,* 135.

[121] Barr Ferree, *Pennsylvania: A Primer* (New York: Leonard Scott Publication Company, 1904), 189.

[122] Fischer, *Washington's Crossing,* 188.

[123] Ibid.*,* 189.

World War II

World War II continued the evolution of combined arms in operational art by refining the technological innovations first seen in World War I. In this conflict, combatants combined air, land, sea, and even the electromagnetic spectrum in operations. On the ground, all sides integrated armored vehicles into their formations. The Germans learned in Poland the importance of integrating armor with infantry for protection, anti-tank guns to ward off enemy tanks, artillery to soften enemy positions, engineers to clear obstacles, and supply columns to provide sustainment.[124] Allied officers soon understood how German cooperation between armored divisions and dive-bombers quickly won the early campaigns of the war for Germany.[125]

In the battle for Guadalcanal, not only did American forces integrate land, sea, air, and the electromagnetic spectrum, but they also developed key C2 structures.[126] These innovations meet all three parts of House's definition of combined arms. World War II commanders learned to cope with the complexity of modern operational art by integrating the different arms' tactical actions across space and time to conduct effective battles and campaigns.

Guadalcanal is not only a good example of the use of convergence, but also of positions of relative advantage and windows of advantage. The Guadalcanal campaign was part of a larger plan for US forces to deny the Japanese what could be positions of relative advantage, and gain windows of advantage. As historians note,

> The Allied plan to attack the Japanese positions in the southern Solomons was conceived by US Admiral Ernest King, Commander in Chief, United States Fleet. He proposed the offensive to deny the use of the southern Solomon Islands by the Japanese as bases to threaten the supply routes between the US and Australia, and to use them as starting

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[124] Matthew Cooper, *The German Army, 1933-1945: Its Political and Military Failure* (Lanham, MD: Scarborough House, 1990), 209.

[125] Ibid.*,* 218.

[126] Thomas C. Linn, "Joint Operations: The Marine Perspective," *Joint Force Quarterly* (Winter 1995-96): 16-17, accessed March 22, 2018, http://www.dtic.mil/dtic/tr/fulltext/u2/a525683.pdf.

points for a campaign with the goal of isolating the major Japanese base at Rabaul while also supporting the Allied New Guinea campaign under Douglas MacArthur.[127]

Here Guadalcanal served as a position of relative advantage for the Japanese because they could use it to deny supply routes between the United States and Australia. On the other hand, capturing this position would create a window of advantage for US forces to conduct follow on operations on Rabaul. The airfield on Guadalcanal would give whoever held it an advantage in the air domain, which leaders could converge with ground and naval efforts to gain advantages in other domains.

Another example of the principles at work during World War II is the Japanese capture of Singapore. During this campaign British ground forces occupied Singapore and the Malay Peninsula, but lacked adequate naval support.

> Only two vessels had arrived by October 1941, the relatively new battleship HMS Prince of Wales and the ageing battle cruiser HMS Repulse. It had been intended they would be accompanied by an aircraft carrier but this vessel ran aground in the West Indies leaving the ships devoid of air cover and thus extremely vulnerable - both were sunk on 10 December 1941.[128]

In this situation, Britain's lack of air cover gave the Japanese a window advantage in the air domain. The Japanese used this advantage to converge naval and air power on the two British vessels and achieve dominance in the maritime domain. This turned the maritime domain into a position of relative advantage for the Japanese and created the window of advantage they needed to capture Singapore. Like the British attack on New York during the American Revolution, the Japanese used their freedom of maneuver in the maritime domain to concentrate their forces on the northern side of the island, and bypass British defenses that were scattered across the whole

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[127] New World Encyclopedia, "Battle of Guadalcanal," *New World Encyclopedia,* May 17, 2016, accessed March 23, 2018, http://www.newworldencyclopedia.org/p/index.php?title=Battle_of_Guadalcanal&oldid=995994.

[128] Australian War Memorial, "Battle for Singapore," 2018, accessed March 23, 2018, https://www.awm.gov.au/collection/E221.

perimeter of Singapore. The defenders were too spread out to hold, and through a massing of

Japanese forces, and uncontested aerial attacks, the Japanese pushed British forces into the center

of the islands where they were defeated.[129]

Desert Storm

In Desert Storm the principles behind MDB were once again tested when American-led

coalition forces swiftly defeated Saddam Hussein's Iraq. In this conflict, coalition forces put into

practice the yet untested doctrine of AirLand Battle. This doctrine as discussed before has

elements of convergence, positions of relative advantage, and windows of advantage.

The doctrine calls for friendly forces at the operational level to "throw the enemy off

balance with a powerful blow from an unexpected direction, follow up rapidly to prevent his

recovery and continue operations aggressively to achieve the higher commander's goals."[130] US

forces created this doctrine to take advantage of new aircraft innovations that allowed them to use

convergence to attack deeper and more rapidly to create a "powerful blow" that knocks the

enemy off balance. To do this during the conflict "coalition airpower delivered ton after ton of

firepower on tactical, operational, and strategic targets, day after day for over 40 days."[131] These

attacks isolated and dislocated the Iraqi army in the close battle area in Kuwait and Eastern Iraq,

and allowed US ground forces to defeat the Iraqi army without having to take additional

casualties. By bombarding key targets, destroying the bridges over the Euphrates, and

neutralizing all enemy air defense, Iraqi forces were in a position that was vulnerable to a mass

assault.[132] US forces exploited the window of advantage this created by attacking on land. The

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[129] Australian War Memorial, "Battle for Singapore."

