

Military Review

THE PROFESSIONAL JOURNAL OF THE U.S. ARMY

January-February 2025



<https://www.armyupress.army.mil>

PB-100-25-01/02

Headquarters, Department of the Army

Approved for public release

Distribution is unlimited—Distribution A

AN ARMY UNIVERSITY PRESS PUBLICATION

Military Review

January-February 2025

PIN: 219607-000

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January-February 2025, Vol. 105, No. 1

Professional Bulletin 100-25-01/02

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Military Review (US ISSN 0026-4148) (USPS 123-830) is published bimonthly by the Department of the Army, Army University Press, Fort Leavenworth, KS 66027-1293. Periodical postage paid at Leavenworth, KS, and additional mailing offices.

Yearly paid subscriptions are for \$42 US/APO/FPO and \$58.80 for foreign addresses and are available through the U.S. Government Publishing Office (GPO) at <https://bookstore.gpo.gov/products/military-review-professional-journal-united-states-army>.

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The Secretary of the Army has determined that the publication of this periodical is necessary in the transaction of the public business as required by law of the department. Funds for printing this publication were approved by the Secretary of the Army in accordance with the provisions of Army Regulation 25-30.

By Order of the Secretary of the Army:

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General, United States Army

Chief of Staff

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to the Secretary of the Army

2434803



Officers assigned to 2nd Brigade Combat Team, 10th Mountain Division, execute leadership professional development at an alpine training event hosted by the 2nd Battalion, 14th Infantry Regiment, honing their skills under extreme weather conditions on Fort Drum, New York, 4–5 December 2024. This training not only enhances the brigade's warfighting capability in extreme weather conditions but also elevates the division's ability to fight anywhere no matter the environment. (Photo by Maj. Geoffrey Carmichael, 10th Mountain Division)



Parting Shots

A Farewell to Arms

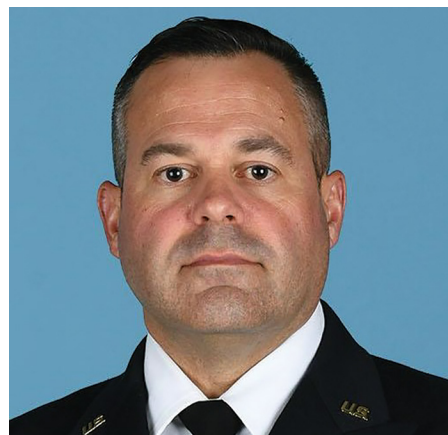
Col. Todd Schmidt, PhD, U.S. Army

It has been one of the great honors of my career to serve the U.S. Army and the Combined Arms Center at Fort Leavenworth, Kansas, as the director of Army University Press (AUP) for the past three years. The team of professionals who make up this organization are exceptionally talented and incredibly dedicated to our mission of supporting professional military education and our shared vision as the premier military service press in the Department of Defense. In an often underappreciated or underrecognized mission, the team at AUP works hard every day to support and augment the education our military professionals receive at every step of their careers.

At the risk of using personal pronouns and admitting personal bias, I came into this position determined to reinvigorate professional military writing. I had an axe to grind, as we sometimes say. I was disappointed by the lack of priority leaders placed on professional development, education, writing, and discourse. However, I quickly found that I was not alone in recognizing this issue as an institutional and cultural challenge. Many Army professionals believed that too often, we let the popular buzz of new concepts and ideas undermine the importance of basic fundamentals.

The launch of the Harding Project and Gen. Randy George's initiative to modernize military journals could not have been timelier. Over the past twelve months, AUP has been the center of gravity for bringing the Army's branch journals onto a modern online platform, Line of Departure.¹ Leaders can now access all the Army's branch journals from one easy-to-use website.

We have spent exceptional time and resources working with all our branch journal staffs, training and developing our editing teams to publish under a new paradigm. Providing up-to-date, fresh content on a daily and weekly basis that is



Col. Todd Schmidt, PhD, U.S. Army
Director, Army University Press

available online and in audio is the new bar for how we share, publish, and engage in professional military discourse. The era of periodically produced branch journal editions that are not optimized for the internet, research, and artificial intelligence is over.

The publication of several *Military Review* special issues was a leadership objective that we pursued to provide current, in-depth content and analysis on salient topics that included space and missile defense, irregular warfare, and professional military writing. We also produced an issue dedicated exclusively to war poetry. In other issues, we featured special sections highlighting artificial intelligence, commemoration of the eightieth anniversary of D-Day, observance of the seventy-fifth anniversary of the NATO alliance and its evolution over the years, civil-military relations, Afghanistan and the Global War on Terrorism, China, the 10th Mountain Division, and the 11th Airborne Division. In 2025, our readership can expect more special issues such as themed edition pertaining to challenges facing the Army professional military education

system, as well as sections dedicated to the 250th anniversary of the U.S. Army, activities of other U.S. Army divisions, and other relevant topics.

The establishment of the MG Edwin “Forrest” Harding Fellowship and the LTG (Ret) James M. Dubik Writing Fellows Program were pinnacle achievements for AUP in 2024.² The Harding Fellowship

scholars seeking to understand the Russia-Ukraine war and how history may inform the outcome. Our forthcoming book, *Siren Songs*, is also expected to garner attention as it addresses past military failures and the dangers of interwar escapism. Our films team’s work on *The Soldier and the Constitution* received exceptional praise and circulation across all military services as it

“ The PEOPLE I have met, the ORGANIZATIONS with which I have served, the PLACES I have traveled, and the MISSION to which I have been a part have blessed me with a phenomenal career, lifelong friends, and, most importantly, the experience of serving the United States of America, the country I love. ”

was established as an official U.S. Army broadening opportunity by Gen. George that will send a cohort of officers to the University of Kansas each year to earn a master’s degree in journalism and mass communications. Upon graduation, Harding Fellows will serve on the editorial staffs of their branch journals, driving change, modernization, and the publication of current, online content. The prestigious, nonresident Dubik Fellowship program selects a more distinguished, senior cohort of established scholars and writers who come from across the spectrum of national security and defense professionals and publish across a number of professional journals and publications. The leadership at AUP was critical to the development and implementation of both fellowships.

While AUP was pursuing new initiatives, our cornerstone mission remained on track. Our books, research, flagship journals, films, staff rides, and multimedia teams kept pace and continuously searched for ways to advance, address customer needs and demands, and improve user experience. The last three years, for example, have seen a marked expansion and improvement in the types of films produced, the quality of books and research conducted, engagement with audiences across all ranks and services, and the new staff rides we have introduced—all of which directly address the Army’s current concerns.

Our books—*Armies in Retreat*, among others—have received exceptional attention from readers and

provided additional resources related to helping service members understand their duties and responsibilities as citizen-soldiers during times of political partisanship and elections. The Combat Studies Institute is currently working on several new staff ride offerings for the military with particular excitement building around a virtual staff ride that features a key engagement in the Russian invasion of Ukraine. Finally, our NCO Journal team was recognized by the secretary of the Army for their groundbreaking work to improve publications, readership, and interest across the force.

From a personal perspective, the underlying motivation for me to promote a renaissance in professional military writing is to counter continued challenges of anti-intellectualism that still infect our leadership ranks. Addressing this challenge required changing Army policy, regulation, doctrine, curriculum, and instruction. We helped rewrite Department of the Army Pamphlet 25-40, *Army Publishing Program Procedures*, to require branch journals and professional bulletins to publish in web-first, mobile-friendly format.³ We worked to change Army Regulation 600-100, *Army Profession and Leadership Policy*, to expand emphasis on written communication skills as a critical component of leadership.⁴ Increased writing requirements, professional reading and referencing military scholarship is a growing requirement for students attending professional development and education courses. Finally, we expect eventual updates to Field Manual

6-22, *Developing Leaders*, that put more weight on professional writing, unit writing programs, and written communication skills as a component of the leadership requirements model.

What's next for AUP? We will continue to place priority emphasis on our core mission, supporting professional military education. However, going forward and looking at the challenges and gaps in PME, it is clear the Army places little emphasis on working with interagency partners and in an interagency environment. Training and development of mid-career leaders in how to interact and interface with the interagency will only grow in importance. Additionally, the engagement of our adversaries in irregular warfare will continue to increase. In such a dynamic, all levers of national power will be exercised, and Army leaders will need to be ready to plan, work, fight, and lead alongside interagency partners. I believe AUP has a role to play in this domain, helping promote,

produce, and publish salient scholarship that addresses how the Army must transform in contact and in a very complex strategic and operational environment with our civilian counterparts from across the federal government.

The title of this final letter from me as director of the Army University Press is "Parting Shots: A Farewell to Arms." It is meant as a final farewell to an organization and mission for which I have immense respect. It is also a farewell to a career that I have thoroughly enjoyed and an organization and community of professionals for which I have the greatest love, admiration, and reverence. The PEOPLE I have met, the ORGANIZATIONS with which I have served, the PLACES I have traveled, and the MISSION to which I have been a part have blessed me with a phenomenal career, lifelong friends, and, most importantly, the experience of serving the United States of America, the country I love. ■

Notes

1. Line of Departure, accessed 26 November 2024, <https://www.lineofdeparture.army.mil/>.

2. Zachary Griffiths, "Meet Your Harding Fellow," Harding Project, 23 July 2024, <https://www.hardingproject.com/p/meet-your-harding-fellow/>; "LTG (Ret) James M. Dubik Writing Fellows Program," Army University Press, accessed 26 November 2024, <https://www.armyupress.army.mil/journals/ltg-james-dubik-writing-fellows-program/>.

3. Department of the Army Pamphlet 25-40, *Army Publishing Program Procedures* (Washington, DC: U.S. Government Publishing Office [GPO], February 2024), 55, https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN42301-PAM_25-40-001-WEB-2.pdf.

4. Army Regulation 600-100, *Army Profession and Leadership Policy* (Washington, DC: U.S. GPO, June 2024), 26, https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN38315-AR_600-100-000-WEB-1.pdf.



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Enter the U.S. Army's premier writing competition!

2025 General William E. DePuy Special Topics Writing Competition

This year's theme: "The challenges of planning for security in a world that is increasingly borderless, multicultural, and economically interdependent."

Developments in modern technology, changing global demographics, increasingly complex economic ties among nations, and the speed and ease of population mobility have dramatically highlighted factors that now must be considered and dealt with to achieve success in modern conflicts. The age of empires that overtly built on the assumption that some states had a natural Darwinian entitlement for military conquest of other states viewed as racial or cultural inferiors has largely disappeared. However, while the age of empires is arguably over, the myths of empire remain. Different permutations of the same instinct to pursue imperial ambitions, but in a different guise, appear to remain powerful underlying elements of aggressor ideologies, nationalism, racial animus, some forms of organized religion as well as international economic and criminal cartels of one stripe or another. It is also a key impetus for resurgent revanchism, a state posture seeking to retaliate against other states for perceived historical wrongs that animates the desire to recover lost territory.

The intent of this year's DePuy competition is to identify by close examination where such factors strongly influence today's operational environment and to identify specific strategies to either mitigate their influence or provide solutions for exploiting them to achieve the accomplishment of strategic objectives. A few examples of such possible topics are provided below. These are provided primarily to encourage authors to identify on their own the most salient of any of a myriad of other such topics relevant to the theme.

- How are China, Russia, and the United States viewed by the populations in Central and Southern Africa as each nation competes to exploit Africa's natural resources? How are they viewed by the international community with regard to their presence in Africa?
- Does racism, tribalism, ideology, and religion play a role in China, Russia, Iran, and other states where conflict has emerged or is emerging? How do they manifest?
- Does regionalism, racism, ideology, or history play the most prominent role in Chinese aggression in the Indo-Pacific region where increasing tensions and potential for conflict are emerging? How do they manifest?
- How much influence do cartels of different varieties and international business conglomerates have on foreign policy dealing with the U.S. military deployments overseas? Do such entities view themselves as virtual independent nations without an obligation of loyalty to traditional nation states?
- What long-term impact would a large-scale war (non-nuclear) between China and the United States have on their mutual economies? Impact the world order?

Competition opens 1 January 2025 and closes 31 May 2025

1st Place: \$1,000 and publication in *Military Review*
2nd Place: \$750 and consideration for publication in *Military Review*
3rd Place: \$500 and consideration for publication in *Military Review*

Prize money contributed by the Association of the United States Army

For information on how to submit an entry, please visit <https://www.armyupress.army.mil/DePuy-Writing-Competition/>.

Write for *Military Review*

Suggested Themes and Topics for 2025

- From a U.S. military perspective, what are the greatest near-term external threats to the United States? Why, and how?
- What are the greatest long-term threats (looking out twenty-five years)?
- Many observers assert that Russia, China, and Iran already see themselves at war with the United States. Is there evidence that these and other actors are conducting actual “war” against the United States, and what are the probabilities of their success?
- What confederated blocs of nation-states are now aligned against the United States, and how do they cooperate with each other? What types of treaties or agreements do they have that outline relationships they share to reinforce each other?
- Which U.S. adversaries best synchronize their DIME (diplomacy, information, military, and economic) elements of power to achieve their strategic goals? Contrast and compare employment of DIME by China, Russia, Iran, and the United States. How should the United States defend itself against foreign DIME?
- Do China, Russia, and Iran have “Achilles’ heels”? What is their center of gravity? If they have one, how can it best be attacked/exploited?
- What do China, Russia, and Iran view as the United States’ “Achilles’ heel” or center of gravity? How specifically are they attacking it?
- What is the role now of the U.S. Armed Forces in Africa? Far East? Middle East?
- What does the future hold for nanoweapons? Electromagnetic warfare? Artificial intelligence? Information warfare? How is the Army planning to mitigate effects?
- What is diversity? How does one reconcile the concept of diversity with the concept of unity?



To learn more about submitting an article to *Military Review*, scan the QR code or visit <https://www.armyupress.army.mil/Publish-With-Us/#mr-submissions>.

Sgt. Nestor Muma (*right*) points out the target for Spc. Jude Effah, both infantrymen with 1st Battalion, 175th Infantry Regiment, Maryland National Guard, during squad attack lanes in Ben Ghilouf, Tunisia, during African Lion 2024 on 6 May 2024. (Photo by Pfc. William D. Kennedy III, U.S. Army)

8 Cyber Considerations of a Resistance Operating Concept

The Subversive Potential of Persuasive Technology

Jason A. Spitaletta, PhD

Maj. Michael B. Matthaeus, U.S. Army

Michael Guadian

The cyber domain affords the opportunity to apply psychological targeting to conduct precise engagements at scale, not simply mass persuasion, contributing to the subversive nature of cyberspace operations.

26 Lessons in Reconstitution from the Russia-Ukraine War

Gaining Asymmetric Advantage through Transformative Reconstitution

Maj. Thomas Haydock, PhD, Washington Army National Guard

Maj. Jack Meeker, U.S. Army National Guard

The Army can absorb lessons learned from the Russia-Ukraine War and create a superior model for force expansion and reconstitution to deter now and win the next fight by dominating the potential transition to protraction. This article won first place in the 2024 General William E. DePuy Special Topics Writing Competition.

42 Meeting Expectations

Failure in Ukraine Will Not Change the Russian Aerospace Defense Force

Lt. Col. F. Jon "Spinner" Nesselhuf, U.S. Air Force

The invasion of Ukraine has not led to a significant reformation in the Russian Aerospace Defense Force's strategy, operations, or tactics. Russia is not trying to build an American-style air force. This article won second place in the 2024 General William E. DePuy Special Topics Writing Competition.

54 Classical Methods of Influence Applied to Contemporary Military Leadership

Maj. Joseph D. Schmid, U.S. Army

Leaders can use classical leadership techniques espoused by Aristotle and Marcus Aurelius to provide clear and concise purpose, direction, and motivation to their soldiers. This article won second place in the 2024 General Douglas MacArthur Military Leadership Writing Competition.

61 Toward a Leadership Theory for Mission Command

Commandant Gavin Egerton, Irish Army

Certain leadership theories have characteristics that individually and collectively contribute to an aggregated leadership theory congruent with the essence of mission command, and leaders should adjust their leadership style to suit their ability, the ability of their subordinates, and the nature of the situation and task. This article won third place in the 2024 General Douglas MacArthur Military Leadership Writing Competition.

68 Reconstituting Partner Forces in Conflict

A Global Unity of Effort

Lt. Col. John T. O'Connell, U.S. Army National Guard

The U.S. military must cooperate with NATO and other allies and partners to build a collective network of capabilities and resources that can be used to train, advise, and assist partner nations with reconstituting their forces while in contact with the enemy and with no guarantees of interoperability.

78 Black on Ammunition, Green on Forecasting

Ammunition Lessons Learned from a DIVARTY in a Division Warfighter Exercise

Maj. Mikhail "MJ" Jackson, U.S. Army

Traditional sustainers will consider being "black" on ammunition as indicative of a critical shortage or potential shortfall in supply, but one unit employed unconventional forecasting techniques and conducted in-depth ammunition analysis to navigate potential shortfalls and achieving its mission objectives.

86 Achieving Decision Dominance

The Arduous Pursuit of Operationalized Data

Capt. Alexander K. Adkins, U.S. Army

Army leaders must delineate roles and responsibilities for achieving decision dominance with data to empower commanders at echelon.

96 Operating In a Multidomain Environment

Combat Support Training Exercise 86-24-02

Col. Jon V. Erickson, U.S. Army Reserve

One unit has modernized its training environment to practice operating in a dynamic and complex multidomain training environment against a peer adversary when the use of cyber or electromagnetic capabilities have been denied or degraded.

104 The Problem with Convergence

Dispelling the Illusion Surrounding the Tactical Application of Offensive Space and Cyberspace Capabilities

Maj. Trevor M. Brown, U.S. Army

Leaders at all echelons should approach the offensive space and cyberspace capabilities frequently associated with convergence as nothing more than an extension of combined arms and remain prepared to rapidly exploit opportunities by understanding and maximizing the utility of all capabilities at their disposal regardless of domain.

116 Homeland Joint Interagency Task Force

Can It Better Deliver Planning, Coordination, and Information Sharing Protocols to Counter Transnational Criminal Threats?

Cmdr. Jonathan K. Corrado, PhD, U.S. Navy Reserve

The success of Joint Interagency Task Force (JIATF) South provides an exceptional blueprint for the Department of Defense to form a JIATF North to combat the growing threat imposed by transnational criminal organizations in the United States.

123 Can the President Federalize the National Guard?

Lt. Col. Ryan P. Hovatter, Florida Army National Guard

Historical evidence shows that while it is well within the president's constitutional powers to federalize a state's National Guard to uphold the law, it is an uncommon and limited practice.

132 Preparing for Hot Conflicts

Army Training and Operations in a Warming World

Maj. Erik M. Patton, RG, PhD, U.S. Army

Christopher L. Chapman, PhD

Gabrielle E. W. Giersch, PhD

In the diverse regions where the Army operates, hotter local temperatures will continue to occur more frequently and be more extreme than previously recorded, and military leaders must understand how the future operational environment will be impacted and how to adapt to mitigate heat risk during deployments.

146 The U.S. Military Risks Mineral Shortages in a U.S.-China War

Lessons from World War I, World War II, and the Korean War

Gregory D. Wischer

The U.S. military has experienced mineral shortages during previous wars, and mineral shortages in a potential U.S.-China war may not only prolong the conflict but, if severe enough, also contribute to a U.S. defeat.

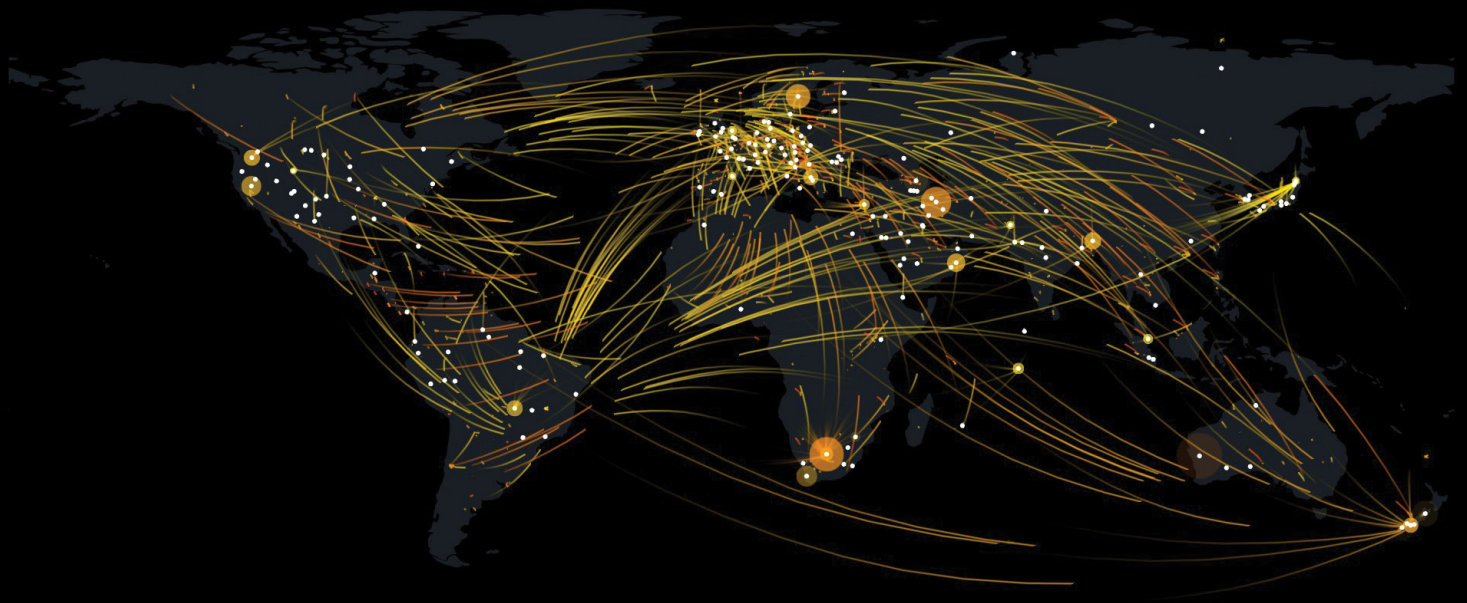
REVIEW ESSAY

158 Robert E. Lee and Me

A Southerner's Reckoning with the Myth of the Lost Cause

Lt. Col. John H. Modinger, PhD, U.S. Air Force, Retired

The author critiques a book by Ty Seidule that provides an intimate look at Robert E. Lee's youth and career within the military and challenges deeply held myths about the Civil War and what it was really all about.



