



Soldiers with the 24th Composite Truck Company and Task Force Spartan work together to change tires on an M1000 Heavy Equipment Transporter semitrailer 24 December 2021 during Operation Provider Caravan in Saudi Arabia. The operation, conducted with elements of the armed forces of Saudi Arabia and Kuwait, exercised some of the logistics capabilities within the U.S. Central Command area of responsibility to ensure U.S. and partner forces have the resources and flexibility to deliver supplies and materiel wherever needed. (Photo by Sgt. 1st Class Mary S. Katzenberger, U.S. Army)

Sustaining Multidomain Operations

The Logistical Challenge Facing the Army's Operating Concept

Maj. Bryan J. Quinn, U.S. Army

Strategy, like politics, is said to be the art of the possible; but surely what is possible is determined not merely by numerical strengths, doctrine, intelligence, arms, and tactics, but, in the first place, by the hardest facts of all: those concerning requirements, supplies available and expected, organization and administration, transportation and arteries of communication.

—Martin Van Creveld, *Supplying War*

In 2014, Russia caught the United States and its European allies flat-footed when it invaded Ukraine's Donbas region and annexed Crimea. Using a combination of cyber, hybrid, and conventional warfare, Russia rapidly achieved its objectives before the United States and its NATO allies could react, underscoring a fundamental time and space challenge the United States faces in responding to any overseas conflict. Exacerbating this challenge is Russia's pursuit of antiaccess/area denial (A2/AD) capabilities consistent with a layered standoff strategy, which aims to challenge U.S. force projection and European theater access.¹ Meanwhile, in the Pacific, China is pursuing an antiaccess strategy similarly designed to exploit U.S. time and distance limitations and counter U.S. maritime and air advantages, calling into question U.S. ability to deny either adversary's objectives in future conflict.²

In response to this challenge, the U.S. Army developed the multidomain operations (MDO) concept to mitigate adversarial A2/AD approaches in competition and defeat this strategy in conflict.³ However, despite MDO's attempt to counter antiaccess strategies, the concept is limited by a sustainment architecture optimized for past conflicts in Afghanistan and Iraq and a dependence on emerging, unproven logistical capabilities to solve inherent logistical challenges. As a result, the United States' ability to achieve objectives in future conflict, consistent with MDO's theory of victory, may be at risk.

To resolve MDO's logistical shortfalls requires a more resilient and effective sustainment architecture capable of reliably sustaining ground forces in conflict within antiaccess environments. As a result, the Army must re-examine both the implementation and design of MDO's concept of support. First, the Army must reassess *how it sustains* ground forces in MDO to reduce risk and ensure

success in future conflict. Second, it must reconsider *how it organizes and equips* sustainment forces to better align MDO's concept of support with the character of future war. "More absorbing than the final outcome are the perfection of the tools and the mastery of the components and maneuvers that form part of the undertaking," Fred Iklé wrote in 1971 of the United States' conduct of the Vietnam War.⁴ In a similar way, MDO's narrow focus on the tactical and technical requirements required to defeat the antiaccess problem set comes at the expense of logical coherence and logistical feasibility, limiting its ability to enable success in future conflict. To better assess the Army's new operating concept first requires consideration of past military conceptual and technological advancements, subsequent responses, and a clear understanding of how MDO intends to address similar challenges today.

MDO's Historical Parallels

The fundamental problems facing U.S. force projection today, principally of access and freedom of action, are not new. Although its most recent A2/AD incarnation leverages a higher-tech mixture of weaponry including cyber, long-range precision fires, and integrated air defense systems, preventing or disrupting adversarial action has long been a goal in war. Exacerbating this age-old tension between offense and defense is the development of new or emerging technologies, which can disrupt the balance between firepower, mobility, and protection.⁵ In turn, this disparity can result in either military stalemate or one side obtaining an overwhelming advantage, prompting a rethinking or adaptation of operational concepts to account for new platforms, tactics, or changing operational environment.