[130] Richard M. Swain, *"Lucky War" Third Army in Desert Storm* (Fort Leavenworth, KS: US Army Command and General Staff College Press, 1994), 73.

[131] Mann, *Thunder and Lightning*, 121.

[132] Swain, *Lucky War,* 225.

ground attack that followed was so effective that it was described by historian Richard Swain as "the relentless movement of the drill bit through the coal face."[133] Thirty-eight days of carefully planned deep attacks resulted in resolution of an expected three-week ground offensive in just four days.[134] Desert Storm shows all three principles of MDB through its use of positions of relative advantage to achieve the convergence needed to create windows of advantage,

Conclusion

While current doctrine does not go beyond the conceptual level in explaining the principles of MDB, examining the principles of convergence, windows of advantage, and positions of relative advantage through the lens of history, theory and doctrine shows that MDB is a relevant and robust doctrine with principles that have been tested throughout history. MDB was created to counter the proliferation of enemy anti-access and area denial systems.[135] These systems both deny the joint force access, and create positions of relative advantage for US adversaries. These positions enable enemy maneuver while simultaneously denying maneuver opportunities for the joint force.

The principle of convergence reveals how military leaders can adapt new capabilities and doctrine to this new environment. Doctrines that properly utilize the principle of convergence follow a combined arms approach that arranges each respective arm and space and time to achieve the commander's goals. To achieve combined arms, military leaders must use different combat arms and weapons systems in concert to maximize the survival and combat effectiveness

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[133] Swain, *Lucky War,* 225.

[134] Mann, *Thunder and Lightning,* 122.

[135] McCoy, "The Road to Multi-Domain: An Origin Story."

of the force.[136] For example, the AEF used a mix of infantry and artillery to increase their operational effectiveness during World War I.[137]

Convergence is fully achieved when the different arms, like in MDB, are arranged across time and space (or domains) in a way that accomplishes the overall mission. *Arrangement* is the synchronization of multiple independent efforts to achieve a common goal. Continuing with the World War I example, prior to 1918 the infantry and artillery each had their own objectives, and maneuvered to meet each of them separately. It was the coordination of these objectives over space and time that allowed the AEF to overwhelm their opponents.[138] In MDB, different forces can operate and conduct fires over multiple domains. This means that different elements can converge their actions across multiple domains into one to achieve mass on their objective. An example of this would be a commander massing fires from air, land, and sea assets onto a single objective. Convergence can occur across multiple domains.

Convergence enables the massing of overwhelming effects against enemy weaknesses. This erodes enemy capability and creates windows of advantages for the joint force to exploit.[139] Properly exploiting windows of advantage also requires finding the right capability to employ once an opportunity is found. Napoleon was famous for using convergence to create windows of advantage. His artillery batteries would inflict massive casualties on key units, and then his infantry would charge into the weakened and demoralized formations. The intensity of the attacks would often force a rout, after which Napoleon's cavalry would then pursue the formation and

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[136] House, *Combined Arms Warfare*, 4-5.

[137] Stewart, *American Military History Volume II*, 47.

[138] Perkins, "Multi-Domain Battle: Joint Combined Arms Concept for the 21st Century."

[139] TRADOC, "Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040," 79.

eliminate the unit.[140] In using this tactic, Napoleon exploited the windows of advantage created by the strengths of one arm. He would then use other arms successively in a manner that suited their strengths. This concept can be extrapolated to MDB as different domains conducting operations on a single target. The actions in each domain degrade the target and make subsequent operations more likely to succeed. Each action sets the conditions for the next action to occur. One domain takes advantage of the windows of advantage created by another domain to either create new windows for other elements, capture positions of relative advantage, or achieve the strategic objective.

When all three principles are brought together, one can see the importance of not only recognizing the need to adapt to new technologies and environments, but also the need to ensure that new ideas are properly implemented. As US forces attempt to incorporate new technologies and ideas such as cyber operations, electromagnetic operations, and information campaigns, military leaders need to ensure that their adoption follows the three principles of MDB. It is not enough to acknowledge that these new developments need to be adopted. Military leaders must ensure that each of these new capabilities are given enough autonomy to fully realize their potential under the MDB concept, rather than merely aggregating them into current formations. These new domains and technologies must be able to pursue their own objectives, and these objectives must converge with the efforts of the rest of the joint force.

This leads to the question that was asked at the beginning of the monograph: If the principles of MDB are present throughout history, why do we need to change doctrine to adapt to it? In early 2017, Commander of United States Army Pacific General Robert B. Brown acknowledged that much of MDB is not entirely new, and can be found throughout history. What

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[140] Bonura, *Under the Shadow of Napoleon,* 30.

has changed is the ability of each service to dominate its respective domain.[141] The principles of MDB help the US military operate in this new environment with new threats and technologies. The principles adapt new technologies in domains such as cyber, and electronic warfare, along with the old domains in a way that achieves convergence and allows the joint force to exploit any synergies between them. Multi domain asks us to leverage new domains like cyber, not in support of the infantry, but as their own independent elements that can maneuver and concentrate their effects on enemy vulnerabilities.

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[141] Robert B. Brown, "The Indo-Asia Pacific and the Multi-Domain Battle Concept," *Military Review,* March 14, 2017, accessed March 8, 2018, www.armyupress.army.mil/Journals/Military-Review/Online-Exclusive/2017-Online-Exclusive-Articles/The-Indo-Asia-Pacific-and-the-Multi-Domain-Battle-Concept/.

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