Cyber Considerations of a Resistance Operating Concept

The Subversive Potential of Persuasive Technology

Jason A. Spitaletta, PhD

Maj. Michael B. Matthaeus, U.S. Army

Michael Guadian

Taken 14 November 2024 at 14:44 (UTC -1hr), this NETSCOUT map is displaying real-time distributed denial of service attacks across the globe. Hundreds of attacks are actively occurring almost every minute of the day. (Screenshot from NETSCOUT Cyber Threat Horizon)

The maze of war psychology has not been illuminated yet by scientific knowledge, and therefore strategists make their way blindly in the dark.

—Evgeny E. Messner

Military policy, doctrine, and logic require a collective understanding of the type of conflict in which the joint force is operating.¹ Evgeny Messner's concept of subversion war is an appropriate theoretical framework to comprehend the contemporary operational environment defined by great power competition (GPC) amidst innumerable irregular conflicts, both civil and transregional.² A particularly prescient component of Messner's subversion war is the "vulgarization" of conflict, which includes working by, with, and through resistance movements to subvert the political status quo.³ Initiating, co-opting, or even fabricating resistance movements through cyberspace has been operationalized by Iran, China, Russia, North Korea, and nonstate actors to achieve strategic advantage.⁴ Those efforts have transformed cyberspace into the preeminent domain through which Messner's concepts can be applied. The blueprint developed by Messner during the Cold War is evident in contemporary GPC, including the enduring relevance of resistance warfare within the U.S. *National Security Strategy*.⁵ The United States should not only understand but also operationalize its version of subversive resistance warfare in cyberspace through an updated *Resistance Operating Concept* as a component of a national cyber strategy.

Operationalizing the competencies necessary to formalize and implement a subversive cyber strategy requires themes, messages, and dissemination mechanisms specifically tailored to an individual's psychological vulnerabilities and/or susceptibilities and delivered when the effect will be greatest. Therefore, among the capability requirements is psychological targeting, a set of processes that combines two interrelated facets: the automated assessment of psychological states and/or traits from digital footprints (psychological profiling) and the development and implementation of content to shape

Jason Spitaletta, PhD, is an operational psychologist and an adjunct professor at National Intelligence University.

perception, objective reasoning, and behavior (psychologically informed interventions).⁶ The cyber domain affords the opportunity to apply psychological targeting to conduct precise engagements at scale, not simply mass persuasion, contributing to the subversive nature of cyberspace operations.⁷ The associated psychological targeting research, discussed later, is the centerpiece of the argument for greater special operations forces (SOF) and Cyber Mission Force (CMF) integration from training to education to operations to strategy.

This article (1) contextualizes the role of persuasive technology in resistance warfare, (2) identifies and describes the relevant concepts, (3) articulates training and education requirements, (4) suggests potential research collaborations for SOF and CMF students, and (5) suggests a strategic manifestation of those concepts.

Resistance Warfare and Persuasive Technology: Contextualizing the Problem

Resistance warfare is predominantly a fight for influence, waged in complex human environments using traditional and nontraditional means to achieve strategic advantage.⁸ Cyberspace is such a complex human environment, and one that is becoming increasingly vital to resistance warfare.⁹ The convergence of accessible technology, a social trend toward increased online sharing, and the ability to organize virtually and share experiences in real time via social media have

Maj. Michael Matthaeus,

U.S. Army, is a senior faculty researcher at the University of Maryland's Applied Research Laboratory for Intelligence and Security with a research focus in cognitive security and disinformation. He is a psychological operations officer assigned to U.S. Cyber Command where he conducts integrated cyber, information, cryptographic, and electronic warfare operations.

Michael Guadian is a Department of the Army civilian who has spent the last decade working at the tactical level of U.S. Cyber Command (USCYBERCOM). During that time, he became USCYBERCOM's first master-qualified target digital network analyst and has spent the last several years developing and teaching new tradecraft to analysts under his charge.

fundamentally changed how resistance movements emerge, organize, and mobilize.¹⁰ Cyberspace, especially in its increasingly surveilled state, affords opportunities for subversion as organizations (state and nonstate alike) can leverage persuasive technologies to achieve direct effects or to employ them as part of a disinformation campaign to obfuscate protagonists' true

science.¹⁸ Machine-learning methods, which are better suited to the large volumes of data than traditional statistical methods used in psychological research, have enabled the capability to develop individual profiles at scale and exploited them as a means to financial, social, and/or political ends.¹⁹ AI, digital phenotyping, and psychoinformatics have transformed persuasive

“ The repressive application of surveillance technologies undermines civil liberties, subverts human rights and democratic principles, and decreases trust in public institutions. ”

identity and/or intent.¹¹ The manipulation of existing or complete fabrication of social movements can have profound economic, political, and psychological effects even at the societal level and these effects often rely on some form of persuasive technology as it can take the form of media, tool, and/or social actor.¹²

To serve as a tool, a technology must increase a human's ability to perform a desired task either through decreasing the (physical or mental) difficulty or restructuring the task; for example, pairing subcutaneous implants and a smartphone application to monitor blood glucose.¹³ Persuasive technologies can also function as media through which the combination of interactivity and narrative afford rehearsal, empathy, and/or exploring nonintuitive causal relationships.¹⁴ Social media platforms are persuasive by design, affording a degree of interaction and connectivity not seen with previous telecommunications technology and mass media and, in doing so, blur the boundary between the technological and human.¹⁵ Persuasive technologies can also serve as a social actor whereby the technology is designed to cue and/or elicit social responses.¹⁶ These systems can be rudimentary rule-based systems such as automated helplines or highly sophisticated multimodal sensors that incorporate artificial intelligence (AI) to rapidly process input, compare it against a database, and make therapeutic recommendations.¹⁷ The development of persuasive technologies, initially influenced by the confluence of social psychology and user-centered design, has accelerated over the past decade thanks to advances in software engineering and data

technologies from bespoke solutions in healthcare and assistive technologies to malign influence ecosystems.²⁰ This new environment has become the decisive battleground for political and psychological warfare.²¹

Subversion is a well-established method of psychological warfare that has evolved considerably within malign influence ecosystems.²² Employed by resistance movements and states alike, subversion's reliance on exploitation distinguishes it from warfare and diplomacy, as does its indirect relationships between belligerents and clandestine modes of interaction.²³ Subversive operations exist along a spectrum from overt propaganda to covert disinformation and extend to organized violence, including sabotage and assassination.²⁴ Traditionally, a type of politically sensitive operation conducted by SOF and/or intelligence organizations, subversion has reemerged as instrument of statecraft thanks to the ability to connect with, understand, and manipulate populations through cyberspace.²⁵ Cyber operations provide low-risk, low-cost, and precise options for subversion, sabotage, political interference, and/or economic disruption.²⁶ Consequently, cyber operations afford the opportunity to undermine oppressive regimes, including the technological extension of those regimes. That technological extension, or digital authoritarianism, is the malicious use of the internet and digital surveillance technologies to increase social and political control over a population.²⁷ The intent is to make public life more observable to the state thus reducing opportunities for nonviolent action and inverting the concept of the internet as an engine of human

liberation.²⁸ The repressive application of surveillance technologies undermines civil liberties, subverts human rights and democratic principles, and decreases trust in public institutions.²⁹ The very phenomena digital authoritarianism seeks to quell have been recommended as foreign policy objectives and described as the *raison d'être* of the Army Special Forces profession.³⁰

its adversaries.³⁷ These nascent resistance movements can be enabled (or disabled) by persuasive technologies to achieve strategic advantage.

SOF and CMF should consider digital authoritarianism in the twenty-first-century analogous to Communist International export of subversive ideology in the mid-twentieth century and organize, train,

“As cyberspace has become the principal domain for the conduct of psychological warfare, persuasive technologies provide the opportunity to access, assess, and influence resistance movements.”

The export of digital authoritarianism is a form of foreign malign influence, a threat the White House considers a global priority.³¹ The World Economic Forum conceptualizes the export of digital authoritarian norms as a malevolent cycle: the risk of misinformation devolves into widespread control of information that, in turn, leaves citizens vulnerable to political repression and domestic disinformation.³² The intentional spread of disinformation using botnets, for example, has become a common tactic by state and nonstate actors, forcing political opponents to respond to false information putting them at an information disadvantage and preventing them from anticipating the effect of any emerging narrative or subsequent operation.³³ Botnets, while varying in scope and complexity, can be implemented as social actors for the public good.³⁴ However, botnets can also be used as an inexpensive and unattributed means of amplifying propaganda or, in effect, “jamming” the attempts of an adversary to disseminate their messaging.³⁵

The combination of government suppression of information and actively manipulating the population through the dissemination of disinformation is an infringement on the universal human right of the consent of the governed. Consequently, the repressive application of surveillance technologies increases the number of oppressed peoples and, counterintuitively, the number of nascent resistance movements.³⁶ Cyber partisans have emerged in Belarus, Ukraine, the Middle East, and Venezuela, all of which present political opportunities for both the United States and

and equip to understand then undermine this global threat.³⁸ These technological developments and citizens’ resistance to them should stimulate the reconsideration of cyberspace from simply a complicated suite of technologies to a complex sociotechnical system.³⁹ Consequently, the operational understanding of the cyber domain must evolve to embrace this complexity.

Applying Persuasive Technologies: Psychological Targeting and Resistance Warfare

As cyberspace has become the principal domain for the conduct of psychological warfare, persuasive technologies provide the opportunity to access, assess, and influence resistance movements.⁴⁰ Psychological targeting presents significant applied research opportunities to develop, refine, and validate, along with considerable operational challenges to implement. Spotting, assessing, and recruiting insurgents, as well as influencing the populace’s behavior, are fundamental requirements of cyber resistance.⁴¹ As those tasks rely on similar underlying social psychological concepts, both military information support operations (MISO) and human source intelligence (HUMINT) can benefit from psychological targeting.⁴² Psychological targeting is the center of gravity of persuasive technology and refers to the practice of influencing the behavior of large groups of people through psychologically tailored interventions.⁴³ Psychological targeting combines software and analytic techniques that adapt content to the user’s vulnerabilities (needs, wants, desires), susceptibilities

(propensity to receive and act on a message), psychographics, and/or previous online behavior.⁴⁴ Mood and emotion have been predicted from spoken language, video data, wearable devices, smartphone sensor metadata, and an individual's exposure to weather.⁴⁵ Research also suggests that personality can be predicted from personal websites, Facebook and Twitter profiles, blogs, language use, financial transaction records, and pictures.⁴⁶ This data can also include both traditional personality assessments administered online and derivative measures developed from online datasets, making them well suited to remote assessment.⁴⁷ Psychological targeting doesn't require a user interacting with a particular technological system, affording the clandestine modes of interaction preferred in subversion.⁴⁸

Psychological targeting affords the opportunity to exploit psychographics to segment an audience into a set of psychologically homogeneous groups that allow for a more tailored approach to developing arguments that garner emotionally laden attention. These segments, however, need not be geographically collocated as online communities can be developed solely from these shared psychological characteristics.⁴⁹ Psychological profiling has been used to locate and target specific voters through lookalike modeling, which uses data-rich models of current supporters to identify likely supporters who exhibit similar signatures.⁵⁰ Cambridge Analytica implemented psychological targeting techniques to identify American voters with latent authoritarian preferences and thus framed its arguments accordingly.⁵¹ The resultant microtargeting exacerbated the veracity problem on many social media platforms as different audiences received different information and/or different interpretations on ambiguous information.⁵² Foreign malign influence to disrupt or corrupt electoral processes remains a global threat whose complexity evolves every election cycle and such, the subversion potential of persuasive technologies such be considered an enduring threat.⁵³ Addressing said threat requires both defensive and offensive methods. Subversion requires nuance which implies a need for exquisite detail on target audiences.⁵⁴ MISO, a core activity of SOF, should be conducted against target audiences as narrow as can be assessed, and the intelligence collected through cyberspace affords opportunities for such precision.⁵⁵ The operational application of persuasive technologies is most pertinent to MISO and

HUMINT as both involve understanding and influencing human behavior.⁵⁶ Both also happen to be critical in cyber resistance as MISO and HUMINT are becoming increasingly reliant on cyberspace as a medium to spot, assess, recruit, train, and influence individuals, organizations, and populations.⁵⁷ The cyber domain affords the opportunity to conduct precise engagements (whether to recruit or manipulate) at scale, contributing to the subversive nature of cyberspace operations.⁵⁸

Psychoinformatics, the confluence of computer science and psychology, has developed potentially applicable methods some of which may be implemented at scale. Psychoinformatics adapts tools and techniques from computer science to improve the collection and analysis of psychological data by prioritizing the direct assessment of behavior derived from human-machine interaction on an operating system level.⁵⁹ Psychoinformatics incorporates statistical techniques from both psychological and computer science but relies more heavily on the latter. Machine learning, a subfield of AI, employs algorithms to "learn" from the data ingested. Machine learning can be supervised or unsupervised with the former referring to approaches where the model is trained on human-labeled data to ultimately predict unlabeled data and the latter referring to approaches without any external intervention. Applied research that incorporates the combination of self-report and smartphone sensor data in larger samples over time will yield further insight into the psychological inferences that can be obtained from operating system information alone. This operational system data exists within various collection databases and could be mined and compared with other reporting and/or assessments.

Digital phenotyping uses data collected from smart devices to track markers of mental disorders.⁶⁰ Mobile sensing technologies enable the continuous measurement of physiological and behavioral data, the combination of which can provide unique insight into an individual's susceptibility to a particular intervention. The combination of technologies and techniques afford clinicians the opportunity to implement precision medicine through the combination of objective assessments and precisely calibrated treatments. Digital phenotyping typically entails application, computing, sensing, and conceptual layers.⁶¹ The conceptual layer or the clinical formulation of mental health and

well-being is the interaction among biological factors, emotional factors, behavioral traits, social factors, and cognitive ability.⁶² The sensing layer is the combination of contextual sensing capabilities of the smartphone, paired wearable sensors, social media platforms, and/or an electronic health record.⁶³ The computing layer is the hardware and software instantiations of psychoin-

the algorithmic extraction methods. However, the research on psychologically informed interventions is insufficient to suggest it is effective in diminishing symptoms of various mental disorders. That said, the science is evolving methodologically and technologically and warrants attention, but little can currently be applied to time-sensitive targeting without additional

“Operationalizing the capability for strategic subversion could serve as an unconventional deterrent to complement offensive and defensive cyber operations to defend the U.S. electoral process. Doing so, however, requires advanced training in both human and technological systems, and the confluence thereof seems to be a pedagogical gap in military and intelligence curricula.”

formatics, including psychometric analysis, behavioral anomaly detection, social analytics, and biomarkers.⁶⁴ The application layer is the purpose of the project or product and could be a means to evaluate and/or diagnose, monitor, intervene, prevent, and/or support a patient.⁶⁵ The combination is a holistic, or multiform organismic, approach to understanding an individual in an operational context.⁶⁶

Psychological targeting research suggests that psychological profiling is a reliable means of inferring state and trait characteristics.⁶⁷ Algorithmic approaches to personality assessment, when compared with other psychometrics, have the most empirical support in the scientific literature and the most compelling operational applications, particularly when enriched with other types of digital footprints.⁶⁸ Research incorporating the combination of self-report and smartphone sensor data in larger samples over time will yield further insight into the psychological inferences that can be obtained from operating system information alone.⁶⁹ This operating system data exists within various collection databases and could be mined and compared with other reporting and/or assessments to provide more refined target audience analysis to support a range of subversive cyber operations. Adapting and applying the psychological targeting research methods using more operationally relevant data sources is feasible, but ground truth is necessary for comparing and validating

exploration. The penultimate section will address this issue in greater detail.

Persuasive technologies attempt to influence behavior; synthesizing elements from each in conjunction with established methods of social influence thus holds potential to deter and influence in cyberspace.⁷⁰ Operationalizing the capability for strategic subversion could serve as an unconventional deterrent to complement offensive and defensive cyber operations to defend the U.S. electoral process.⁷¹ Doing so, however, requires advanced training in both human and technological systems, and the confluence thereof seems to be a pedagogical gap in military and intelligence curricula.

Training and Education Requirements for Persuasive Technologies

U.S. Cyber Command (USCYBERCOM) emphasizes training cyber operators in the technological aspects of networking and system vulnerabilities, focusing on critical work roles that enable access and conduct operations, with little emphasis on the cognitive domain. Furthermore, there is limited understanding (within both cyber operators and cyber operations planners) of psychological warfare concepts and their applicability to cyber effects operations.⁷² While there is little doubt that technologically competent personnel are essential to the CMF, it is necessary to have

a thorough understanding of the more complex and ambiguous node of the network: the user.⁷³

Computer networks conform to standards established by the Institute of Electrical and Electronics Engineers Standards Association, giving all networks a degree of similarity that provides a common analytic baseline.⁷⁴ The users of those networks, however, vary considerably and thus require human factors analysis (HFA) to perceive, comprehend, and project.⁷⁵ The current paradigm within the CMF prioritizes access operations from a purely technological standpoint with little to no emphasis on human factors.⁷⁶ Decades of interdisciplinary cybersecurity research have demonstrated the human to be the most significant vulnerability in any computer network, yet the application of social science to cybersecurity lags.⁷⁷ Cybersecurity is, however, psychologically distinct from cyber operations, and it is the latter that requires greater pedagogical attention as there is even less applied social and behavioral science research dedicated to it.⁷⁸ The CMF is equipped with a unique set of authorities, accesses, and capabilities to support resistance warfare.⁷⁹ Presently, the established intelligence and cyber curricula do little to address and/or further explore resistance warfare in cyberspace. The existing coursework provides a rudimentary understanding of basic cyber architecture and function with little in the way of advanced intelligence or psychological training necessary to understand cyberspace as the complex sociotechnical system it is.⁸⁰ For example, as previously noted, algorithmic approaches to psychometric assessment have potential operational utility.⁸¹ This is particularly so when those analyses are enriched by data collected via signals intelligence (SIGINT). SIGINT can provide insight to MISO, but precision messaging requires personalization that can be objectified, quantified, and contextualized through open-source intelligence.⁸² As MISO becomes increasingly reliant on the internet to not only conduct target audience analysis but also disseminate messages the intelligence support, particularly SIGINT, must adapt.⁸³

SIGINT enables targeting at all fulcrums of assessment within HFA, and the nature of the accesses provide reliability that other intelligence disciplines cannot.⁸⁴ As cybersecurity practices are increasingly adapting psychological research findings and integrating them into their defenses, similar translations

must be made to cyber operations and their SIGINT support.⁸⁵ This translation needs to begin at the basic qualification courses. The U.S. Army's Cyber Center of Excellence is the home of the Cyber School, an institution critical to training SIGINT and cyber personnel for an increasingly prominent role in contemporary military operations.⁸⁶ The Cyber Center of Excellence, however, has been slow to adopt more comprehensive conceptualizations of both cyberspace and how best to apply cyber capabilities as an instrument of statecraft. Consequently, neither cyber resistance nor the more complex conceptualization of cyberspace that emphasizes the cognitive domain have been integrated into the curriculum. Cyberspace is a complex dynamic sociotechnical system and thus, a shift in cyber and intelligence training is necessary to address the skill deficit in HFA to better support operations once the individual is assigned to the CMF.⁸⁷

The current model for intelligence certification implements a three-tier system of basic, senior, and master levels. While the initial training is sufficient, it is typically focused on the relevant technologies that comprise computer networks. Counterintuitively, there is less differentiation as one progresses to senior and master levels. Better integration of more advanced psychological training is necessary for the progression to senior and, ultimately, master. Fundamental changes must be implemented, particularly for the intelligence personnel specializing in persona analysis within SIGINT better support cyber operations.⁸⁸ Psychological targeting methods can be translated for operational application; however, it will require the tactical integration of social and behavioral scientists and more advanced training for intelligence personnel supporting both SOF and CMF. While some coursework will need to be created for and tailored to specific units within the CMF, there may also be opportunities to share resources and/or cross-train with SOF to better achieve both service and joint force training objectives.⁸⁹

The U.S. Army John F. Kennedy Special Warfare Center and School recently established the Psychological Warfare (PSYWAR) School, which marks a significant development in training SOF to focus on resistance movements during multidomain operations.⁹⁰ Specifically, the PSYWAR School has an opportunity to institutionalize the assimilation of

persuasive technology and resistance warfare through cyberspace into joint SOF and CMF formative training. While the PSYWAR school is designed to improve the initial and advanced training experiences of psychological operations personnel, it is not postured to train and educate CMF personnel.⁹¹ However, by allowing CMF personnel who meet the requisite criteria to enroll, the PSYWAR School can embody the fifth SOF Truth and provide the intellectual foundation for warfare psychologically waged through cyberspace.⁹²

Joint Special Operations University (JSOU) offers a spectrum of courses relevant to both CMF and SOF requirements of modern warfare.⁹³ Courses such as the National Resistance Course, Joint Unconventional Warfare Operations Course, SOF Sensitive Activities Foundation Course, and the pilot program for SOF Influence and Operations in the Information Environment incorporate instruction on both cyber operations and resistance movements, to include their confluence.⁹⁴ These courses are designed to enhance the understanding and operational skills of personnel in multidomain environments, which are increasingly influenced by cyber dynamics. Furthermore, JSOU has specific sections devoted to integrating cyberspace operations within the scope of special operations, exemplified by Cyberspace and Special Operations Forces and the Theater Special Operations Command Cyber Planner Course.⁹⁵ These courses lay the practical foundation for the integration of emergent, accessible, and low-cost technology in cyber operations, crucial for modern resistance warfare. While portions of the instruction include emergent and influential technologies like generative AI, there remains no unifying theme as to the applications for SOF in cyber operations or for CMF integration into resistance warfare. Critical for any SOF and CMF training evolution is a focus on how multidomain environments are shaped by cyber dynamics. Additionally, reframing these cyber actions in a subversive warfare context adds a coherent framework for developing resistance movements to subvert great powers.