Both the desire for each side to limit an opponent's freedom of action as well as the cyclical nature of firepower enhancement and the survival from that weaponry has played out on the battlefield for centuries.⁶ For instance, World War I's infamous deadlock between Entente and Central Powers resulted in the advancement of protection and mobility for

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ground forces that countered the immobility imposed by trench warfare and other defensive tactics that restricted offensive action.⁷ Similarly, during the interwar period, the same desire to circumvent enemy defenses drove the United States, Germany, and others to push the boundaries in the air domain, developing airborne capabilities, tactical aircraft, and strategic bombing campaign concepts.⁸ These advancements subsequently resulted in the advancement of the radar, anti-aircraft weapons, and other defensive capabilities, demonstrating the pendulum swing between offensive and defensive tactics and technology.⁹

Like their early twentieth-century land-force counterparts, the naval fleet also became paralyzed as a result of new offensive technologies including the torpedo and submarine. To regain freedom of action and break the maritime stalemate, Britain developed a concept to penetrate German coastal defenses known as the Baltic Project.¹⁰ In a close parallel to modern doctrinal solutions, Britain planned to seize key German coastal terrain through closely synchronized naval and amphibious operations in the face of a layered defense of coastal artillery, mines, and submarines; an early twentieth-century A2/AD equivalent.¹¹

Late in the Cold War, the United States and its NATO allies again found its freedom of action restricted due to Soviet numerical and battlefield geometry superiority. In response, the United States and its allies advanced a new concept known as deep attack.¹² Like its doctrinal predecessors, deep attack leaned on emerging technologies to counter Russian defensive advantages but retained the central tenets of its precursors; employing initial entry forces to gain the initiative but relying on large-scale, follow-on forces to ultimately achieve strategic objectives.¹³ Like previous technological and concept advancements, this strategy shift precipitated an imbalance between NATO and Soviet forces requiring Russian reaction.¹⁴ In turn, Russia responded by increasing its antiaccess capability that, precipitated by recent cyber and fires advancements, again demands U.S. offensive adaptation.¹⁵

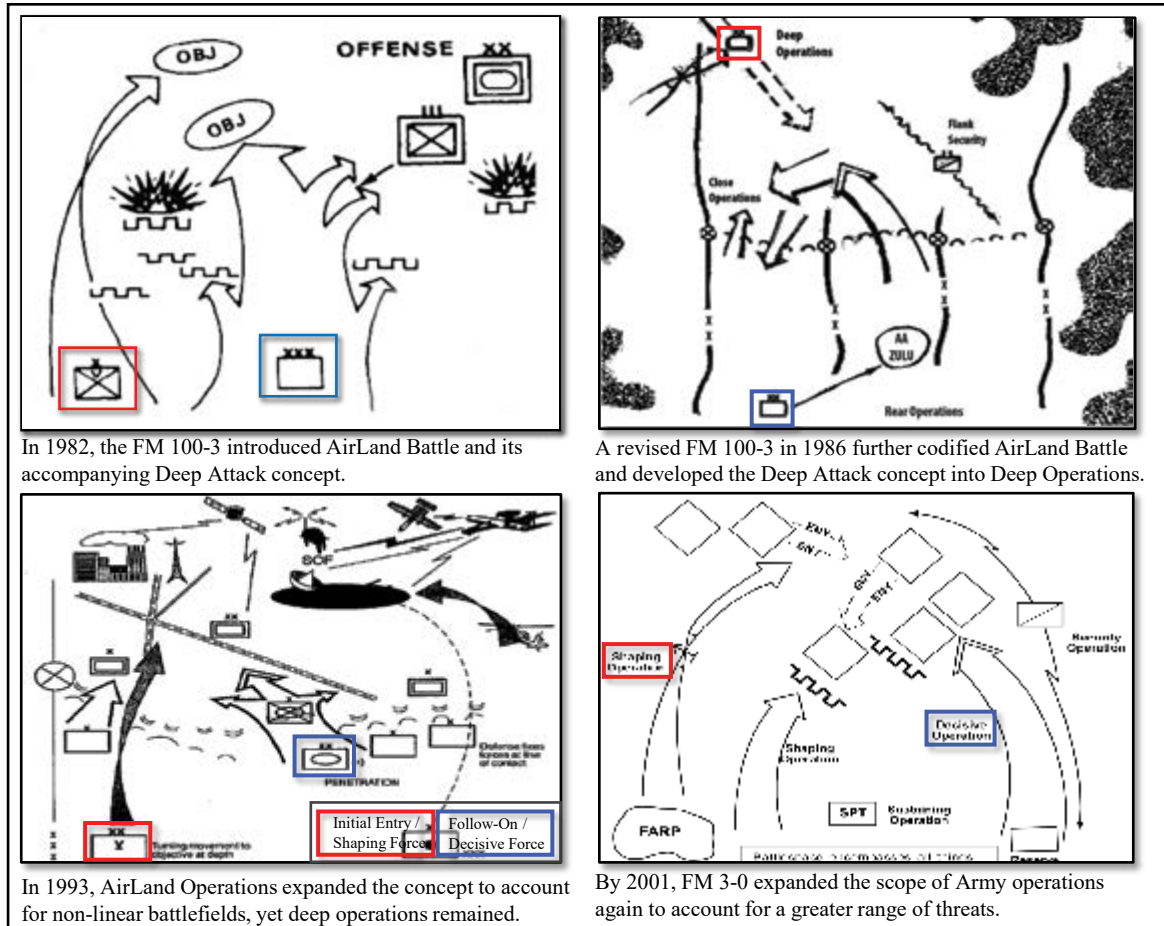
As each historical case demonstrates, the cycle of conceptual and technological innovation, driven by the pendulum swing between offensive and defensive tactics, is not unparalleled. While technology may alter conflict's character, its nature remains unchanged. As a result, past solutions can provide an invaluable