The National Intelligence University (NIU) Anthony G. Oettinger School of Science and Technology Intelligence prepares students for careers at the forefront of science and technology intelligence.⁹⁶ The school offers cyber intelligence and information and influence intelligence concentrations, both of

which provide the interdisciplinary scientific and technological underpinnings of contemporary conflict and the research skills necessary to conduct the necessary applied research. NIU can provide both the advanced educational and research opportunities to SOF and CMF personnel to explore the psychological, technological, legal, operational, and strategic implications of operationalizing persuasive technologies.

Applied Research in Persuasive Technologies

The U.S. Army John F. Kennedy Special Warfare Center and School can provide the necessary introductory training along with some advanced training, while JSOU can address the latter. The respective curricula described herein can then be augmented through advanced education at NIU. Both advanced training and education should include CMF and SOF to develop the necessary shared understanding. NIU can then develop (or refine existing) programs where students conduct research within their academic and operational expertise alongside students with different expertise to understand different aspects of a shared problem set.

A potential research collaboration among the U.S. Special Operations Command, USCYBERCOM, JSOU, and NIU might be to develop digital phenotypes of malicious cyber actors (MCAs) so that intelligence professionals can better understand the psychological characteristics as cybersecurity analysts understand their technical characteristics. Cybersecurity research and intelligence firms attribute advanced persistent threats (APT) based on observed tactics and even threat profiling, and the assessments can be enriched by incorporating psychological targeting data from individuals affiliated with said APTs.⁹⁷ Some APTs function like more traditional reconnaissance units, gaining access, observing, and reporting.⁹⁸ Others are a contemporary manifestation of Messner's crypto-covert forces, who operate surreptitiously across a broad spectrum of activities ranging from reconnaissance to sabotage to psychological warfare.⁹⁹ APTs like Sandworm combine technological and psychological effects as part of a broader cyber-psychological approach to information confrontation.¹⁰⁰ These cyber-psychological approaches may create distinct digital footprints that can be used as both indication and warning signals, and attack surfaces to subvert.

Digital phenotypes of operational phenomena, for example MCAs, could be developed using similar methods and technologies. Translating concepts from clinical psychology such as risk factors, long used to assess likelihood of symptom reoccurrence and/or relapse as well as dangerousness, may be combined with techniques from digital phenotyping and cyber threat intelligence analysis to develop digital phenotypes of MCA.¹⁰¹ The conceptual layer of this model would be less about mental health or well-being and more about propensity to engage in malicious cyber activity, but the remaining aspects (biological factors, emotional factors, behavioral traits, social factors, and cognitive ability) would still apply.¹⁰² The application layer would also be for nonclinical purposes, such as accessing and assessing, but the sensing and computing layers would remain.

The challenge of translating a clinical paradigm to an operational one has concomitant risks, namely the assumption that persons of interest will exhibit some form of observable behavior that has discriminant validity.¹⁰³ The research to date, while promising, often fails to include healthy controls against which the behavior of patients can be compared. Using such approaches to develop signatures risks false positives and thus collecting on individuals whose behavior is close enough to the target of interest but otherwise irrelevant. Like any composite profile, there are individuals who may not exhibit any of the characteristics described. The concomitant behavioral correlates of the attributes of interest must be identified and validated. The diagnosticity of the approach in an operational context requires a comparison of existing device-level data, observed behavior, and/or other psychological assessments. Consequently, additional applied research by teams of scientists, CMF, and SOF is required. Upon graduation, NIU alumni can then apply what they've learned to novel operational designs through more coherent cyber doctrine, policy, strategy, and offensive and defensive tactics included in an updated *Resistance Operating Concept* (ROC).¹⁰⁴

Operationalizing Persuasive Technologies in the Next ROC: Developing a Subversive Cyber Strategy

Cybersecurity researchers and cyber operators (inclusive of both SOF and CMF) could benefit from

this type of integration and applied research as it applies directly to establishing subversion as an element of a cyber strategy.¹⁰⁵ USCYBERCOM's mandate is to "Direct, Synchronize, and Coordinate Cyberspace Planning and Operations—to Defend and Advance National Interests—in Collaboration with Domestic and International Partners," which, in practice, means access operations instead of incorporating full-spectrum operations into planning and execution.¹⁰⁶ Cyber operations tend to be viewed as systems-focused and defensive or as a contemporary form of fire support whereby the operational objective is the degradation and/or destruction of adversary information systems.¹⁰⁷ This latter application has had only technological and/or tactical success and thus the role of strategic cyber operations warrants reconsideration.¹⁰⁸

The 2023 *Cyber Strategy* identifies malicious cyber activity, to include foreign malign influence efforts, as a threat to the Nation and USCYBERCOM has the mission to deter, disrupt, manipulate, and defeat adversary cyber and malign influence actors.¹⁰⁹ Despite cyber threats being as psychological as they are technological, USCYBERCOM prioritizes the latter at the expense of the former.¹¹⁰ Consequently, there is insufficient institutional recognition that cyber operations should be integrated into a larger psychological strategy.¹¹¹ Training and educating SOF and CMF together in advanced venues could help dissolve cultural resistance to the others' concepts and develop better integrated operational approaches.

The ROC served as a blueprint for Ukrainian resistance to the 2022 Russian invasion and occupation.¹¹² While the 2022 Russian invasion of Ukraine was less adherent to Messner's concept than their 2014 invasion, both employed resistance movements in the cyber domain in attempt to create a strategic advantage.¹¹³ The United States must update and advance the ROC to better account for cyberspace and its concomitant complexities. This requires not only more integrated training but also an ideological convergence of SOF and CMF. Developing a subversive resistance warfare thrust within a national cyber strategy could facilitate the convergence.

The separation between the training of SOF and CMF has limited the strategic effectiveness of military operations, particularly in subverting great powers by, with, and through cyber resistance movements.¹¹⁴ As

adversaries increasingly resort to subversive tactics, traditional power gaps are bridged through cheap, accessible cyber tools to achieve strategic advantage.¹¹⁵ SOF and CMF are critical in GPC, yet do not maintain a coherent and reproducible mission alignment. Adversary actions in cyberspace underscore the necessity for a collective understanding and operational capability in

in a strategic context. A development pathway must provide comprehensive exposure to advanced technologies such as AI, digital phenotyping, and psychoinformatics, which are crucial for the development of sophisticated cyber operations and psychological warfare tactics.¹²² Critical for this joint development is how cognitive impacts may be created from resistance

“Adversary actions in cyberspace underscore the necessity for a collective understanding and operational capability in subversion, propaganda, covert disinformation, organized violence, and cyber operations—integral components of contemporary resistance warfare.”

subversion, propaganda, covert disinformation, organized violence, and cyber operations—integral components of contemporary resistance warfare.¹¹⁶

CMF and SOF collaboration is necessary to develop contemporary concepts for resistance warfare in the cyber domain, and there are practical similarities between CMF and SOF that warrant tactical through strategic partnerships.¹¹⁷ Integrated training between CMF and SOF should focus on several key areas. The first is interoperability. In practical terms, training programs must emphasize operational integration in which cyber and special operations personnel conduct joint missions, leveraging each other's strengths in real-time operational contexts. Resistance warfare calls for operationalizing resistance movements, propaganda, sabotage, espionage, and destructive actions, all while focusing on the asymmetric cognitive impacts for strategic advantage.¹¹⁸ Cyberspace operations facilitate these actions in a cheap, accessible, and repeatable fashion without the need for full-time physical presence.¹¹⁹ Additionally, full interoperability between CMF and SOF brings a course of action development flexibility. Lessons from Ukraine and Israel reinforce the idea that capabilities must be developed prior to crisis and conflict.¹²⁰ SOF has a unique remit to conduct battlefield preparation, partner force training, and developing resistance networks in foreign countries.¹²¹ Cyber resistance is the logical evolution and extension of this responsibility.

SOF and CMF must also integrate and curate persuasive technologies to develop asymmetric advantage

warfare tactics in and through cyberspace.

Finally, an integrated CMF and SOF capability must share operational design. Drawing on information from the modern operational environment, the defense industrial base, U.S. allies and partners, and adversary cyber campaigns, a resistance operating concept in cyberspace is an evolving but durable concept. The cognitive impact of cyber operations is undeniable but understudied. If a society or its people are reliant on digital technology, then that behavior can be exploited.¹²³ Iran, Russia, and China have already demonstrated both the capability and intent to operationalize cyber resistance movements to achieve a political objective.¹²⁴ A joint CMF and SOF design for resistance movements in cyberspace utilizes the strengths of both forces to affect combined arms integration.

Conclusion

Messner places the psychological dimension of conflict at the center of a strategy to influence the psyche of the enemy.¹²⁵ There are few operational environments more conducive to such approaches than the cyber domain.¹²⁶ Messner's concept of subversion war is an appropriate theoretical framework to understand contemporary resistance warfare in cyberspace.¹²⁷ While the U.S. strategy of persistent engagement does not cite Messner, his principles of subversion war underlie the U.S. approach to cyber operations.¹²⁸ The United States should embrace this and develop a cyber strategy with subversion at its core accentuated by

persuasive technologies and a well-trained and well-educated force to operationalize them.

The methods identified in the psychological targeting literature are adaptations and extensions of approaches developed in clinical and political psychology combined with statistical methods used in computer science.¹²⁹ These indirect assessments have long been

which unites SOF and CMF communities. Increased coordination with partners and allies is not only an operational priority but also a strategic imperative. NIU could provide CMF and SOF students the opportunity to conduct such exploratory and applied studies to advance our understanding of the limits of these approaches and their potential operational util-

“While the U.S. strategy of persistent engagement does not cite Messner, his principles of subversion war underlie the U.S. approach to cyber operations. The United States should embrace this and develop a cyber strategy with subversion at its core accentuated by persuasive technologies and a well-trained and well-educated force to operationalize them.”

used in the intelligence community and can be readily adapted within the next ROC.¹³⁰ Doing so, however, requires the capability for precision influence at scale that requires considerable applied research.

A joint operational design between CMF and SOF incorporates dynamic and targeted operations, influences activities, and coordinates actions. Engaging directly with adversaries online or covertly exposing malicious behavior to various audiences provides a methodology to counter MCAs. MISO should be conducted against target audiences as narrow as can be assessed, and SIGINT affords such opportunities to do so in support of CMF.¹³¹ Cyber targeting is unique in that, often, one can strike a single target multiple times from multiple approaches with the same desired effect. Correspondingly, allies and partners likely prioritize similar adversary cyber targets,

ity. A research priority should be developing digital phenotypes of MCAs, a potential focal point of the next ROC.

To compete with and/or deter great powers and maintain proficiency in resistance warfare, the U.S. must give primacy to subversion in future cyber strategy.¹³² Doing so requires not only the adoption of subversion as a national strategy for cyber but also integrating training and education of CMF and SOF so that the subversive potential of persuasive technologies can be operationalized through an updated ROC. The updated ROC will serve as a blueprint for a more egosyntonic, and thus subversive, national cyber strategy. ■

The views expressed in this article are the authors' and do not imply endorsement by the Director of National Intelligence or any other U.S. government agency.

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Lessons in Reconstitution from the Russia-Ukraine War



Gaining Asymmetric Advantage through Transformative Reconstitution

Maj. Thomas Haydock, PhD, Washington Army National Guard
Maj. Jack Meeker, U.S. Army National Guard

The Russia-Ukraine War is replete with tactical, operational, and strategic lessons for our Army while serving as a vivid reminder of the national challenges involved in protracted conflict. News headlines and videos constantly offer commentary on combining arms or show unmanned systems preying on tanks, but they miss the wider lessons. Russia began this conflict by falling for a common trap, believing it would achieve a quick victory, and Ukraine has showed it otherwise. Russia's folly is a reminder that major, protracted conflict is a contest of the national ability to remain in the fight, to deliver and absorb blows better than an opponent. In short, victory in protracted conflict requires reconstituting armed forces and doing it well. The truth is that Russia has proven quite capable of reconstituting lost

personnel and materiel, but its reconstitution model has created a force of amateurs. Unfortunately, the U.S. Army is not only decades out of practice in reconstitution, but our model is unsettlingly like Russia's, focused on balancing supply and demand. We can absorb the lessons from this war and create a superior model for force expansion and reconstitution to deter now and win the next fight by dominating the potential transition to protraction.

While the Russia-Ukraine War has novel features (as all wars do), it has numerous similarities to relatively recent conflicts, including World War II and the Korean War. We can synthesize observations to build an asymmetric advantage through a superior reconstitution process that does more than simply regenerate personnel and materiel. Specifically, this article



A Ukrainian serviceman walks next to a fighting vehicle outside Kyiv, Ukraine, 2 April 2022. On the same day, French President Emmanuel Macron committed to delivering artillery pieces to Ukraine to reconstitute combat units fighting Russian forces. (Photo by Vadim Ghird, Associated Press)

proposes a new reconstitution model, *transformative reconstitution* (TR), that structures our Army for the transition to protraction so we maintain and improve our qualitative advantage over time rather than devolving like Russia. TR is intended to transform our Army's initial transition from conflict opening to protraction and model a reconstitution process that allows our Army to transform into a superior force during protraction. To do so, this article will extract reconstitution observations from the Russia-Ukraine War (due to space limitations, our observations will focus on Russia, our potential adversary), examine current U.S. Army reconstitution doctrine and our own historical examples, use those to identify the process we need (TR), and offer an operational approach for how to implement TR. Ultimately, reconstitution is a requirement to win protracted conflict, and we need to use our opportunity now, in peace, to build a war-winning model.

Reconstitution in the Russia-Ukraine War: What Not to Do

As of July 2024, Russia's daily casualties have averaged about 645 troops; in U.S. Army terms, that is a battalion per day, or a large division per month.¹ Its equipment losses have also been staggering, with average losses of about eighteen artillery platforms (a battalion) per day.² Further, the rate of losses has accelerated in 2024; for instance, Russia averaged over 1,200 daily casualties in May, and its artillery losses have increased to roughly three battalions per day.³ Ukraine has similarly suffered tremendous losses. Figure 1 shows visually confirmed Russian equipment casualties as of 19 July 2024 (*left*), as well as the losses that Ukraine claims to have inflicted on Russia (*right*). Note that Russia has certainly lost more equipment than has been visually verified by independent analysts, and that both Russia and Ukraine may have inflated their claims of battlefield success.



(Figure by authors; data from Oryx and the Armed Forces of Ukraine)

Figure 1. Visually Confirmed versus Reported Russian Equipment Losses

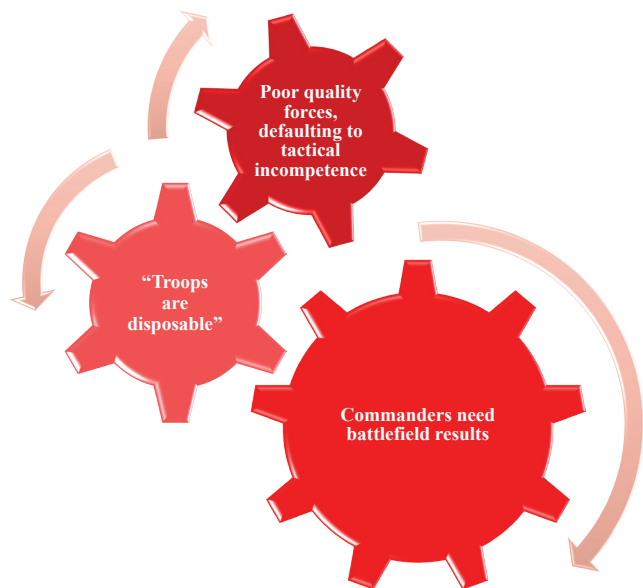
The losses are astonishing, greatly exceeding replacement rates, and yet both have found viable reconstitution processes because the conflict is still raging with full intensity. Russia's approach has generally involved pulling from its deep equipment war stocks and filling its ranks with whoever it can find, including prisoners and old men; in general, its reconstitution is a story of devolving quality. Ukraine has similarly drawn down war stocks and struggled to fill ranks but with the added complication of integrating equipment from well over a dozen nations. Due to space limitation, we will focus on Russia since it is our potential adversary and more comparable to the United States in size. We have a choice: learn lessons and build a better system now while out of war or learn lessons as Russia and Ukraine have, the hard way, while dealing with a thousand other challenges during war.

Russian Reconstitution

Russia's approach to reconstitution has generally been effective at refilling its army with personnel and materiel, but its approach has led to the steadily declining quality and efficacy of its force. Despite hundreds of thousands of casualties, the Russian Army is now

recruiting thirty thousand soldiers a month and actually growing, increasing its troop strength in Ukraine "from 360,000 to 470,000" between 2023 and 2024.⁴ Its materiel regeneration is similarly impressive. "Russia is on track to produce or refurbish over 1,200 new main battle tanks a year, and to manufacture at least three million artillery shells or rockets per year—over triple the amount the United States estimated at the beginning of the war—and more ammunition than all thirty-two NATO allies combined."⁵ While the numbers are genuinely impressive, the reconstitution process is not one to emulate.

In general, Russia's army is caught in an *efficacy dilemma* in which the tensions of viewing its troops as disposable while also having poor-quality forces have created a mutually reinforcing cycle. In this dilemma, commanders need to produce results, but their forces lack the training for even moderately sophisticated operations, and so the pressure to produce results, combined with disregard for the lives of troops, has created a reinforcing loop. One of the most well-known examples of this is the infamous nearly yearlong battle for the village of Bakhmut, where Russia incurred over ten thousand killed, frequently through mass frontal



(Figure by authors)

Figure 2. Russia's Efficacy Dilemma in Reconstitution Operations

attacks into prepared defenses.⁶ Russia's net gain was minuscule territory, but those human wave attacks were the only tactic that seemed to produce even the slightest results on land, so they have become standard practice rather than an inspiration for change.

Further, Bakhmut was no isolated incident. March 2024 in Umanke, Russia, demonstrated it is still caught in the efficacy dilemma:

On 29 March [2024], 6th Tank Regiment (90th Tank Division) mounted a battalion-sized attack supported by the militia 428th Motor Rifle Regiment. As many as 36 tanks and 12 APCs [armored personnel carriers] were committed, the largest grouping seen since October 2023. The assaulting force launched from Tonenke. The aim seems to have been to force the Durna [River] at Umanke where the river narrows to a shallow or dry stream. The attack was conducted in daylight (due to lack of night vision capability) across open ground. The assaulting force followed a road. The Russians remain unable to coordinate an all-arms assault (with engineers, artillery, aviation or air) due to the lack of a working VHF [very-high

frequency] tactical net. The likelihood was the vehicles were communicating on walkie-talkies. 'Follow the leader' is the default tactic. Destruction of the lead tank quickly leads to the attack breaking up. This is what happened. 25th Separate Airborne Brigade was the main defending formation, supported by 68th Jaeger (Mountain) Brigade. One or more Ukrainian T-80s engaged the head of the column. Then a combination of artillery fire, FPV [first-person view] drones, ATGMs [anti-tank guided missiles] and mines broke up the attack. The Russians lost 12-15 tanks, including two T-90Ms, and eight APCs.⁷

Unsurprisingly, Russian performance in places like Umanke led the United Kingdom's Ministry of Defense in May 2024, a year after Bakhmut ended, to notice the same efficacy dilemma. It characterized Russia's army in general as defaulting to human wave attacks because its troops have little training and are consequently unable to perform more complex operations.⁸ Figure 2 models the Russian efficacy dilemma embodied by its performance in Bakhmut and Umanke.

Russia's materiel regeneration has shown similar qualitative decline, but its combination of deep war stocks of old equipment and new production will enable it to continue to reconstitute for at least the next one to two years. The table shows Russia's war stockage of tanks, with the clear implication that Russia has mostly exhausted stockpiles of its newer tanks (T-80s), and its armor is facing

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Table. Russia's War Stock of Tanks over the Course of the Russia-Ukraine War

	By Type				Remaining
	Pre-War	Mid-2023	Mid-2024	Difference	
T-55	313	257	216	-97	69.01%
5-62	1846	1292	1167	-679	63.22%
T-64	562	499	499	-63	88.79%
T-72A/Ural	1142	1063	1042	-100	91.24%
T-72B	861	595	418	-443	48.55%
T-80B/BV	1207	431	260	-947	21.54%
T-80U/UD	193	157	55	-138	28.50
T-90	112	89	0	-112	0.00%
Total	6236	4383	3657	-2579	58.64%

(Table by authors)

a qualitative decline. While the table looks at tanks, Russia has had similar consumption of its other major end items like artillery and armored fighting vehicles. Given its equipment losses and production, it's estimated that Russia will have depleted most of its once massive war stock of tanks by 2026.⁹

The takeaway is that Russia looks at reconstitution as a tool to support attrition, and it is quite good at its form of reconstitution. It has not only replaced personnel losses but grown its land forces in Ukraine. Simultaneously, while the pace of its equipment losses exceeds its replacement rate, it institutionally prepared for this with deep war stocks. But this is no model to emulate because Russia is caught in an efficacy dilemma, and it is unable or unwilling to break this dilemma based on events like Bakhmut in 2022–2023 and Umanske in 2024. Russia's model, underpinned by viewing its troops as a disposable commodity, is fundamentally at odds with the character of our Army and Nation. The lesson we should glean is that our reconstitution process should solve the issue of refilling and growing our Army in conflict without creating our own version of the efficacy dilemma.

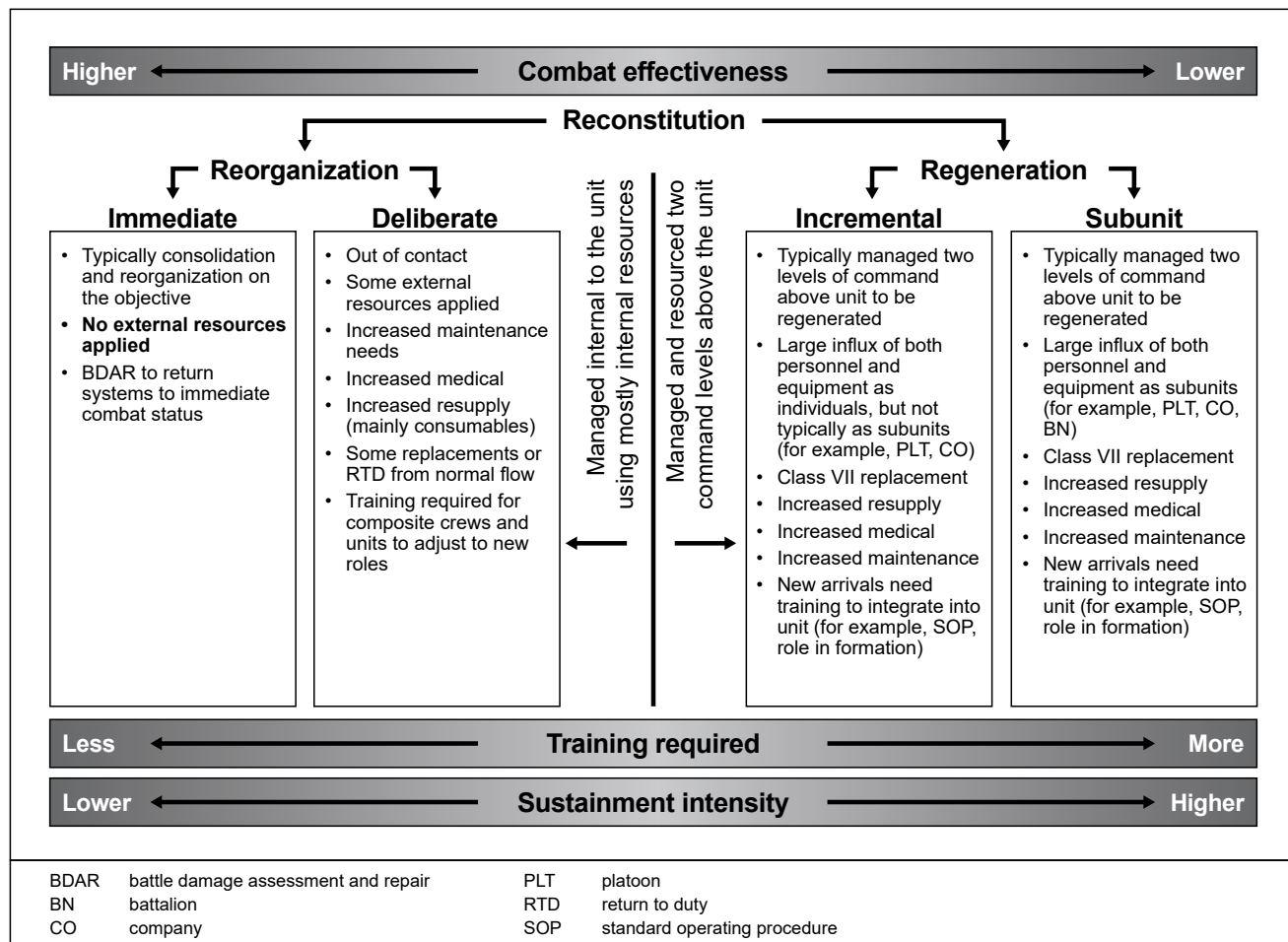
U.S. Army Reconstitution Doctrine and Experiences

Our reconstitution doctrine, found in Army Techniques Publication (ATP) 3-94.4, *Reconstitution Operations*, looks at reconstitution as a supply and demand problem, with the acknowledgment that the

supplied quantity and quality of new personnel and equipment may differ from the demand.¹⁰ The ATP defines reconstitution as “an operation that commanders plan and implement to restore units to a desired level of combat effectiveness commensurate with mission requirements and available resources.”¹¹ Reconstitution consists of *assessment, reorganization, and regeneration*. Assessment is “a commander’s estimate of the unit’s ability to accomplish its mission” and “must include the commander’s judgment of all factors.”¹² Following the assessment, a unit can be reorganized or regenerated as described in figure 3. In essence, reorganization reshuffles a unit with what remains and what a higher headquarters has available to provide.¹³ In contrast, regeneration is the deliberate “rebuilding of a unit through large-scale replacement of personnel, equipment, and supplies ... and training” and “usually occurs at the corps level and above, out of contact with enemy forces.”¹⁴

ATP 3-94.4 acknowledges our Army has needed to reconstitute major formations on numerous occasions, and includes the below 7th Armored Division vignette following the December 1944 Battle of the Bulge:

After retiring across the Salm River, the 7th took stock of the price paid over the previous two weeks. In all, the 7th’s delaying action cost the division over 40 percent of its tanks and 10 percent of its personnel, predominantly in the cavalry and armored infantry units. With Hodges already planning the First



(Figure from Army Techniques Publication 3-94.4, *Reconstitution Operations*)

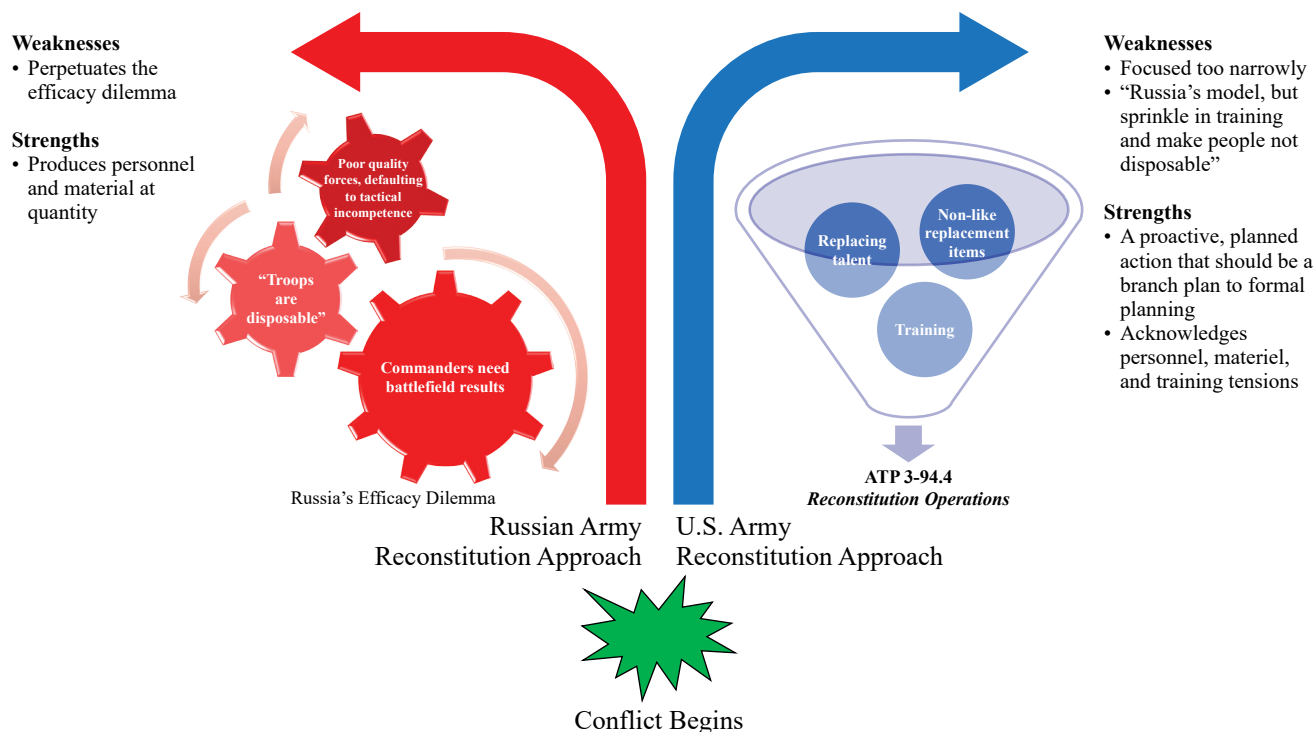
Figure 3. Reconstitution Elements versus Training and Sustainment Required

Army counterattack, there would be little time for Hasbrouck to prepare his division for its next mission ... The task of reconstituting the division was daunting. Many units had suffered greater than 50 percent casualties. One such unit, B/87th Reconnaissance Squadron, had made it across the Salm with only 35 Soldiers of its original 135, and 1st Sergeant Ladd, as the sole surviving leader. Many of the replacement Soldiers were either recent inductees with no combat experience, or cooks or anti-aircraft artillerymen, all now becoming infantry. Units would need to be completely rebuilt and then conduct individual, platoon, and up to battalion level training. Focusing on the mission at hand, Brigadier General Hasbrouck determined

the use of small combined-arms task forces, consisting of tanks, infantry and engineers, operating decentralized, would be best suited to regaining the ground lost ... Unit drills focused on platoon gunnery and infiltration, allowing the 7th Armor Division's M4 Shermans to close to within 200 yards of German positions.¹⁵

This deliberate approach, which included three weeks of training before returning to the fight, all designed to maximize potential at the lower echelons that the division could train up to in the time available, worked. In just three days of combat, the 7th Armored Division recaptured the terrain it had slowly ceded over two weeks.¹⁶

The strength of our doctrine is that it acknowledges the essential nature of reconstitution and the



(Figure by authors)

Figure 4. Comparison Between U.S. Army and Russian Army Approaches to Reconstitution: More Similar than They Should Be

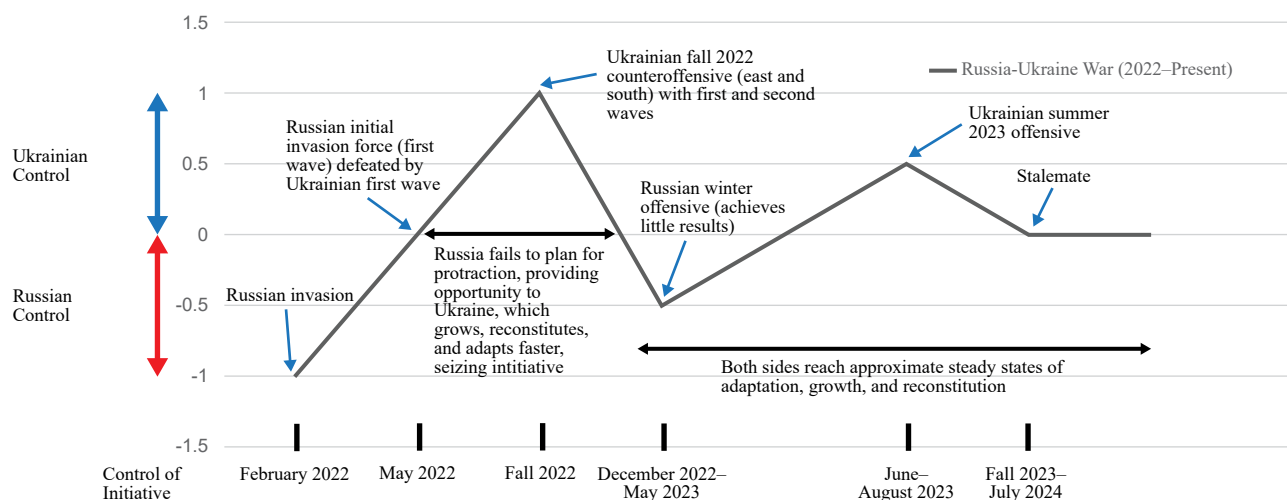
tensions within the process, supported by our history. Specifically, our doctrine notes that regeneration (the heart of reconstitution) is "a proactive, planned action," for which "planners should develop a base reconstitution plan as a branch plan during the formal planning process."¹⁷ One of the tensions in our process, which mirrors attrition trends in the Russia-Ukraine War, is replacing talent. Returning to our history, "a typical World War II division from June 1944 to May 1945 experienced 200-300 percent personnel turnover as it received replacements on its eastward advance. In the early stages of conflict, a unit may receive personnel with the rank and experience requested, but as a conflict continues, that likelihood decreases."¹⁸ Likewise, our doctrine acknowledges the materiel tensions that Russia and Ukraine are both encountering as they replace losses with what our doctrine terms *non-like replacement items* (replacing equipment with older or newer generations, or even foreign analogs).¹⁹ Lastly, our doctrine identifies the tension of weighing the immediate need for combat power versus their greater efficacy after training. The weakness of our doctrine

is that it looks at reconstitution too narrowly, balancing demand for personnel and materiel with available supply over time.

While ours makes clear that training is a critical ingredient for reconstituted units (something Russia lacks), as in the 7th Armored Division example, our doctrine is just a variation of the Russian attrition focused model (see figure 4). We need a more comprehensive approach, an approach developed, practiced, and refined before conflict, which anticipates the transition to protraction and expansion of the force while balancing supply and demand over time, ultimately producing a better force.

A More Comprehensive Approach: Transformative Reconstitution

The speed and timing of reconstituting and expanding forces matters tremendously, and getting the timing right to seize limited windows of opportunity can win or stalemate wars. For the Russia-Ukraine War, the timing of the shift to protraction and major reconstitution events has determined operational level initiative.



(Figure by authors)

Figure 5. Initiative Over Time: Russia-Ukraine War

The side that can better anticipate and execute these transitions has a decisive advantage. While Russia initially and briefly seized large portions of Ukraine in early 2022, the initiative decidedly switched in fall 2022 as Ukraine's counteroffensive achieved significant results in the south and east (see figures 5 and 6). Since then, while the initiative has tilted as both sides traded offensives, the war generally appears to be in

a stalemate, with neither likely to achieve its political objectives, and this stalemate is the result of failed reconstitution.

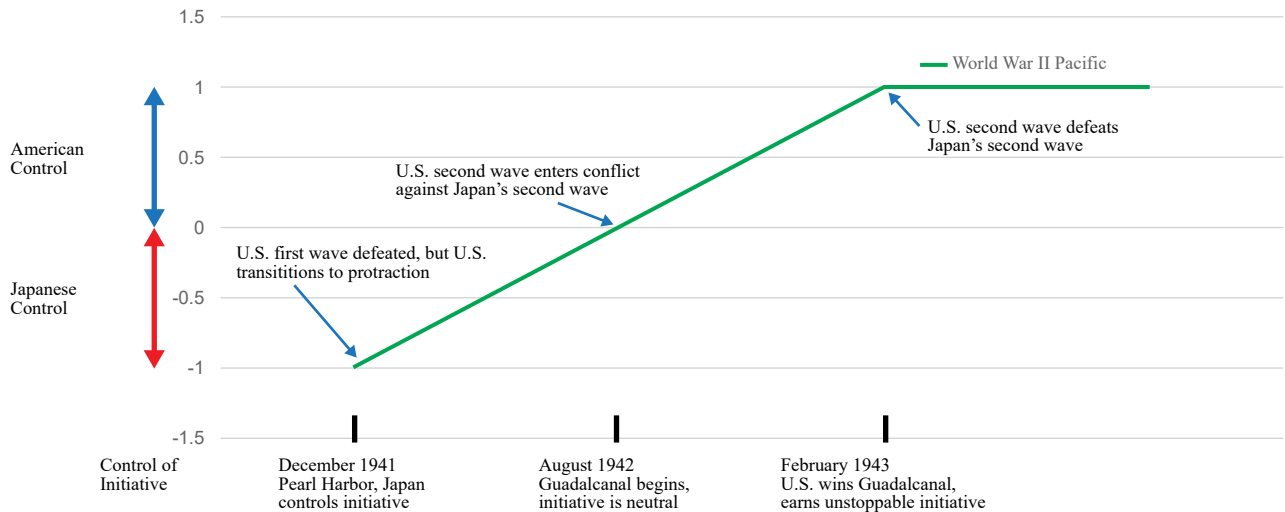
While we (the authors) decidedly want Ukraine to win this war (one of the authors served in Ukraine in 2021), its size in comparison to Russia makes it exceedingly unlikely it will reconstitute and grow enough mass to recapture all its lost territory. In



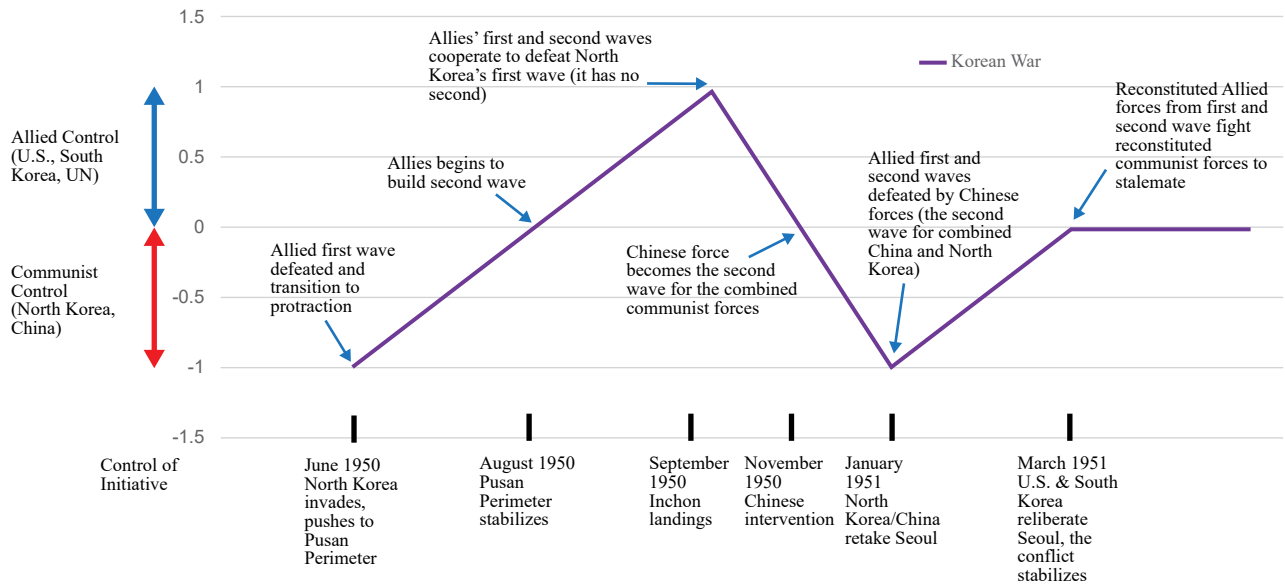
(Figure by authors; data from Institute for the Study of War)

Figure 6. Timeline of Territorial Control in Ukraine

Initiative Over Time: World War II



Initiative Over Time: Korea



(Figure by authors)

Change in control of initiative over time in relation to first, second, and subsequent wave forces: top, World War II Pacific; bottom, Korean War.