blueprint for future doctrinal and force design modifications. Regardless of the specific operational or technological challenges of any one evolutionary example, each adheres to a common thread of logic. For example, as demonstrated by figure 1 (on page 131), the United States historically employs expeditionary (initial entry) forces to enable larger, follow-on forces to secure lines of communication and exploit initial success for greater operational objectives.¹⁶ As ground forces today remain similarly restricted in scope, scale, and duration due to logistical limitations, their application should likewise remain consistent. Therefore, the solution to today's antiaccess challenge, while adapting to meet wars changing character, should follow a similar thread of logic as the physics of war, namely time and space, remains largely unchanged.

Sustaining MDO

Like its doctrinal predecessors, MDO seeks to leverage U.S. technological superiority through coordinated cross-domain forces to project power, enable operational reach, and defeat enemy defenses designed to limit U.S. freedom of maneuver.¹⁷ However, while previous concepts employed expeditionary forces as a means to achieve positional advantage or facilitate employment of conventional follow-on forces, expeditionary, or "inside" forces constitute MDO's main effort.¹⁸ Consistent with the MDO concept, once "inside forces" are inserted through a brief window of superiority, these forces undermine an opponent's A2/AD approach by simply operating within its antiaccess environment, thereby defeating an adversary's standoff strategy.¹⁹ While space, cyber, and other joint effects will be necessary in achieving brief superiority over A2/AD systems, this is only a means by which to insert initial ground forces. Notably absent from this theory of victory, however, is consideration of conventional ground-force formations, considered to be infeasible in future conflict consistent with the chief of staff of the Army's *Army Multi-Domain Transformation* white paper.²⁰ Yet, by excluding follow-on ground forces, not only does MDO diverge from historical precedent, but it also favors innovation and prioritizes technological capability over sustainment feasibility, calling into question the ability for MDO to succeed in conflict.

Despite its rebranding of initial entry forces, MDO's inside force remains subject to the same