Figure 7. Comparison of Initiative Over Time Between World War II and the Korean War

contrast, Russia had all the potential needed to win this war. It failed in the first half of 2022 because it greatly overestimated its ability; consequently, its strategy to destroy Ukraine's government was infeasible. However, following its initial defeat in spring-summer 2022 (its first-wave forces), Russia had

the opportunity to learn and create an entirely new force (its second-wave forces: newly created forces or freshly mobilized reserves) that would help it win the war, but as Bakhmut and Umanske have shown, it squandered that opportunity. This story has many parallels to our own history in World War II and

the Korean War, as well as how things might unfold in potential conflicts in Taiwan, Korea, or virtually anywhere we may engage in large-scale combat operations.

In World War II, following initial defeats of our first wave across the Pacific, we had to defend to buy time to reconstitute our entire Army and grow a second wave from scratch. In the Korean War, our first wave again suffered initial defeats and was forced into the defense around Pusan. In World War II, our reconstituted and enlarged force, the second wave, regained the initiative, leading to unstoppable momentum against Japan in World War II; the same would have happened in Korea if not for China, whose entry reconstituted and expanded the communist forces. In both World War II and Korea, revisionist nations launched rapid initial offensives, forcing the democracy to defend while reconstituting, much as Ukraine was forced to in 2022—much as may yet happen in Taiwan or Lithuania. As modeled in figure 7, following the democracy's initial defense, initiative either shifted to the side that could better reconstitute or settled into stalemate in cases of equal reconstitution, as in Korea following the Chinese intervention.

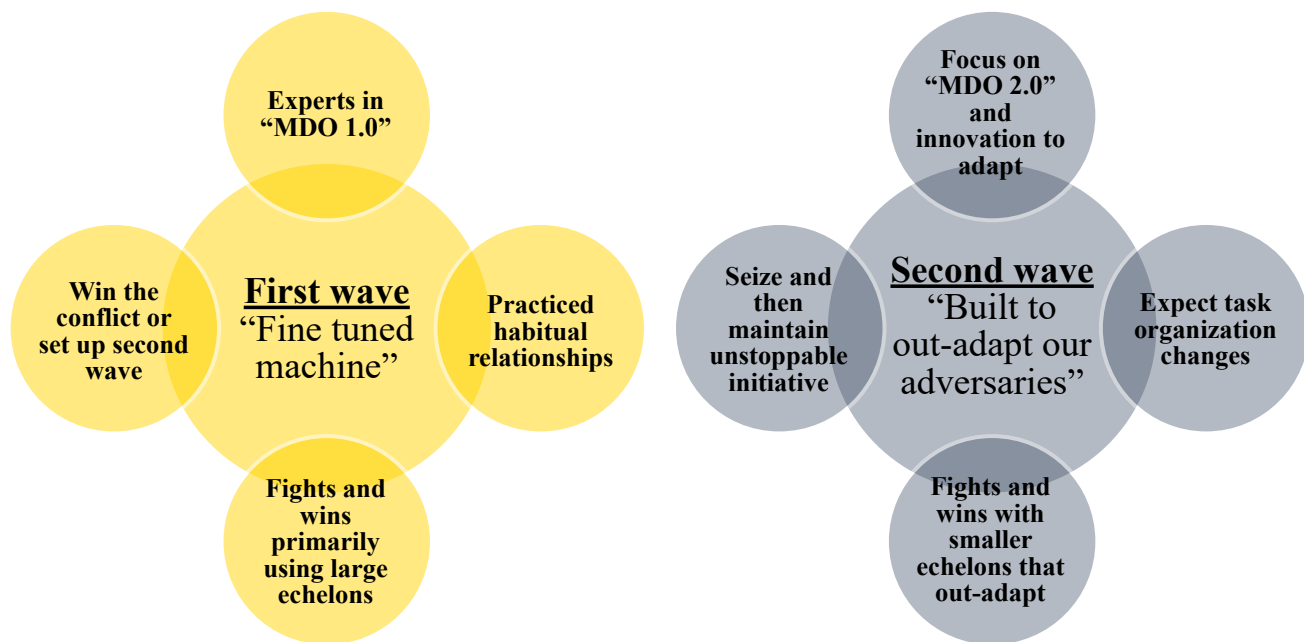
We will likely have another conflict where yet again our first wave forces initially defend to set offensive conditions for some combination of remaining first wave forces and new second wave forces, as Ukraine was forced to. However, as discussed, our reconstitution system is eerily like Russia's, which has been unable to beat a country a quarter its size despite sharing a 1,900 km border.²⁰ One potential difference is that in our next conflict, we could be in direct conflict with China or Russia rather than a nation several times smaller than us. Further, as has been widely discussed throughout our profession, our industrial defense base is not what it was during World War II or Korea, and waiting years for it to retool at scale to enable the arsenal of democracy may be years too late. We need a better approach to reconstitution that does not inherently rely on months to years of buildup and is more than simply regenerating personnel and materiel and sprinkling in some training. We need an asymmetric advantage for our first, second, and any subsequent waves that would allow us to transition to the offense faster than our adversaries and then underpin unstoppable initiative through absolutely superior reconstitution.

The Design of Transformative Reconstitution

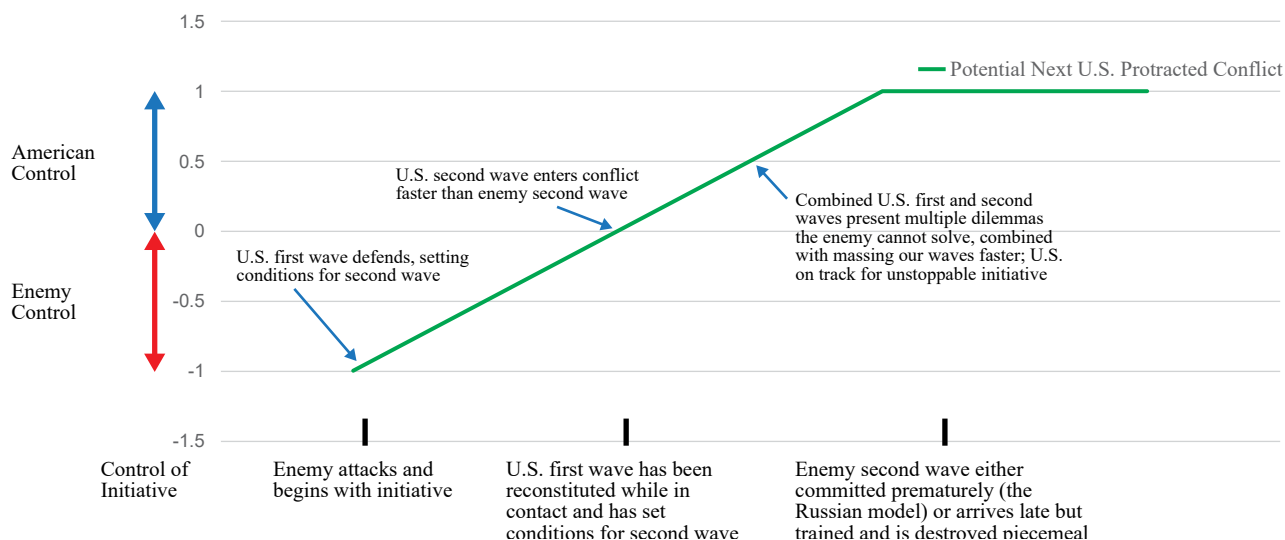
The Department of Defense's force development model centers on the well-known elements of doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P), yet our reconstitution model focuses just on training, materiel, and personnel.²¹ TR needs to include the other elements of force development. Doctrine, supported by leadership and education, and instilled through organization and training, is the cultural underpinning of our Army and the place to start for designing TR.

Following Russia's initial invasion in February 2022, both sides adapted to the conflict. The lessons learned in electronic warfare, maneuver, sustainment, fires, and more spread through both sides. As we have seen, the Russians generally devolved into simplistic tactics like human wave attacks and excessive reliance on column formations during movement. Put differently, their doctrine, organization, training, and leadership adapted backward. Consequently, when Russia regained the initiative and launched its winter offensive in early 2023, its forces crashed into well-adapted Ukrainian forces; instead, Russia should have adapted forward and hit its opponent with new doctrine and supporting models of organization, training, and leadership. Germany fell into the same trap in World War II when it doubled down on failure by continually relying on blitzkrieg tactics that the Allies had already adapted to. Our better model of reconstitution needs doctrine that can anticipate this adaptation so our reconstituted forces (whether they are our fresh second wave or regenerated first wave) can hit the enemy with something new.

Since official publication of the current Field Manual 3-0, *Operations*, in 2022, our Army has begun transitioning to multidomain operations (MDO) doctrine.²² By the time of our next protracted conflict, we will have likely coalesced on an operationalized form of MDO (or possibly a subsequent doctrine if our next conflict is far in the future). This means that in our next protracted conflict, by the time the initiative swings to us, our adversary will likely have adapted to the standard form of MDO that our first wave employs ("MDO 1.0"). Our implication is that to avoid the pitfalls of Russia in Ukraine and Germany in World War II, our second wave needs to employ something the enemy has not already adapted to, an "MDO 2.0." But MDO 2.0



What We Want Transformative Reconstitution to Provide



(Figure by authors)

Top: a comparison of the first and second wave forces

Bottom: the effect on initiative that transformative reconstitution should provide the combined first and second waves

Figure 8. First and Second Wave Forces and Their Effect on Initiative

will likely require different organization and training, enabled by leadership with the right education.

Reconstituting in contact will undoubtedly be difficult, as seen for Russia and Ukraine, and as our own history has shown, and MDO 2.0 will need to account for that. Thinking back to the 200 to 300 percent turnover in our Army in the European theater during World War

II, as well as to the casualties that Russia and Ukraine have already suffered, our MDO 2.0 warfighting doctrine needs to be effective and teachable. If it is not, we will either default to what our adversary has already adapted to, MDO 1.0, or we will devolve, like the Russians in Umanske. Further, the competing requirements to put our reconstituted or new forces back in the fight but also

needing to keep them out for training will likely lead to instances in which we cannot reach proficiency at higher echelons. As with the 7th Armored Division example or the ubiquity of company-level-and-below operations in Ukraine, MDO 2.0 should be optimized for lower echelons to give us the best advantage.

Supporting MDO 2.0 and its likely focus on lower echelons while remaining a dilemma to the enemy through our inevitable personnel churn has implications for our organization, training, and leadership and education. Specifically, TR should prepare us to frequently change task organizations and become accustomed to more temporary, transactional relations between supporting and supported units rather than the habitual relations we so often strive for. While habitual relations make sense for our first wave forces who may have years together prior to conflict, our second wave needs to be inherently built to out-adapt our adversary, which includes being unphased by frequent task organization changes. Likewise, our leadership and education need to enable our second wave to out-adapt.

In essence, the first wave needs to be a fine-tuned machine, with practiced habitual relationships and expertise in MDO 1.0 to set conditions for a change in initiative with our second wave. In contrast, the second wave needs to seize and then maintain unstoppable initiative by preempting the enemy's adaptation and then continuously out-adapting after contact. Doing so will require our second wave to be different from the start with MDO 2.0 and organization, training, leadership, and education geared toward preparing for uncertainty (see figure 8).

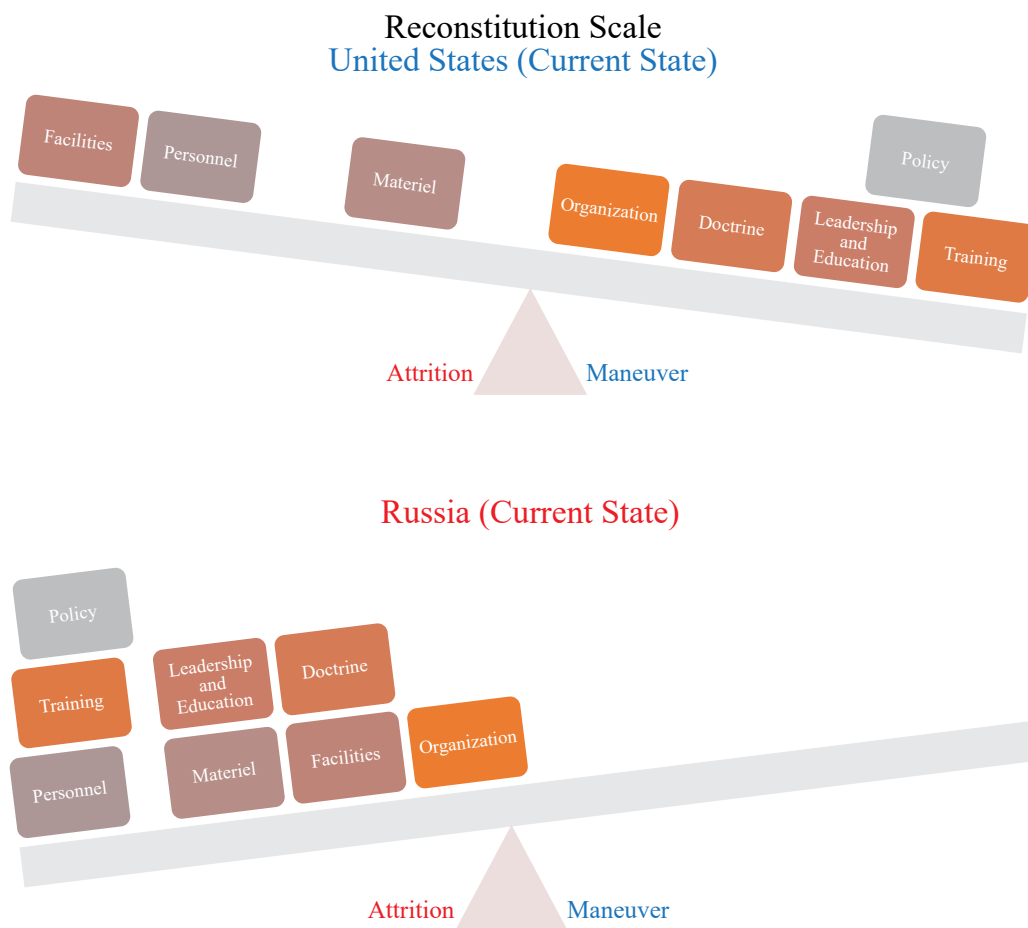
The last two elements of force development, facilities and policy, need to rapidly regenerate the first wave while speeding the second wave to the fight during the window of opportunity to seize the initiative. Fortunately, our Army generally has the facilities to enable rapid expansion because of our dozens of active installations and potentially reopened inactive facilities. The policy side is harder, and things like reinstituting a draft and changes to the industrial base are strategic decisions for our political leadership. However, we can ease this process through having a ready-built list of required policy changes across DOTMLPF-P to support our ability to regenerate, reorganize, expand, and out-adapt adversaries. For these reasons, this article focuses on the other elements of force development.

An Operational Approach to Implement Transformative Reconstitution

Talk is easy, but action can be hard, and our Army needs an operational approach to take us from our current state to TR. The truth of our current state is we have the doctrine discussed previously but are decades out of practice. Further, as frequently discussed in the defense community, our military is oriented to fight short duration, maneuver-centric conflicts, as indicated by our shallow stockages of ammunition, long training pipelines, emphasis on joint operations, and public sentiment against a draft. A lot of this orientation is good—we want to win quickly and decisively and have oriented our doctrine, organization, training, leadership, and policy to enable that. If we are unable to win quickly, we have some depth in materiel (vehicle war stocks), personnel (the Reserve Component [RC], the Individual Ready Reserve, etc.), and facilities but not what we would need for protracted large-scale combat operations. Figure 9 illustrates our current state, along with Russia's, and our respective biases toward maneuver and attrition, respectively.

Our current reconstitution model and the operational approach to achieve the future state of TR are depicted in figure 10. Our operational approach should anticipate our Active Component (AC) constituting the majority of our first wave with the RC (the National Guard and Army Reserve) forming the nucleus of our second wave. For the most part, the AC, focused on controlling initiative, developing and proliferating MDO 1.0, and maximizing current habitual relations, already has the right ingredients for our first wave. What the AC is missing is the experience in the transition to protraction that will allow the combined first and second waves to control and maintain unstoppable initiative. But experience can be resolved through exercises with RC units.

The RC already embodies most of what the second wave needs, particularly the ability to adapt and emphasis on smaller echelons. For instance, their mixture of civilian and military experience and military and domestic operations make the RC highly adaptive by nature. Further, with their limited training days per year, RC forces spend most years training to lower-echelon proficiency, typically platoon to battalion (but up to brigade during combat training center rotations), with variation depending on a unit's place in the readiness cycle. Generally, our RC forces are designed



(Figure by authors)

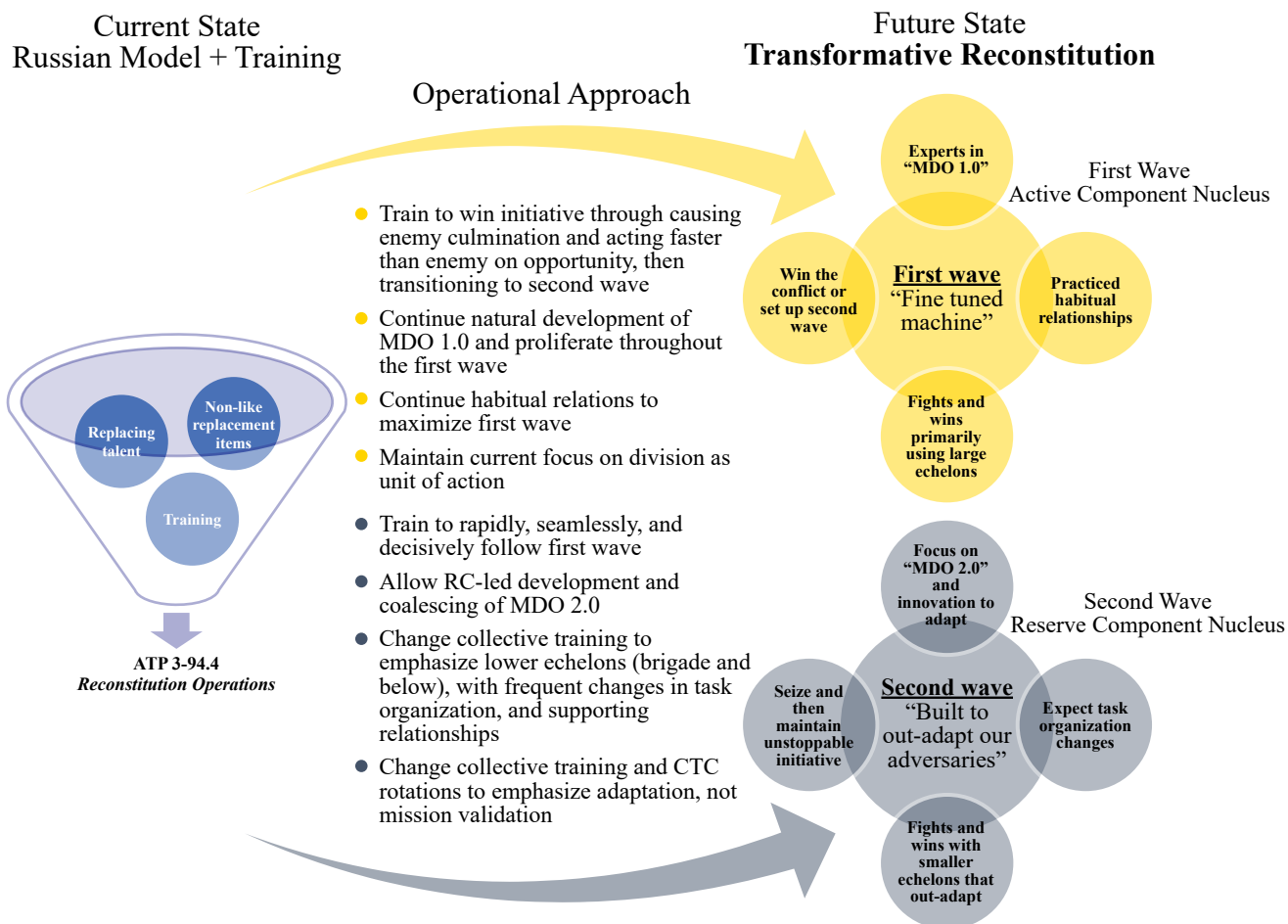
Figure 9. Current State of the U.S. Army and the Russian Army in Reconstitution across DOTMLPF-P

to duplicate AC forces but with fewer training days; turning them into the second wave we need requires deliberate focus on that role to meet the model.

Building the second wave we need will require better integration between RC and AC forces. Fortunately, virtually all these measures can originate in training and exercises. For instance, we can change our combat training center (CTC) rotations so that when RC units follow AC units, both conduct deliberate transition operations like passage of lines and retirements. CTCs can also develop RC units to follow the first wave rapidly, seamlessly, and decisively. For example, scenario scripting can reward superior transitions with fast units facing a smaller delaying force but slow transitions leading to face larger main bodies, simulating acting on windows of opportunity. This emphasis on

experimentation to out-adapt and overcome unexpected changes in the enemy and operational environment will naturally enable the development of a MDO 2.0, which the RC can serve as the proponent for.

CTC rotations for units that do not need mission validation—such as formations not deploying overseas—offer vast opportunity for developing units to out-adapt. This can include breaking traditional CTC norms such as having rotations unexpectedly be completely urban or forcing units to use their succession of command by sending regenerated leaders into different roles if they become casualties. Other examples include a surprisingly large or small opposition force that requires the RC unit to realize the situation and then develop and act on a new course of action. It can also include preparing units for task organization and



(Figure by authors)

Figure 10. Reconstitution in the U.S. Army: Our Current State with an Operational Approach to Reach the Future State of Transformative Reconstitution

supporting relationship changes through mixing elements of different brigades for rotations, or by presenting them with arrays of smaller objectives that require tailored combined arms formations.

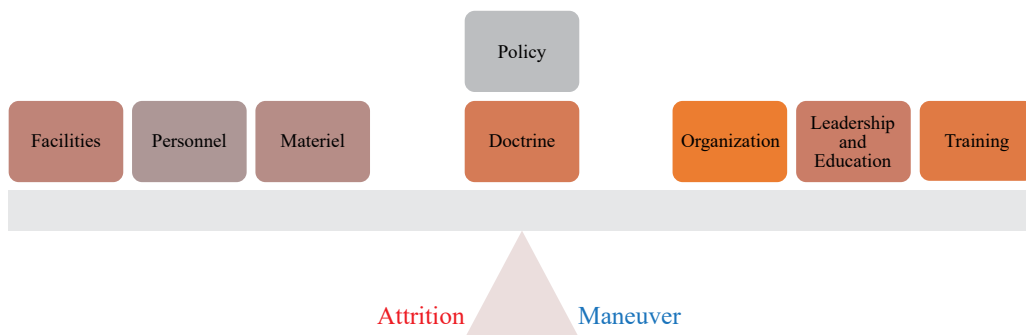
These cumulative changes to CTC rotations and their implied cascading changes in prior train-up will naturally foster the development of an MDO 2.0 that supports a second wave built to out-adapt adversaries. CTCs are keystone in our discussion due to their robust resourcing and their status as culminative events that drive months to years of preparation. They also allow our formations to demonstrate new doctrine and organizational concepts. However, the real critical element is a cultural focus on out-adapting, which can and should also be inculcated inside professional military education

and events outside CTCs. Further, as the nucleus for the second wave and its MDO 2.0, the RC is the natural proponent to lead MDO 2.0's development. Essential to driving this change will be getting away from the desire to have RC units be interchangeable duplicates of AC units since experimentation requires latitude for change. We have all the potential needed to affect these changes; we just need to be bold enough to try.

Conclusion

The Russia-Ukraine War is a reminder that conflict is never one sided, and Russia's fantasy of a quick and decisive victory was almost immediately replaced with protracted war. While Russia has failed to achieve much meaningful gains since summer 2022, it has

Reconstitution Scale U.S. Army with Transformative Reconstitution



(Figure by authors)

Figure 11. Transformative Reconstitution, the Balance Between Our Attrition-Leaning Doctrine and Maneuver-Focused Institution

excelled in its own form of reconstitution, which is just managing to keep the war in stalemate. Specifically, Russia has grown its ground forces in Ukraine from 360,000 to 470,000 and as of October 2023, has even reconstituted units like the 155th Naval Infantry Brigade as many as eight times.²³ We need a better model that suits our maneuverist culture of creating and exploiting a position of advantage during windows of opportunity, and transformative reconstitution aims to provide that for protracted war.

TR is a bold change to our reconstitution model, and there will undoubtedly be hurdles and counterarguments. Institutional inertia is probably our greatest barrier. Further, it is true that our AC and RC forces are already generally aligned with the first and second wave models. TR builds on this reality and deliberately incorporates the RC's strength in lower-echelon operations. But the shortcoming in our current force structure is molding RC forces into interchangeable duplicates of AC forces. TR abandons this because preempting an adversary's adaptation with our second wave requires latitude to experiment so that MDO 2.0 and the supporting organization, training, and leadership develop naturally.

The Russia-Ukraine War is a reminder that hopes for quick victory can rapidly disintegrate to protraction. We are currently caught in a dilemma with an attrition-leaning reconstitution doctrine that seeks to balance supply and demand, like Russia, but with an institution and industrial base more suited to maneuver warfare. TR seeks to balance those and tune the U.S. Army to prepare for protraction in Europe, Korea, Taiwan, or elsewhere. Transformative reconstitution intends to transform us in two ways, first by preparing us now for protraction and force expansion so that our second wave is ready to preempt enemy adaptation. Further, it anticipates combat losses and proactively fosters the development of new forms of doctrine, organization, training, and leadership focused on lower echelons to avoid devolving to our own version of Russia's efficacy dilemma. We are culturally built for maneuver warfare but need balance (see figure 11) to avoid derailment by attrition in protracted conflict. Developing and implementing an asymmetric advantage in reconstitution and force expansion can deter now, and if needed, win the next fight by dominating any transition to protraction. ■

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Meeting Expectations

Failure in Ukraine Will Not Change the Russian Aerospace Defense Force



Lt. Col. F. Jon “Spinner” Nesselhuf, U.S. Air Force

Russia's invasion of Ukraine has put the so-called “New Look,” or Serdyukov Reforms of the Russian Aerospace Defense Force (RADF), to the test.¹ Western critics tend to interpret the air operation as a failure that would shift the RADF to a model of seizing control of the air, suppressing enemy air defense, and increasing integration with the Russian army. The Russians, however, see the air aspect of the invasion differently. Primary research in *Military Thought: A Russian Journal of Military Theory and Strategy* indicates that Russian military thinkers believe the invasion validates their air power strategy and operational assumptions.² They argue that the RADF should continue to focus on a defensive air power strategy that prioritizes defending against North Atlantic Treaty Organization (NATO) decapitation strikes, developing standoff weapons, and increasing the presence of uncrewed aerial vehicles (UAVs).³ RADF theory seeks to overcome enduring command-and-control (C2) challenges between the RADF and the Russian army through the use of attritable assets. The ideas presented in the journal combined with battlefield observations indicate that the RADF will not pursue meaningful reforms following the war against Ukraine.

Russia's invasion of Ukraine provides NATO with reams of data on the Russian military and its performance. The surprise of Russia's failed blitz was

palpable in the U.S. intelligence community.⁴ The RADF reached an apogee in status after contributing significantly toward victory over the Islamic State in Syria, a feat that analysts should not overlook. Western analysts anticipated greater competence and a more NATO-like approach to war: joint integration, emphasis on air superiority, and complex air operations combining multiple platforms to defeat air defense systems. This current literature compares the RADF negatively against NATO standards but does not examine the Russian military's self-perception.⁵ Analysts lacked material at the beginning of the war to understand Russia's air power intentions, but now, two years into the war, enough publications exist to create assessments.

Through an analysis of *Military Thought*, this article studies Russia's perception of the RADF's performance and the changes the RADF is likely to pursue. *Military Thought* is an excellent primary source because of its association with senior military leaders like Gen. Valery Gerasimov and its heritage as the journal of Soviet and Russian military theory.⁶ *Military Thought* is like PRISM or *Military Review*. Still, unlike these journals, the published articles are more controlled by the operational chain of command. From summer 2022 to spring 2024, *Military Thought* published seven articles on the future of aerospace operations and twelve articles related to the use of UAVs. The nineteen articles represent 18



A Kinzhal 47-M2 missile is mounted to a MiG-31K on display at the Army 2020 International Military-Technical Forum in Moscow. (Photo by vaalaa via Adobe Stock)

percent of the published material in *Military Thought*.⁷ The UAV articles focus primarily on the employment of UAVs by ground forces and provide insight into the different lessons Russian services gleaned from the invasion of Ukraine.

In addition to *Military Thought*, this analysis leverages current news articles, Russian Minister of Defense announcements on Telegram, TASS reporting, think tank reports, and journal articles to augment and contextualize the primary sources. Reporting about the war indicates which theories are becoming practiced and the likely impact on the future of Russian air-war making. Reports from RAND, MITRE, the Institute for the Study of War, the Center for Naval Analysis, and the Royal United Services Institute provide excellent background on the topics, including explanations of Russia's prewar aerospace doctrine. Their analysis, combined with a review of primary sources, establishes a baseline to assess changes in current doctrine.⁸ This article seeks to expand the analysis in journal

articles such as Matthew S. Galamison and Michael B. Peterson's "Failures of Russian Aerospace Forces in Ukraine."⁹ Their article assessed the doctrinal causes of Russia's failure but not the Russian perspective of the RADF's performance in war.

Understanding Russia's lessons learned requires an analysis of past, present, and plans at the strategic, operational, and tactical levels. The first section describes Russia's air power theory at the outbreak of the conflict to establish the RADF's defensive strategy and focus on standoff strikes. The second section examines Russia's self-assessment and argues that the conflict does not challenge Russia's prewar air power assumptions. In addition, it describes the Russian response to the invasion, including the embrace of UAVs, the finger-pointing of the RADF members, and, most importantly, the observed behavior from the battlefield. Finally, the third section projects the impact of the "special military operation" on the future of the RADF and the lessons NATO can learn about its adversary. Other factors

such as corruption, rigid command structure, and culture also play an essential role in shaping the future of the RADF but are not the focus of this study on the ideas of military thinkers in Russia.

Russian Air Power on the Eve of Battle

At the start of the invasion, Russian military officers' assumptions resembled Western assumptions on the future of air warfare. The Russians studied operations in Syria, Ukraine, and Azerbaijan in the years leading up to the invasion and sought to shape the RADF accordingly. They wrote that standoff or "non-contact" weapons would increase in importance operationally and tactically. Like the American air planners, they considered air superiority forces and C2 nodes the most critical targets for their fires.¹⁰ The development of precision weapons, they believed, required greater integration between domains, especially between sensors and shooters. They argued that air and space superiority would be essential to shaping the conflict and determining who would win. Lastly, they anticipated that UAVs would grow in value and use with war.¹¹

Despite mirroring the American assumptions about the future of air war, Russia's strategic, operational, and tactical response diverged significantly. Strategically, the Russians are much more defensively focused than Western-style air forces, especially the U.S. Air Force. The Russians express their probably accurate belief that

the RADF is no match in an air-to-air contest with NATO. The Russians understand they cannot symmetrically match the quantity and quality of the NATO force. For example, Russia's fifth-generation fighter, the Su-57, lacks the total spectrum stealth of the American F-22 Raptor, and Russia only has thirty-one copies of the plane to the 186 remaining F-22 airframes.¹² The RADF's strategic aim

is to defend the strategic missile forces required for a retaliatory nuclear strike.¹³ The RADF does not plan to dominate the skies over enemy territory but to ensure the Russian nuclear option remains available.

Russia's defensive strategic assumption shaped its operational approach from beginning to end. The Russians describe a need to operate through the air but would not need the command of the skies to the same degree as Western air forces. The RADF combined crewed counterair assets, mobile ground-based systems, disruptive standoff weapons, and electronic warfare units that operate best in defeating attacks, not projecting power. The RADF relies more on surface-to-air missile (SAM) systems than Western forces. Its SAMs are effective at point defense but have limited power projection capability. The prewar system sought to avoid the West's strengths and pursue limited aerial superiority in Russia.¹⁴

RADF's defensive approach discouraged the development of operational and tactical power projection skills. Most importantly, the RADF chose not to develop robust suppression of enemy air defense or destruction of enemy air defense tactics. Russian aviators learned from the last ten years that modern mobile advanced air defense systems effectively denied air space.¹⁵ The Russian solution was to avoid these threats and develop precision standoff weapons to disrupt SAMs from afar. RADF's prewar doctrine relied on hypersonic weapons, cruise missiles, and other standoff weapons launched from the safety of air space controlled and protected by Russian ground-based air defenses. The West first observed these strike tactics in Syria, where Russian long-range aviation used weapons like the Raduga Kh-101 launched from distant airspace.¹⁶ This operational approach relies on robust intelligence, reliable C2, and ground-based air defense that frees up aircraft to launch disruptive strikes.

Tactically, the RADF worked to create a "reconnaissance-strike complex" before the conflict. The Russians believed that the nation that converted intelligence into targets the fastest would win the battle. The Russians, however, lacked the C2 mechanisms to achieve this integration at the operational level. The Russians could not coordinate mixed squadrons, ground units, and UAVs in real time. Russia recognized the flaw but failed to gain the urgency needed for reform. With its lack of air threats, the Syrian environment did not challenge

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A 500 kg-class FAB-500 M-62 high-explosive bomb equipped with a UMPK guided glide kit is attached to the midboard port wing station of a VKS Su-34 strike fighter assigned to the 47th Bomber Aviation Regiment at Voronezh-Baltmor air base in Russia. (Still image courtesy of the Russian Ministry of Defence)

the targeting process. Russia would invade Ukraine in 2022, anticipating some challenges in C2 but hoped that advances with UAVs mitigated many of the challenges.¹⁷

The RADF intended medium-altitude long-endurance UAVs to complement standoff munitions, providing reconnaissance in their envisioned reconnaissance strike complex.¹⁸ The UAV proved itself to the RADF during operations in Syria, and the Russian military imagined an expanding role for UAVs over enemy air space. UAVs would allow the RADF to disrupt enemy offensive maneuvers by facilitating strikes at acceptable losses.¹⁹ Specifically, UAVs reduced the need for complex coordination with the Russian army's ground-based air defense system (GBAD). No military has yet mastered operating GBAD and friendly crewed airborne assets in the same space at the same time without incurring losses to fratricide. The UAV's expendability reduces the risk and allows Russian ground and air forces to operate without joint integration or loss of autonomy. The RADF, in theory, could hunt in the deep while the Russian army kept its GBAD on full alert.²⁰

Russia's prewar assumptions are best reflected in the development priorities of the post-Soviet reforms

announced by President Vladimir Putin in 2008.

Russia invested in modern precision weapons, hypersonics, SAMs, UAVs, and modern aircraft. RADF purchased aircraft, such as the SU-35 and SU-34, with electronic warfare and weapons guidance systems to take advantage of precision weapons. Simultaneously, Russia purchased advanced SAM systems like SA-22 Pantsir and S-400, which would provide reliable ground-based denial of and suited Russia's defense strategy.²¹ Russia felt confident in its New Look air force after successfully pummeling the Syrian resistance and showing NATO-like capabilities in a power projection environment.

Russian Air Power at War

From an outsider's perspective, Russia's air campaign in Ukraine seems like a failure. The Russians have failed to establish air superiority in the skies over Ukraine, and the ground component gave up its decapitation effort, settling into a war of position in southern Ukraine. The Russians have lost 234 aircraft, or 11 percent of their prewar total.²² Western analysts should be forgiven for assuming this loss level would

drive fundamental change. However, the seven articles published in *Military Thought* since the invasion do not indicate that the Russians are considering significant reform.²³ Of the seven articles, the “Use of Aerospace Forces’ Strike Aviation in Future Military Conflicts” by Cols. O. V. Yermolin, N. P. Zubov, and M. V. Fomin provides the most relevant assessments.²⁴ The Russian authors indicate that the war validated their strategic, operational, and tactical assumptions.²⁵

The invasion of Ukraine reinforced the RADF’s belief in its defensive strategy. Each aerospace article pays homage to the defense of the missile force, while three of the seven focus on defending missiles for strategic deterrence. The conventional inferiority on display in Ukraine further elevated the importance of nuclear weapons as the great equalizer to the economically and technologically dominant West.²⁶ The Russian military’s demonstrated weakness deterred the RADF from developing a more offensive outlook and focus on shepherding scarce resources to repel possible attacks by the West.²⁷ To highlight the defensive focus, Russia purchased ten Su-57s in 2024, aircraft most useful in air-to-air defensive operations, not air strikes in Ukraine.²⁸

The invasion of Ukraine provided more space for the evolution of air power operations. The RADF attempted a Desert Storm-like takedown of the Ukrainian state with considerable success. For example, the opening attacks destroyed 75 percent of Ukraine’s static air defense sites, and Russia was able to eliminate 51 percent of Ukrainian air assets. Nevertheless, Russia failed to destroy Ukraine’s numerous mobile SAM systems, disassemble the Ukrainian C2, or dominate the skies.²⁹ Ukrainian mobile SAM systems, in turn, degraded Russian capability, limiting the Russians to close air support missions and standoff strikes.

The RADF’s losses encouraged them to embrace standoff operations against fixed targets further. Russian thinkers sought to reinforce success by advising further investments into robotic wingmen, hypersonics, and cruise missiles. The crewed offensive was too hard, but the standoff disruptive strikes met the intent. The reconnaissance strike complex failed, not because the concept failed but because planners employed the reconnaissance UAVs improperly.³⁰ The UAV and standoff munition remain the support element of choice, given low costs and the inability of Russian

crewed aircraft to either operate safely near the front line or respond rapidly to need.³¹ The UAV’s versatility in spotting artillery fire, finding targets, and dropping munitions proved essential for the Russian army. The Russian services assessed the UAV across the board as the solution to cost-effective strikes and surveillance. Though this may seem like a change of assumptions, the assessment of the UAV reflects an acceleration of an anticipated future rather than a disruption.³²

Misses early in the war have not tempered Russian enthusiasm for standoff munitions. The writings indicate that more intelligent and numerous standoff weapons will be a part of the future RADF. Yermolin, Zubov, and Fomin argued that better training, intelligence, and more weapons could overcome any shortfall with standoff weapons.³³ The seven articles on future Russian warfare call for more standoff weapons, especially hypersonic weapons.³⁴ Russia, according to Ukrainian sources, launched over 7,400 guided missiles, including forty-eight hypersonic Kinzhals, since the start of the war.³⁵ Then Defense Minister Sergei Shoigu, while announcing the purchase of Su-57s, also announced the purchase of more hypersonic missiles.³⁶ The general sense in the journal is that mass and persistence will overcome weapon inaccuracy and degrade enemy air defenses. Russia’s development and employment of glide bombs and using SAMs as ballistic missiles are their attempt to use mass firepower to resolve intelligence shortfalls.

Complementing the use of standoff weapons like hypersonics, the Russians lean toward the promise of uncrewed aviation. The twelve articles on UAVs reveal that the Russian army and the RADF see the UAV as a panacea to their shortcomings. The term UAV is so broad that it tells little about the platform’s capabilities and requires clarification to appreciate the Russian’s employment. The Russian army uses uncrewed platforms to provide close air support, reconnaissance, and artillery coordination. The RADF uses UAVs as slow cruise missiles and would like to use them to accelerate their targeting cycle in line with their reconnaissance strike doctrine.³⁷

The Russian army evolved the air domain by increasing the use of UAVs at lower altitudes. Adopting micro- and mini-UAVs by the Russian army indicates tactical innovation. Due to their low cost and ability to create a quick kill chain, these platforms enhanced



Ukraine's Main Directorate of Intelligence confirmed reports 5 August 2024 of an early morning drone attack at the Morozovsk military airfield in Russia's Rostov region. The verified image showed that a Su-24 fighter bomber was destroyed and indicated that two other aircraft likely suffered damage. (Photo courtesy of Ukraine's Main Directorate of Intelligence)

the Russian army's lethality. For instance, the ZALA Lancet loitering munition aggregates the dynamic targeting cycle into a single platform. Operators do not need a sophisticated battle network. Instead, they can find and eliminate their targets without higher headquarters or significant risk to themselves. This streamlined process is far more efficient than the traditional Russian methods of calling for artillery fire or requesting close air support.³⁸

While strike UAVs aggregate the kill chain into a single platform for the Russian army, the quadcopter disaggregates the division reconnaissance strike complex to the platoon level.³⁹ At the tactical edge, Russian soldiers did not wait for the state to take care of their reconnaissance needs. Soldiers purchased commercial drones to provide intelligence on the local battlespace, dropped small munitions, and enabled indirect fires. Private

citizens rallied around these frontline forces, creating online training forums and providing UAV training to as many soldiers as possible.⁴⁰ The disaggregation of reconnaissance and strike processes compensates for the failures of C2 at the higher level.⁴¹ The Russian army observed that delegating power to the edge combined with organic reconnaissance and strike capabilities is their best method for a successful kill chain.⁴²

To complement the Russian army's widespread adoption of these tactical UAVs, the RADF employs larger classes of platforms. The RADF engages in a long-range standoff battle that uses UAVs to find targets deep in Ukraine or strike targets themselves.⁴³ The primary UAV is the Shahed, a remotely piloted munition operating like a slow cruise missile. According to the Ukrainian Armed Force Center for Strategic Communication, Russia launched 3,700 Iranian

Shahed or Geran-type attack UAVs.⁴⁴ These weapons complicate the Ukrainian defense planning and facilitate attacks by more deadly weapons such as the Iskander ballistic missile.