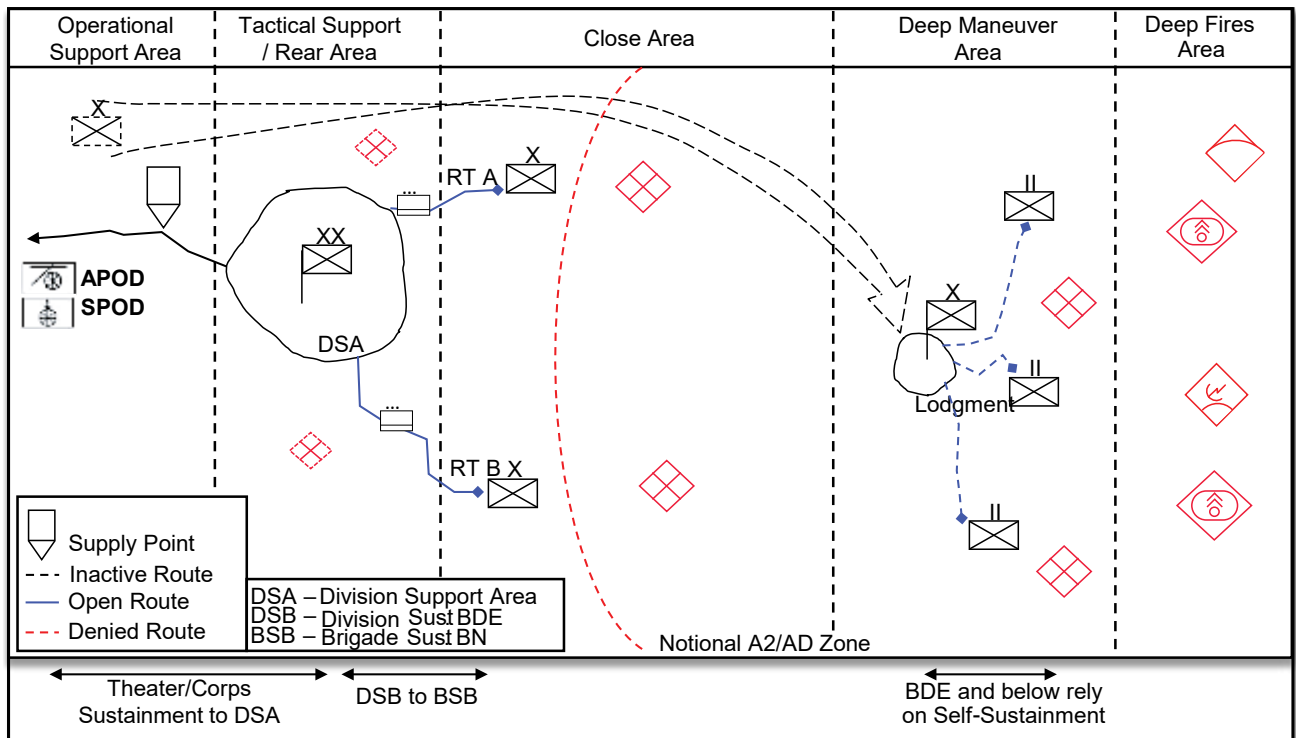


(Figures from Field Manual [FM] 100-5, *Operations* [1982, 1986, and 1993 versions]; and FM 3-0, *Operations* [2001])

Figure 1. Deep Attack 1982; Deep Operations 1986; Deep Operations 1993; Operational Framework in the Offense 2001

logistical and sustainment challenges and culmination risks as any other deep maneuver force. Comparatively, Britain ultimately abandoned its World War I plan to penetrate Germany’s coastal defenses, not because of the incredible risk of securing initial lodgment in the face of overwhelming defensive firepower, but because it could not feasibly hold or sustain forces following initial success.²¹ Without a credible concept of support, British leadership could not logically link initial operational success to larger military objectives in Europe. MDO faces a similar challenge today. Absent follow-on forces, MDO lacks the ability to secure lines of communication, and, as a result, the feasibility of expanding initial lodgment or exploiting success without a resilient connection to the support area remains in doubt.

To address the challenge of sustaining ground forces in the deep maneuver area without reliable air or ground lines of communication, the Army’s Training and Doctrine Command and Army Futures Command developed MDO’s functional concept for sustainment, depicted in figure 2 (on page 132). This supporting concept is clear on its solution to MDO’s sustainment challenge, principally by employing “precision logistics” that provide a “layered, agile, and responsive sustainment capability necessary to support operations.”²² This capability is subsequently enabled by a “predictive decision support system,” a “real-time common operating picture,” and “demand reduction” across the force to “lessen delivery requirements by 50%.”²³ In short, to solve MDO’s logistical challenges, the sustainment warfighting function aims



(Figure by author)

Figure 2. Current MDO Brigade Combat Team Self-Sustainment Model

to reduce demand by minimizing uncertainty, an elusive and ambitious goal in warfare as well as commercial logistics throughout history. However, while these aspirational capabilities may drive sustainment toward a more efficient solution, the future operating environment and adversarial threat requires a sustainment architecture that prioritizes effectiveness and resiliency over efficiency.