As revealing as the Russian's perceived successes are their perceived causes of failure, Yermolin, Zubov, and Fomin blamed shortfalls in intelligence, training, old equipment, and army-centric C2. The RADF's intelligence failures and C2 problems are linked at the operational level. The training and equipment shortfalls combined come together at the strategic level regarding funding and revealed shortcomings in the tactical employment of weapons. Lastly, the Russians reinforced the way forward with the New Look, indicating that a revolution was not underway.⁴⁵

As airmen are wont to do, the RADF complains about how the Russian army theater commander employs aircraft.⁴⁶ Russian air power theorists recognize that the Russian military district system prevents the centralized command of air power across Russia. They believe the siloing of air power prevents rapid intelligence sharing and coordination, degrading the ability of the RADF to coordinate complex air operations and leading to slow response times. Tactically, the Russian aircrew have good reason to be concerned as the air support capable platforms directed by Russian army leadership suffered disproportional losses. The RADF lost 33/197 (17 percent) Su-25 Frogfoots, 34/127 (26 percent) Su-34 Fullbacks, and 61/115 (53 percent) KA-52 Alligators of Russia's prewar total of aircraft.⁴⁷ Operationally, Yermolin, Zubov, and Fomin chastised theater commanders for the lack of interdiction efforts and focused on close air support. This maneuver attempts to shift responsibility for failed air operations onto the ground component.⁴⁸

Another external cause of failure remains funding priorities. Yermolin, Zubov, and Fomin argued that the RADF operates too many platforms and spends too few hours training for future conflict.⁴⁹ Western observers tend to agree with the assessment, noting that the best Russian units get around 120 hours of training a year while over 200 hours are necessary for proficiency.⁵⁰ Yermolin, Zubov, and Fomin stated that strike pilots lack experience launching standoff weapons or operating with UAVs to execute air operations. They would prefer that money shift from keeping Soviet-era platforms alive to investing in training pilots and

buying modern systems. Critically, Russian authors are not arguing for doctrinal changes or the development of suppression of enemy air defense training. Their argument aligns with the goals of the 2008 New Look reforms and prewar doctrine.⁵¹

Lessons for the Future

Russia's air operations in Ukraine offer NATO air planners lessons about and lessons learned from the RADF. In learning about the RADF, NATO should anticipate Russia will fight the next air campaign in a comparable manner to the operations in Ukraine. The Russians will fight behind their SAMs, launching varied waves of standoff munitions at fixed targets. The inability to effectively interdict fielded forces will lead them toward a punishment strategy, striking fixed targets. Russia's elimination of 50 percent of Ukraine's power generation and bombing of civilian centers forewarn its willingness to attack the essential infrastructure of society.⁵² The Russians believe the hypersonic always gets through.

The Russians seem unlikely to use this war as a pivot to develop a Western-style air force with Western-style operational goals like the U.S. Air Force adapted to precision weapons and SAMs in the 1970s and 1980s.⁵³ Ironically, the UAV may prevent the reform. The UAV empowers the Russian army and takes pressure off the RADF to evolve. The Russian army prefers UAVs and ground-based air defense, which it can control and does not require contentious coordination with other services. Russia's new ground maneuver system will build on the UAV as its air support and reconnaissance capability and attempt to free itself from the slower RADF system. The RADF, likewise, appears content to divest the close air support mission to focus on its primary defensive missions and standoff operations.⁵⁴ The Su-25 Frogfoot ground attack aircraft, which no longer has an active production line, might be the first Soviet-era asset eliminated. The RADF will likely conduct air support missions using preprogrammed glide bombs dropped in salvo to saturate the enemy battlefield and enable ground maneuvering.

Russia's most significant weakness will be its inability to create a joint C2 system that gives the RADF a more substantial role in planning and operations. C2 failures limit the role of air power, which, given its speed and complexity, requires more significant levels

of communication than ground operations. The UAV is a technical solution that attempts to solve a maladaptive command structure. Yermolin, Zubov, and Fomin's idea of using organic UAVs to crew wings will not work as it did for the Russian army.⁵⁵ The aircraft's speed and need to operate over long ranges require a C2 system that the Russians are not trying to develop. The RADF crewed force will remain aerial artillery and ground-controlled defensive counterair assets.

the privilege of tanks, helicopters, and crewed aircraft. Now, a twelve-man team can carry television-guided weapons. These weapons increased the lethality of small teams on the battlefield, spreading units out and forcing the dissemination of authority to the lowest level. The UAV further saps the power of offensive weapons and strengthens defensive operations.

The ubiquity of UAVs also places a premium on electronic warfare and counter-UAV systems. Modern

“The modern soldier must become more familiar with robotized weapons like the mini-UAV and prepare to attack and defend with these intelligent weapons.”

Continuity in strategy and operations also translates to continuity in procurement. The RADF will continue New Look modernizations but with a decidedly more international production line. Russia grows steadily more reliant on China, Iran, and North Korea for war materials as the war continues. The most likely course for RADF inventory in the future is to leverage its comparative advantage and points of national honor within this group.⁵⁶ The Russians will continue to make fighter and bomber aircraft, but they will become more dependent on Chinese electronics. The Chinese will benefit from additional help modernizing jet engines and ground-based air defense. The Russians have and will continue to buy UAVs from Iran, a state with demonstrated capability in the field.⁵⁷ In return, the Russians are likely to continue to modernize Iran's air defense and fighter fleet. Lastly, Russian trade, diplomatic support, and nuclear expertise will probably reward North Korea's contribution. The exchanges fulfill the participant's strategic needs, support Russian industrial strengths, and provide solutions for the air power theories proposed in *Military Thought*.

NATO should also apply the lessons learned from Russia to its operations. The most apparent lesson is the mini-UAVs' value for reconnaissance, precision attacks, and assisting indirect fire. The modern soldier must become more familiar with robotized weapons like the mini-UAV and prepare to attack and defend with these intelligent weapons. The guided weapon was once

military units will need dedicated electronic warfare capability at the company level and below. As micro and mini attack UAVs evolve, the soldier will have to be able to eliminate them to survive. Passive methods like cover and concealment are less valuable against these weapons than kinetic direct or indirect fire weapons. The modern soldier needs to be able to destroy or turn off attacking UAVs to survive much less advance. The Russian acclaimed success at jamming the United States' precision strike systems is a lesson NATO must heed for the sake of its troops and victory.

The second major lesson is that combined arms across the domains are essential to offensive operations. The modern system described by Stephen Biddle, which combines fires, armor, air, and infantry, still works despite the advance of robotic weapons.⁵⁸ Russia has advanced by employing combined arms tactics and massed airpower. Russia's advanced in Adivka through a combination of Ukraine's exhaustion, Russian commitment, and mass employment of glide bombs from Sukhoi attack aircraft. UAVs are deadly, but their users themselves are vulnerable to coordinated operations by a peer opponent.

The employment of air power en masse reinforces a third lesson NATO can learn from Russia: the centralized command of air power. The Russians hamstringing themselves by not employing their aircraft as coordinated strike packages. The district system that splits up the Russian air force reduces the risk of NATO surprising Russia from an unknown direction

at the expense of the speed and flexibility of air power. Through better-centralized control of air assets, the Russians could concentrate the RADF's assets with ground-launched attacks like Iskander missiles to create opportunities for deeper penetration by the Russian army. The inability of a single air commander to build a continuous attack, taking advantage of each platform's unique capabilities, hinders the Russian offensive effort.

Lastly, Russia's biggest shortcoming is the inability to collect and communicate intelligence rapidly enough to conduct dynamic targeting. The United States should take note of the growing importance of targeting intelligence in modern combat. The further the weapon must fly to its target; the more critical intelligence becomes to success. The Russian's inability to find, track, and engage Ukrainian ground-based air defense denied them control of the air. The Joint All Domain Command and Control (JADC2) concept of the United States attempts to collect, communicate, and control the battlespace in a way that resolves Russia's current problems. The JADC2 vision is to match the best weapon to the target regardless of service or command. The ability to strike within minutes of discovery will be the difference between air superiority and taking crippling losses in a future war.⁵⁹

Conclusion

The invasion of Ukraine has not led to a significant reformation in RADF's strategy, operations, or tactics. Articles in *Military Thought* indicate continuity with prewar assumptions and a lack of disruptive proposals. Russia is not trying to build an American-style air force. NATO should not expect an aggressive RADF with a well-integrated attack capable of asserting aerial superiority over a given territory. NATO should expect more standoff weapons, such as the loitering munitions and glide bombs, to be employed in future conflicts. These assets will augment Russia's doctrine by increasing the RADF's ability to overwhelm enemy air defenses. The Russians will employ barrages of relatively accurate standoff munitions at static targets. Rather than inspiring reform, the high losses of crewed assets and assessed success of standoff weapons entrenches the RADF in its assumptions. NATO air forces do not have to make the same mistake. The NATO allies can invest in electronic warfare, loitering munitions, intelligence networks, and all-domain C2 solutions like JADC2. ■

The views presented in this article are the author's own and do not represent the views or policy of the Air Command and Staff College, Air University, the U.S. Air Force, or the U.S. government.

Notes

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2. Eastview Press translates *Military Thought: A Russian Journal of Military Theory and Strategy* into English. The journal's Latinized Russian name is *Voyennaya Mysl*, commonly abbreviated *VM*. This article will use the abbreviated *Military Thought* for simplicity.

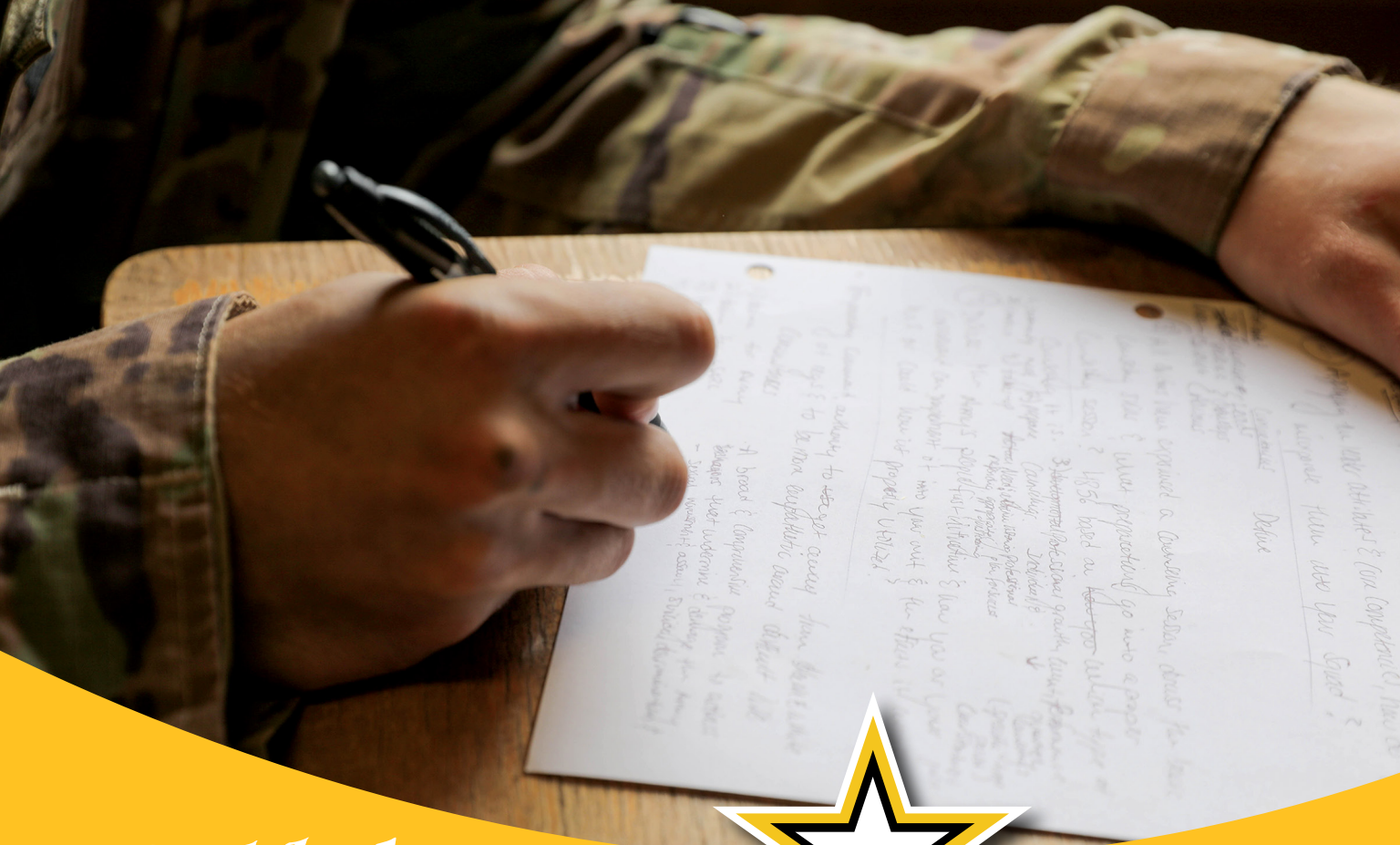
3. This article will use the anglicized Russian Aerospace Defense Force (RADF) abbreviation for simple reading. The actual name, converted to Latin script, reads *Vozdushno-Kosmicheskiye Sily (VKS)*. The most common vernacular for uncrewed aerial vehicle is UAV or unmanned aerial vehicle. This article will use a gender-neutral "uncrewed" and eschew the alternatives of "drone" due to its assumption of autonomy and Army doctrine's unmanned aircraft system (UAS) due to its lack of everyday use in the U.S. Air Force community. The most accurate description of current technology is remotely piloted aircraft, or RPA.

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Classical Methods of Influence Applied to Contemporary Military Leadership



Maj. Joseph D. Schmid, U.S. Army

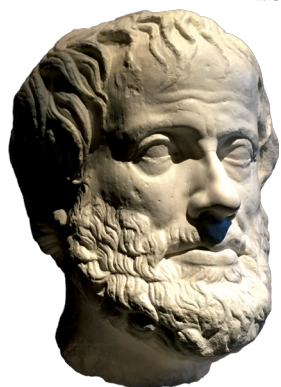
The key to successful leadership is influence, not authority.
—Kenneth Blanchard

Army leadership is defined as “the activity of influencing people by providing purpose, direction, and motivation to accomplish the mission and improve the organization.”¹ Therefore, think of an individual’s ability to influence as dependent upon his or her skill at either articulating or exemplifying purpose, direction, and motivation. In this way, the leader’s ability to influence becomes the independent variable that acts upon the three later dependent variables of subordinate purpose, direction, and motivation. And yet, how does one improve the ability to influence others?

Numerous scholars have leveraged various lenses while exploring this point of inquiry. For example, Gerald Sewell asserts that those leaders who

leverage emotional intelligence and empathy are better equipped to intuit how team members will both receive and interpret tailored messages.² These types of leaders directly influence others primarily through empathy. Conversely, Col. Joseph Escandon focuses on gaining and maintaining an exceptional unit culture that champions “trust, cohesion, and teamwork.”³ In this way, leaders influence indirectly by building a culture in which team members feel comfortable operating. Both Sewell and Escandon’s modern theories have provided valuable insight into the present point of inquiry. However, their ideas reside squarely in the realm of modern theory. This article proposes an altogether different approach.

I argue modern military leaders can significantly augment their ability to influence others by returning to the ideas expressed in classical Greek and Roman philosophy. Ancient texts such as Aristotle’s *Rhetoric* and Marcus Aurelius’s *Meditations* both contain methods of direct or indirect influence that contemporary military leaders can and should put into practice. Consequently, this article aims to summarize these classical techniques and explain how direct and organizational leaders can use them to provide clear and concise purpose, direction, and motivation.



Aristotle (Image courtesy of Wikimedia Commons)



Pericles as Orator Addressing the Athenian Assembly, by Philipp von Foltz, 1852. (Image courtesy of Wikimedia Commons)

Aristotelian Rhetoric

First, consider how Aristotle differentiates among ethos, pathos, and logos while discussing the art of direct rhetorical persuasion.⁴ Ethos denotes a method of influence that originates in individuals of recognized expertise. Pathos refers to influencing individuals through tailored emotional statements crafted to evoke a compelling response. Lastly, logos leverages logic and rationality to illustrate the inevitability of the orator's argument; or a complete proof. In classical times, orators such as Pericles would travel to the Agora and give an oration in the hopes of influencing the minds of the audience. These speakers would leverage all three methods of influence (ethos, pathos, and logos) in an attempt to sway listeners.

Those who leverage ethos undergird their message with the weight of their own credibility. For example,

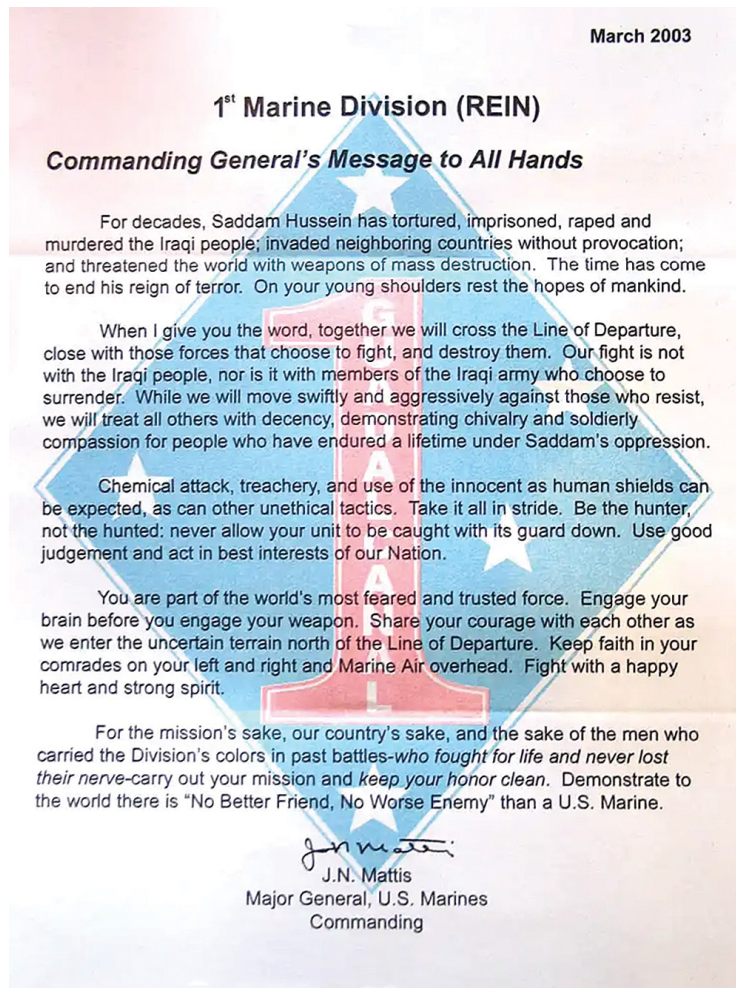
Michael Halloran interprets ethos as “what we might call the argument from authority, the argument that says in effect, ‘believe me because I am the sort of person whose word you can believe.’”⁵ Therefore, ethos would be used by orators in classical Greece who embodied the polis's most prized moral values whether courage, cunning, or liberality. Furthermore, the orator's audience would be more likely to be swayed by their arguments if the orator had a reputation of expertise in the subject under discussion. In this way, perceived expertise, authority, and credibility all augment a leader's ability to exude ethos while attempting to steer the minds of large bodies of citizens.

Numerous historical examples illustrate how leaders successfully enact ethos. For example, in 1940, during World War II, Winston Churchill asserted,

We shall go on to the end, we shall fight in France, we shall fight on the seas and oceans, we shall fight with growing confidence and growing strength in the air, we shall defend our Island, whatever the cost may be, we shall fight on the beaches, we shall fight on the landing grounds, we shall fight in the fields and in the streets, we shall fight in the hills; we shall never surrender.⁶

From the British population's perspective, the credibility of this message was magnified because Churchill had gained a reputation as a staunch opponent of appeasement. For example, even when Churchill failed to win a seat in the Commons during the interwar years, he still critiqued those who wished to appease the burgeoning Nazi threat. Essentially, Churchill was cultivating an ethos of dogged determination in the face of overwhelming odds. Consequently, this reputation lent credibility to Churchill's words when he gave his "we shall fight on the beaches" speech.

Keeping these sentiments in mind, contemporary leaders of warfighters must first gain credibility in whatever warfighting function they hope to lead. Relevant experience must be accrued, hardship must be suffered, and adversity must be overcome before leaders at the tactical, operational, and strategic levels



(Image from Michael Velenti, "The Mattis Way of War: An Examination of Operational Art in Task Force 58 and 1st Marine Division," Art of War Paper [Fort Leavenworth, KS: U.S. Army Command and General Staff College Press, 2014])

Figure 1. 1st Marine Division Commanding General's Message to All Hands

can exude ethos in their everyday interactions. The actions and words of contemporary military leaders at all echelons will only be taken seriously if those they lead know that the leader retains authoritative expertise. Consequently, leaders of warfighters must seek to continuously build their capacity for projecting ethos.

Second, pathos refers to the skill of tailoring arguments to evoke emotional responses in the audience. Spectators become influenced after the orator has correctly intuited a value statement that the audience finds compelling. For example, Sara Rubinelli suggests that "emotional appeals can influence the persuasiveness of speeches because they touch upon aspects that influence human decision-making."⁷ In this way, emotional appeals become the fulcrum that enables the leader to influence the audience. Consider the March 2003 "1st Marine Division Commanding General's Message to All Hands," as depicted in figure 1, and as penned by James Mattis before the invasion of Iraq.