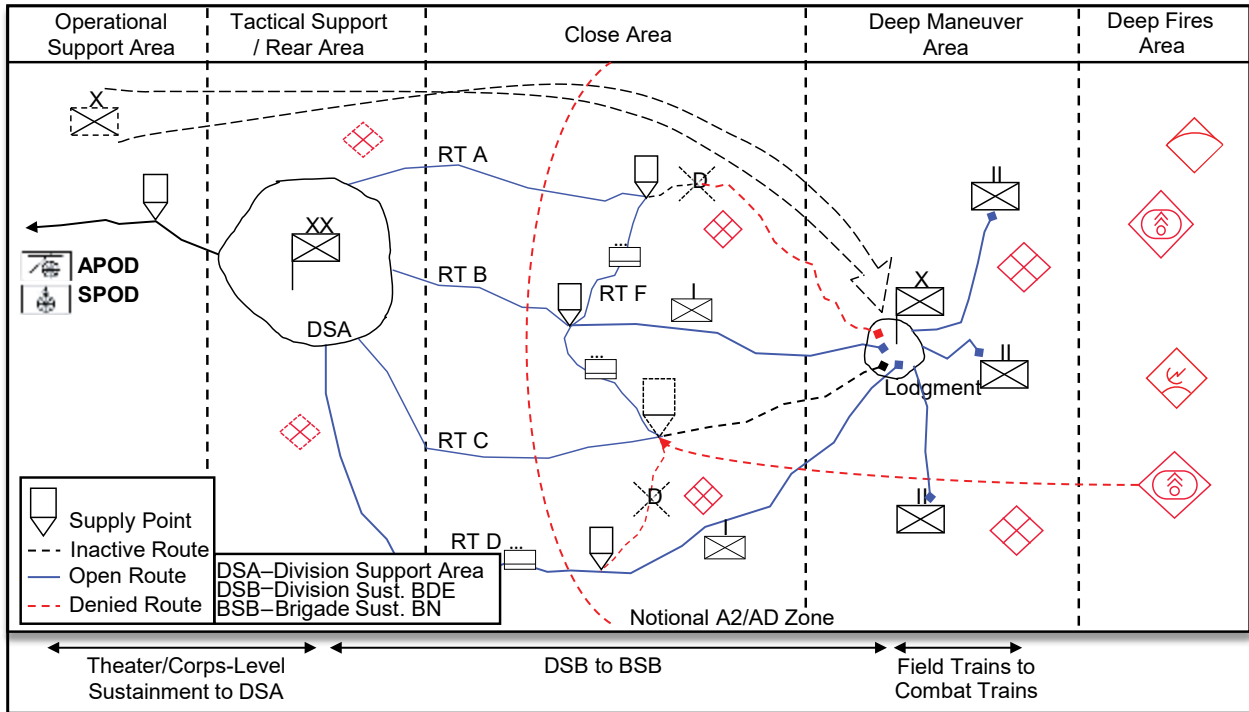
Across other warfighting functions, supporting concepts similarly envision the sustainment of “cross-domain maneuver [through] reduced logistic demands, organic power generation, autonomous resupply, and additive manufacturing.”²⁴ However, none of these solutions are proven at scale, and technology alone is not a strategy. While the ability of combat units to self-sustain is an ambitious long-term goal, relying on the scalability and reliability of unproven emerging technologies is equivalent to wishing the problem away. For the foreseeable future, combat units will continue to be sustained the way they have always been, through the physical movement of large amounts of supplies primarily along ground lines. Without solving the challenge of credibly sustaining operations into denied,

hostile territory, U.S. forces cannot begin to challenge an adversary’s A2/AD network, fundamental to MDO’s theory of victory.

Sustainment Reassessment

Ultimately, without a feasible concept of support, MDO remains limited in its ability to deter adversaries in competition and enable combat forces in conflict. As a result, MDO must resolve two central challenges. First, an overreliance on unproven technology to solve sustainment challenges places the sustainment of MDO forces in doubt. Second, a dependence on a legacy distribution network designed to support previous counterinsurgency and counterterrorism missions is ill-equipped for the future fight. To address these challenges, MDO’s concept of support requires greater effectiveness, driving requirements for a more resilient and redundant sustainment network, and a sustainment organization better postured to enable success in line with the expected character of war.

Operations can be sustained in one of two ways; either through self-sustainment or over a line of communication.²⁵ While MDO currently relies on the former,



(Figure by author)

Figure 3. Proposed MDO Concept of Support and Theater Framework

this method can only sustain combat operations for as long as a unit’s basic load allows, usually no more than a few days before culmination.²⁶ Although captured sustenance, foraging, and technological advancements may extend endurance, limitations of many classes of supply as well as maintenance of proposed advanced capabilities ultimately limit how long a unit can operate independently. Moreover, enemy antiaccess weapons preclude large-scale aerial resupply commonly relied on in previous conflicts. As a result, MDO’s deep maneuver forces must sustain across ground lines extending from the rear area to the deep maneuver area. Without this linkage, expeditionary forces are isolated and place at risk the ability to achieve strategic objectives.

Consistent with the future operational environment, MDO’s concept of support must provide a more resilient and redundant sustainment architecture. To achieve this resiliency, supply lines must be shortened through additional sustainment nodes and the number of lines must be increased to allow for dynamic redirection and prevent disruption. Future formations can no longer rely on a handful of large main supply routes to link combat forces to the support area. Just as recent

global supply chain disruptions led to a reassessment of the balance between effectiveness and efficiency, threats within the operational environment must drive that same balance for logistics in future conflict.

To solve logistical challenges, MDO’s concept of support borrows heavily from recent commercial and private sector trends, relying on supply chain innovation and efficiency enabled by emerging technologies. However, fueled partially by massive global disruptions over the past year, it excludes other more recent and applicable developments. For example, commercial vendors have recently shifted from a reliance on large regional fulfillment centers, popularized by Amazon and others, to a last-mile delivery strategy.²⁷ This approach results in a proliferation of smaller logistics nodes to link the vendor and its supply chain to the consumer.²⁸ By redirecting efforts toward smaller terminals and delivery stations that store limited high-demand supplies and dispatch them directly to the consumer, vendors reduce both delivery time and supply chain disruption.²⁹

Likewise, to ensure the sustainment of dispersed inside forces, a similar approach can be applied to

in future conflict to reduce the risk of large supply nodes and ground-line disruptions. By expanding the number of sustainment nodes and supply lines from the rear support area to the deep area, MDO can

thereby increasing the redundancy and resiliency of MDO's sustainment architecture. As a result, MDO's sustainment solution may already exist, requiring small modification to existing concepts developed

“As a result of two decades of conflict in Iraq and Afghanistan, the Army incrementally reduced its sustainment force structure, favoring efficiency at the expense of effectiveness.”

ensure a more resilient and responsive connection between ground forces and the sustainment network, represented in figure 3 (on page 133). This approach enables sustainment flexibility by shortening the length of ground lines of communication, accelerating sustainment responsiveness, and by allowing routes and nodes to dynamically open and close as they are disrupted or denied, thereby increasing the sustainment architecture's resiliency and redundancy. While dispersing formations along multiple routes may result in less efficiency, greater effectiveness can increase resilience and reduce risk resulting in a more robust sustainment network.

Consistent with the cyclical nature of military advancement, the concept of supporting expeditionary forces through additional, intermediary sustainment nodes already exists in both Army and joint doctrine. The intermediate staging base (ISB) is a logistics node central to sustaining joint forcible entry operations by providing a “temporary location used for staging forces, sustainment, and/or extraction into and out of an operational area.”³⁰ Critical for sustaining inside forces, this sustainment node increases points of entry and ensures sustainment capacity is kept directly out of the area of operations but close enough for immediate support, thereby increasing redundancy and reducing risk to sustainment forces.³¹ Even current doctrine acknowledges the importance of intermediary logistical nodes, stating that the ability to “maintain continued pressure in the face of [A2/AD] is reduced significantly” without the ISB.³² Likewise, integrating an ISB-like capability into MDO's concept of support can similarly enable the persistent sustainment of ground forces from the tactical support area,

over decades versus the current attempt to revolutionize military sustainment.

Second, to sustain MDO forces, the Army must reassess how sustainment units are organized and equipped to better match the expected character of war. As a result of two decades of conflict in Iraq and Afghanistan, the Army incrementally reduced its sustainment force structure, favoring efficiency at the expense of effectiveness.³³ As a result, the structure of organic tactical-level, as well as separate, task-organized sustainment units are the result of an organizational evolution in response to counterinsurgency and contingency operations. A conflict where the United States maintained a sizable advantage against its adversary relied heavily on contracted support down to the tactical level and operated from static locations. Yet, the character of the war must determine the logistics response.³⁴ Therefore, as the operational environment and adversarial threat shifts, Army senior leaders must also reassess its current sustainment force structure to optimize for MDO and the future threat environment.

Outside of MDO's current force structure changes, limited to the multidomain task force and subsequent intel, cyber, electronic warfare, and space units, the Army largely intends to fight the next war with the force it built for the last one. That is, most requirements identified within the MDO concept are modernization, innovation, and technologically based capabilities intended to amplify current capabilities and old tactics. Yet, the force structure across warfighting functions, including sustainment, is largely unchanged from the modular brigade combat team (BCT)-centric structure developed over the past twenty years. Retired



Soldiers from the 230th Sustainment Brigade work together to organize critical supplies required to support all Tennessee Guardsmen in Fort Hood, Texas, as they conduct an eXportable Combat Training Capability exercise 19 July 2021. (Photo by Pfc. Everett Babbitt, U.S. Army)

Brig. Gen. Huba Wass de Czege notes as much in his 2018 response to Gen. David Perkins, then commanding general of the U.S. Army Training and Doctrine Command, on MDO's credibility, arguing that the concept focused too narrowly on technological shortfalls of current Army structure and failed to question its suitability in a different context.³⁵ Consequently, the Army must rebalance its sustainment architecture to favor the effectiveness required of MDO over the efficiencies of previous conflicts.

For example, a standard BCT's brigade support battalion facilitates supply distributions from the brigade to its battalions. Yet, this organization maintains only a single distribution company and a single transportation platoon to complete the sustainment mission.³⁶ Likewise, an Army division's organic sustainment, responsible for sustaining subordinate brigades from the division support area through the close area and into the deep maneuver area, is made up of a single division support brigade. Within that organization, a single division service and support battalion and truck company

maintain sole responsibility for division sustainment.³⁷ Consequently, neither the BCT nor the division is currently equipped with the appropriate sustainment architecture to sustain a future large-scale or MDO envisioned fight.

Likewise, to support MDO's dispersed and independent operating concept, tactical-level support units, including forward support companies and brigade support battalions, must also be equipped to operate in a more distributed environment. Future sustainment operations will require hardened communications, robust maneuver support capability, air defense, and other protection capabilities to operate across deep maneuver and support areas. Therefore, MDO must also emphasize greater organic protection to harden the sustainment structure against enemy disruption. While protection assets can be task-organized to sustainment units, MDO's sustainment architecture must bias toward a purpose-built solution consistent with the expected threat and operating environment. As a result, integrating these platforms



Soldiers of the 3rd U.S. Infantry Regiment participate in a Joint Tactical Aerial Resupply Vehicle (JTARV) exercise on Fort A. P. Hill, Virginia, 22 September 2017. During the exercise, the JTARV demonstrated its potential for soldiers on the battlefield to execute autonomous resupply. However, the JTARV is significantly restricted by range, capacity, and signature. (Photo by Pvt. Gabriel Silva, U.S. Army)

more closely with support units from a conceptual level can increase effectiveness over ad hoc, task-organized units in a future environment demanding greater synchronization and integration.

Ultimately, an increase in sustainment redundancy and resiliency to create a more robust distribution network in support of MDO and the future fight comes at a cost. As adversarial A2/AD approaches force longer, more at-risk lines of communication requiring greater logistical redundancy, sustainment formations in turn demand more equipment, resulting in greater maintenance, sustainment, and manpower costs. Simply, MDO and the future operating environment demand an increase in the ratio between combat, support, and protection assets. Even Army Futures Command recognizes this dilemma, stating that “without significant technological advancement and a reduction in demand, BCT requirements will result in a significant reinvestment in sustainment force structure and capacity.”³⁸ In line with this concession, to enable a more effective and resilient

sustainment architecture, the Army must optimize sustainment forces to operate independently and distributed consistent with the expected environment.

Concluding Remarks

Following the 2022 release of Field Manual 3-0, *Operations*, MDO replaced unified land operations as the Army’s operating concept. By elevating MDO into doctrine, the Army has ensured that the concept will drive programs, force structure, force design, and doctrine for the foreseeable future. However, before the tenets of MDO can be implemented and its ambitions fully realized, the Army must reassess how it organizes logistics units to best sustain maneuver forces in future conflict. By emphasizing technological means over policy ends, unlinked to a clear idea of how to sustain ground forces or achieve greater strategic objectives, MDO’s inside forces become an end in of themselves, and gaining access, strategy.

As in past conflicts, technology will play a significant role in defining the character of the next one and

shape how units are employed in battle. For MDO, technologies that reduce unit signature or speed transition toward greater autonomy while reducing demand can mitigate risk and ease sustainment challenges. However, while technological solutions may present some opportunities to alleviate sustainment and logistical challenges, technology alone cannot substitute for strategy. Likewise, reliance on the technological overmatch of expeditionary forces and the promise of future technology alone risks failure. As a result, how much emerging technology can offset sustainment requirements in future conflict remains in question.

If the point of strategy is to cast a shadow on the enemy's decision-making and strategic calculus, then any operating concept must create doubt in the

adversary's mind through a logical and credible theory of victory that calls into question the enemy's object.³⁹ Yet, without a realistic appreciation of the logistical requirement necessary to conduct operations in line with its new operating concept, the Army's solution to its time and distance problem is incomplete. To correct this deficiency, senior leaders must increase the resiliency and redundancy of MDO's sustainment architecture by reexamining *how to sustain* expeditionary forces and *how to organize and equip* sustainment units consistent with the character of future war. Failure to address these flaws and acknowledge the inseparable nature of tactics and logistics may ultimately result in the inability of U.S. ground forces to achieve their purpose in future conflict.⁴⁰ ■

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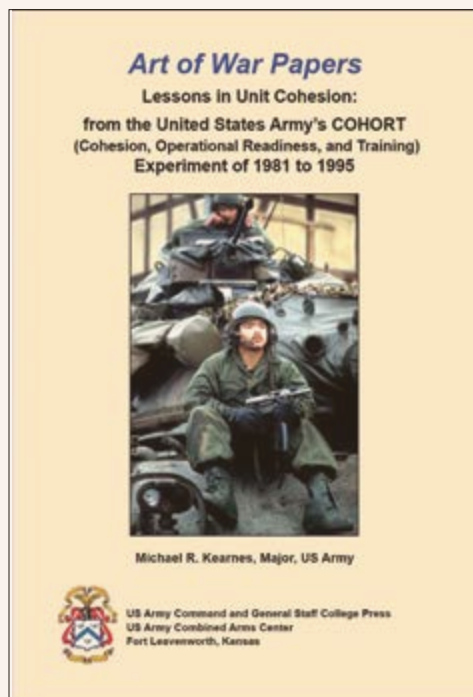
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Lessons in Unit Cohesion:

From the United States Army's COHORT (Cohesion, Operational Readiness, and Training) Experiment of 1981 to 1995

Maj. Michael R. Kearnes, U.S. Army

In 1981, the U.S. Army experimented with its personnel management philosophy to examine the benefits of a unit-based system over an individual system. In this Art of War series contribution, Maj. Michael R. Kearnes examines the historical background of personnel management from World War II to the Vietnam War, leading up to the COHORT experiment of the 1980s and 1990s. COHORT aimed to build cohesion via stability at the company and battalion levels on a three-year life cycle. Kearnes concludes that personnel stability is a prerequisite to cohesion and unit effectiveness, and that the personnel system ought to focus on building unit cohesion through personnel stability and account for individual concerns when possible in both peace and war.

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