Mattis expertly makes use of pathos while seeking to steel his Marines for seemingly imminent armed conflict. For example, as figure 2 portrays, he opens with "Saddam Hussein has tortured, imprisoned, raped, and murdered the Iraqi people; invaded neighboring countries without provocation; and threatened the world with weapons of mass destruction. The time has



Lt. Gen. James N. Mattis, commanding general of 1st Marine Division, speaks to marines of Regimental Combat Team 7 on 20 February 2003 at Camp Ripper, Kuwait, during Operation Enduring Freedom. (Photo by Lance Cpl. Kevin C. Quihuis Jr., U.S. Marine Corps)

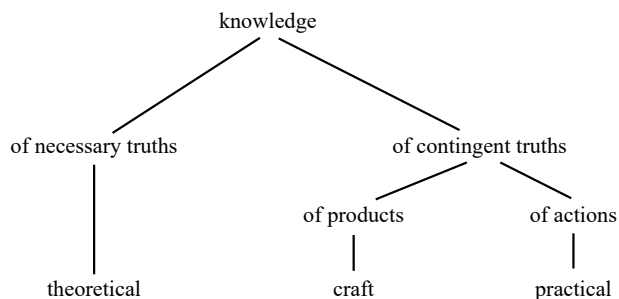
come to end his reign of terror. On your young shoulders rest the hopes of mankind.”⁸ These words evoke justified anger in the audience that can envision itself as a force for good seeking to undermine a dangerous despot. Furthermore, the 1st Marine Division will fight longer and endure more because they move into armed conflict believing that they are supporting the hopes of mankind. In this way, Mattis has woven pathos and emotionally charged rhetoric into his message while preparing his marines for war.

However, to be an effective purveyor of pathos, contemporary leaders must understand the emotional levers within those warfighters they are charged with leading. Once this understanding has been achieved, then leaders can tie purpose, direction, and motivation to the emotional centers of their formations.

Consider further how, at its core, armed conflict has always remained “a human endeavor.”⁹ Formations at all echelons are built by human individuals who all retain individual emotional responses, decision-making processes, and value systems. Therefore, the leader is

responsible for crafting a message that galvanizes the entire formation toward one shared emotional feeling. In his book *War as an Inner Experience*, Ernst Jünger refers to this shared emotional feeling as *eros*, or the unified spirit common to all warfighters.¹⁰ Jünger’s memoirs are full of illustrations that depict formations of combat power entering into and sharing common emotional experiences. Therefore, the aim of effective pathos in public oratory is to harness the potential common sense of purpose rooted in shared emotions. For this reason, contemporary leaders of warfighters would do well to recognize this fact and incorporate it into their daily interactions.

Lastly, *logos* leverages theoretical or observable logic, reasoning, and fact patterns to bolster the validity of an argument. Therefore, audiences are influenced by the overwhelming facts that an orator brings to bear in his or her rhetoric. For example, Thomas Johansen uses figure 2 to articulate how three types of logical knowledge (*logos*) can be interwoven into an orator’s argument to influence those who are listening.



(Figure from Thomas Johansen, "Aristotle on the 'Logos' of the Craftsman," *Phronesis* [2017])

Figure 2. Logos Map

Johansen distinguishes among theoretical (absolute truths), craft (what can be made), and practical (what can be done) knowledge while arguing that all three contribute to "the reasoning which works with desire to bring about an action."¹¹ Consequently, an orator uses these three types of reasoning to merge the audience's potential future action with his or her desires. Essentially, logos drives action through logic.

Perhaps the best example of logos within the strategic military context can be found within think tank organizations such as RAND Corporation or the Center for Strategic and International Studies. These types of organizations are adept at leveraging logic to influence policy decision-makers toward specific outcomes. For example, RAND's latest report, titled *U.S. Military Theories of Victory for a War with the People's Republic Of China*, combines all three types of logical knowledge while advocating for specific defense policy decisions revolving around the defense of Taiwan.¹² From a theoretical perspective, the report assumes that China will continue to seek to dominate Taiwan, resulting in a potential "conflict breaking out across the Taiwan Strait."¹³ From a craft perspective, the authors compare American and Chinese military platforms that could rapidly be brought to bear in the event of a conflict within the Taiwan Strait. And lastly, from a practical perspective, the authors envision five separate variants of U.S. victory labeled dominance, denial, devaluing, brinkmanship, and cost imposition.¹⁴ These five variants are potential routes the United States could take in the event a conflict over Taiwan unfolds. In this way, the report leverages all three modes of logos.

This same use of logos can be distilled down to the tactical and operational levels. Therefore, contemporary military leaders should make a deliberate effort to communicate logic, reasoning, and fact patterns to formations that hunger for purpose, direction, and motivation. After all, as Leonard Wong suggests, an all-volunteer force consisting of a professional well-educated population will want to understand why they are fighting.¹⁵ Consequently, commanders who provide "the why" by blending logical reasoning into their orders are more likely to gain and maintain the trust of those they lead.

Marcus Aurelius and Team Membership

Marcus Aurelius offers an altogether different approach from leaders who seek to directly influence through the spoken or written word. Writing as an emperor in ancient Rome from 161 AD to 180 AD, Aurelius favored leaders who were cognizant that they were only a small portion of the greater whole (*μελος*) while simultaneously seeking to constantly improve their own sense of virtue. In this way, organizational leaders could apply indirect influence on followers who recognized they were being led by an enlightened individual who has the interests of the whole ahead of the interests of the self.

Consider his thoughts on membership in a team. Aurelius declares "as several members in one body united, so are reasonable creatures in a body divided and dispersed, all made and prepared for one common operation ... I am a *μελος*, or a member of the mass."¹⁶ Therefore, each member, no matter how affluent or powerful, is only a part of the whole, a smaller mechanism in the larger machine, a subordinate portion to the overarching organism. For Aurelius, leaders at all echelons must exercise moderation while dutifully acting out the role he or she has been assigned. Those who are unable to internalize this reality fall into prideful conceit and begin to subsequently act against the interests of the larger body.



Marcus Aurelius (Image courtesy of Wikimedia Commons)

Different cultures throughout time have referred to this fall using a variety of words. For example, Anglo-Saxon *ofermōde* denotes overweening pride in oneself.¹⁷ Ancient Greek recognized it as *ὑβρις*, or what contemporary listeners would interpret as hubris.¹⁸ They all denote the antithesis of Aurelius's argument. Therefore, this is what contemporary military leaders must avoid if they wish to remain an influential portion of the greater whole. However, how does the idea of *μελος* translate into contemporary reality within the military sphere of influence?

Predictably, obtaining knowledge of Army doctrine offers an excellent route for those seeking to define a sense of purpose within the greater organization. Manuals such as Field Manual 3-96, *Brigade Combat Team*, and Field Manual 3-94, *Armies, Corps, and Division Operations*, offer large overarching models of Army organizations complete with duty position descriptions. Therefore, one could argue that officers who digest these manuals are better prepared to articulate how their team's individual efforts support those at higher echelons.

Furthermore, obtaining wisdom from those who have gone before can also be helpful in further clarifying one's own role in relation to the greater whole. For example, Jocko Willink and Leif Babin comment on the importance of checking one's ego while interacting with both subordinates and superiors. They state, "Ego clouds and disrupts everything ... ego can prevent a leader from conducting an honest, realistic assessment of his or her own performance and the performance of the team."¹⁹ This statement is a modern manifestation of Aurelius's comments on *μελος*. Outsized egos block a leader's ability to correctly determine his or her role while interacting with subordinates and superiors alike. Therefore, modern military leaders must seek to maintain control over their egos while making decisions that affect their own team as well as the teams at echelons above and below them. In this way, they can more faithfully fulfill the function that has been assigned to them.

Likewise, Viktor Frankl's philosophy on meaning also reverberates the Aurelius *μελος* concept. For example, after suffering in four separate concentration camps during 1942 to 1945, Frankl came to believe meaning is "an unintended side-effect of one's dedication to a cause greater than oneself or ... the byproduct of one's surrender to a person other than oneself."²⁰ Again, one

sees the importance of willingly serving a greater cause. Therefore, for Frankl, purpose, direction, and motivation manifest themselves when an individual's efforts are aligned toward something other than self-interest.

Keeping these sentiments in mind, modern military leaders must strive to embody the *μελος* principle. Among other tasks, formations of combat power exist to shape, seize, or pursue. These tasks always serve a greater purpose within a larger scheme of maneuver. Effective leaders can successfully check their own ego while articulating how the current task at hand supports the efforts of the next higher formation. In this way, purpose, direction, and motivation are drawn from aligning current efforts with a higher commander's desired end state.

Conclusion

Often, leadership is discussed using modern theories and rhetoric. However, as this article has shown, classical ideas can have an outsized effect on how current leaders can motivate adjacent team members. Aristotelian rhetoric offers a powerful device rooted in persuasive speech that provides the necessary influence to move the minds of warfighters. Ethos, pathos, and logos all contribute to generating meaning for those who are tasked with armed conflict. Leaders should strive to present an absolute proof to team members who are asked to operate with expertise during times of war. There can be no doubt as to how their actions support a universally held desired end state. This idea represents the article's direct form of leadership.

Conversely, Aurelius's *μελος* principle acts as an indirect form of leadership. Knowing one's place and fulfilling one's role in the greater whole is critical in a hierarchical organization such as the U.S. military. Tasks must be nested, main efforts must be supported, and egos must remain out of the way when making decisions that can affect thousands of lives.

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Therefore, to know one's place within the overarching scheme of maneuver and be able to explain that position to adjacent teammates is incredibly important when generating purpose, direction, and motivation. For all of the above-mentioned reasons, officers who

truly wish to improve their critical and creative thinking skills should engage with the ideas of Aristotle and Marcus Aurelius.²¹ Yes, their texts may be old, but their classical thoughts on the role of influence still hold excellent value for the modern military leader. ■

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Lt. Elizabeth Carr emphasizes her commander's intent as she issues a fragmentary order to her NCOs in the back of a Mowag Piranha III armored personnel carrier at the Defence Forces Training Centre, Curragh Camp, County Kildare, Ireland, in 2022. (Photo by Airman Sam Gibney, Irish Air Corps)

Toward a Leadership Theory for Mission Command

Commandant Gavin Egerton, Irish Army

Iknocked on the door of my company commander's office with a manila document folder in hand, ready to brief Commandant Dave Cowhig on the

upcoming exercise I had planned. I was a platoon commander training brand new soldiers and their final field training exercise (FTX) was coming up. For a second

lieutenant commissioned less than a year previously, it was a relatively complicated FTX incorporating a naval ship, helicopters, and three different training areas. I briefed Cowhig on each part of the FTX, and when I got to the administrative details, I explained where I intended to billet him. I had run a shorter FTX a few weeks previously, and Cowhig stayed with us for the duration. At this point, he stopped me, “No, Gavin I won’t be staying with you for the exercise. I’ll visit for the critical events to see how the students perform, but I won’t be there overnight at any stage.” I was surprised, figuring he would want to closely supervise me, ensuring the various aspects of the FTX meshed; his presence mitigating the inevitable problems that would arise. Noticing my surprise, he said, “Gavin, I trust you to make decisions in my absence and to do the right thing.” This was a light bulb leadership moment for me.

I was first introduced to mission command as a cadet when our instructors encouraged us to use mission

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orders during platoon attack training—to focus on the *what* and *why*, not the *how*. But now, finally, as my company commander had put it, I was trusted to make decisions in the absence of supervision because (presumably) I had demonstrated competence on the previous FTX, and he now trusted my judgment. This was mission command in action, and I felt empowered.

This episode sparked an interest in the mission command philosophy that has grown over the years, leading me to employ it with my subordinates both at home during training and when deployed overseas on operations. It fascinates me how

some leaders excel with mission command while others struggle to apply it, micromanaging subordinates rather than trusting their judgment. It would appear that some leaders are more suited to the command philosophy than others, indicating that some leadership styles may be more compatible with mission command than others. But could a greater knowledge of leadership theory help commanders adapt and employ mission command more effectively? If so, what theories offer the best chance of success? In this article, I explore some prominent leadership theories to highlight those most compatible with mission command.

Origins of Mission Command

Mission command traces its conceptual origins to nineteenth-century Prussia’s *Auftragstaktik*. Following significant losses at the hands of Napoleon Bonaparte’s Grande Armée at Jena-Auerstadt in 1806, Frederick William III’s Prussia was left subservient to France.¹ Reflecting on the battles, Prussian officers noted that Napoleon had employed a certain amount of decentralized command, delegating authority to his corps commanders and thus giving himself greater overall flexibility.² By comparison, Frederick William III had employed a command structure that was top-down and highly centralized with little scope for independent action or initiative among his subordinate commanders.³ The lessons learned were harnessed to transform the Prussian army. Before the turn of the next century, leaders such as Helmuth von Moltke oversaw a cultural shift toward empowerment and espoused a new command philosophy, *Auftragstaktik*.⁴ This was a philosophy that included elements of command and control, battle tactics, war conceptualization, superior-subordinate relationships, and most importantly, leadership.⁵

Its modern-day successor, mission command, has become the prototypical command template for Western forces in recent years, with many nations’ militaries adopting it as their preferred command philosophy.⁶ The U.S. Army is no different, defining mission command as “the Army’s approach to command and control that empowers subordinate decision making and decentralized execution appropriate to the situation.”⁷ U.S. doctrine recognizes that “war is inherently chaotic and uncertain” and thus plans must be capable of changing to meet a rapidly developing situation. As

subordinate leaders are typically best situated to understand what is happening, commanders must “capitalize on subordinate ingenuity.”⁸

Leadership Theory

Mission command is a philosophy of both leadership and command. While this article focuses on the leadership aspects, it is important to remember that command, particularly when exercised in a time of war, is a unique form of authority and responsibility not equaled in civilian life. The decisions made by commanders and their orders result in their subordinates risking their lives and carrying out actions not instinctive in a normal setting. Historically, command has been difficult to define and is possibly the least understood military concept.⁹ However, the U.S. military definition is useful, describing command as “the authority that a commander in the armed forces lawfully exercises over subordinates or rank or assignment.”¹⁰ Much of the literature on mission command tends to focus on command theory, but many of the traits and behaviors of commanders who successfully apply mission command reside in the leadership domain. Therefore, studying leadership theory is important to understand what makes mission command succeed.

Generally speaking, leadership theory can be split into two conflicting schools of thought: one perceives leadership as a science, the other as an art. Subscribers to the scientific approach believe leadership is a skill set that can be taught; whereas, those in the art camp view leadership as a collection of natural qualities—something a person is born with. For example, in the mid-nineteenth century, the great man theory of British historian Thomas Carlyle posited that some people were born with innate attributes that made them great leaders.¹¹ This poses an interesting implication for the practice of mission command: perhaps some leaders are more suited to the philosophy due to natural ability or personality traits. However, the preponderance of literature and the prevailing consensus is that leadership is a taught skill set that can be improved through study and practice.

The study of leadership theory can be divided into a number of key eras, which can be further subdivided into multiple theories. While it is generally quite interesting to explore each leadership theory, not all are useful to the study of mission command specifically.

Therefore, the selected theories discussed below contain qualities most pertinent to mission command and are thus worthy of closer examination.

Trait theory. Trait theory originated with Francis Galton, who in his 1870 work *Hereditary Genius*, posited that a person’s natural abilities and innate skills could not be learned but were passed down from generation to generation.¹² Scholars of this theory sought to identify the characteristics of great leaders and then compare them to those of potential leaders, looking for the set of unique attributes that set effective leaders apart from those who were less effective.¹³ Leadership and management expert Ralph M. Stogdill, in 1948, concluded that a person in a position of leadership will excel over others in the following traits: sociability; initiative; persistence; knowing how to get things done; self-confidence; alertness to, and insight into, situations; cooperativeness; popularity; adaptability; and verbal facility.¹⁴ Arguably, many of these traits are associated with a sufficiently competent subordinate commander to whom freedom of action and decentralized command could be bestowed. Therefore, the study of trait theory—despite its apparent obsolescence—has a role to play in deciding with whom mission command can be employed. Commanders could use this to develop their own criteria based on theory and experimentation/experience to gauge who under their command they are most comfortable delegating authority to and how much.

However, Stogdill notes that leadership traits differ with the situation, and thus, the qualities and characteristics required in a leader are determined by the demands of the situation.¹⁵ In other words, an effective leader in one situation may not necessarily be a leader in a different situation.¹⁶ This view is supported by psychology scholar Richard D. Mann, who in 1959 pointed out that enough evidence existed to warrant a situational approach to leadership, suggesting the stability of a leadership model is a function of the task and the composition and culture of the group being led.¹⁷ This would suggest that mission command, rather than having universal applicability, is dependent on the mission, the unit assigned the mission, and the prevailing culture within that unit.

Behavioral theory. As the name suggests, this theory examines the behavior of individuals in leadership roles, signifying a shift in focus from leadership traits.¹⁸ Behavioral theory works by describing the



A platoon commander delivers an operation order brief to his NCOs using the mission-orders style for a hasty platoon attack at Kilworth Training Area, County Cork, Ireland, in 2019. (Photo by Comdt. Gavin Egerton, Irish Army)

major components of leader behavior rather than telling leaders how to behave.¹⁹ Scholars who subscribe to this theory believe leaders are made, not born, and therefore, anyone can become an effective leader if they adopt certain leadership behaviors. This is quite a positive viewpoint when one considers leaders who appear incompatible with mission command, or those to whom freedom of action and authority are not delegated, the implication being that they can be developed to become more compatible with mission command.

In 1949, Bernard M. Bass conducted a series of experiments with leaderless group discussion, observing

participants solving problems and evaluating each individual's performance in terms of leadership behavior.²⁰ He then elicited peer nominations from within the groups of those perceived to have the most leadership potential.²¹ This technique moved toward acknowledging the role of situation or context in leadership.²² Bass's technique could be adapted to identify subordinate commanders with the potential for independent action and decision-making by presenting them with decentralized command scenarios during tactical training and observing their behavior. This could then be used to inculcate a culture of mission command at the most junior levels, early in officers and NCOs' careers. It could also build confidence and comfort in superiors in loosening the reins to delegate more freely and often.

Situational theory. Situational theory recognizes that there is no universal style of leadership that suits all circumstances.²³ Therefore, a successful leader will adapt their leadership style depending on the situation. Scholars of this theory seek to understand the influence of contextu-

al factors on leader effectiveness—in particular, where leaders are interacting with subordinates to complete specific tasks.²⁴ In this regard, it emphasizes the value of understanding subordinates and developing their skill sets.

Paul Hersey and Kenneth H. Blanchard were early pioneers of this theory. In 1969, they suggested four leadership styles: delegating, participating, selling, and telling.²⁵ Each corresponds to the level of maturity of the follower; in other words, their levels of commitment and competence, ranging from “high” for the delegating style to “low” for the telling style. Hersey and Blanchard noted that an optimal style of supervision can be prescribed for given levels of subordinate maturity.²⁶ These supervision styles are derived from combinations of task-focused leaders and relationship-focused leaders. For subordinates low in maturity,

the optimal leader behavior style is task-focused, with leaders telling subordinates what to do. As subordinate maturity increases, the leader's behavior style becomes more relationship-focused and less task-focused. When subordinates reach the highest levels of maturity—fully committed and highly competent—the leadership style is one of delegating, and leaders are eventually seen as redundant or unnecessary.²⁷

Rather than a leader adopting one singular leadership style, their theory suggests leaders should apply a particular style (or styles) appropriate to a particular situation. This approach is quite closely aligned with that of the mission command philosophy, in particular the idea that command exists on a spectrum with detailed command on one end, and mission command on the opposite extreme. A competent and experienced military leader should consider all factors before applying a particular leadership approach, including how much delegation and freedom can be distributed. As former director of the Center for Army Leadership Col. Tom Guthrie observes, “Good leaders tailor their leadership approach according to the mission; the operational environment; and the experience, training, proficiency, and skill of their staff and subordinate leaders and units.”²⁸

The maturity (or, in the military sense, professional competence) and commitment of subordinates will dictate the leadership style applied, and how much delegation and empowerment can reasonably ensue. In other words, in some situations, mission command may be impossible to employ, due to the presence of insufficiently competent subordinates.

Transformational theory. Historian James MacGregor Burns first discussed transformational leadership in his seminal 1978 work, *Leadership*, where he drew distinctions between transformational and transactional leadership styles.²⁹ Burns's work focused on political leadership and power but was expanded upon and widely promulgated as transformational leadership theory by Bass. Transformational leadership is often compared with transactional leadership, so both should be considered together for context.

Transactional leaders are those who lead their followers through a mechanism of social exchange, such as the issue or denial of financial reward in exchange for productivity. Transactional leaders leverage reward for good performance or threat/punishment for poor

performance to ensure the required work output from subordinates.³⁰ In the military context, the unspoken threat of reprimand (or more serious punishment) from the superior rank will result in the subordinate ranks obeying the commands they receive. Conversely, good performance is rewarded in various methods from public praise and positive performance appraisal reports to promotion and the issuing of commendations and medals. Transactional exchanges such as these comprise the bulk of interactions between leaders and followers.³¹

Transformational leaders differ in that they stimulate and inspire followers to commit to a shared vision, turning them into innovative problem-solvers while developing the followers' leadership capacity via coaching and mentoring.³² Transformational leaders help followers grow and become leaders themselves through empowerment. This theory builds upon assumptions that people can be trusted, everyone has a contribution to make, and problems are best handled at the lowest level.³³ Successful leaders who build such cultures articulate and convey a clear vision. They then align their subordinates around their vision and empower them with responsibility for achieving that vision.³⁴ The products of a transformational leadership philosophy are relationships of mutual stimulation and followers who are converted into leaders.³⁵

The aspects of transformational leadership such as building a culture of trust, empowerment of followers (turning them into leaders), and pursuit of a vision echo the essence of mission command. Therefore, it is likely that those who successfully employ mission command are also practitioners of transformational leadership. Transactional leadership interactions will occur in a mission-command-friendly environment while operating under an overarching umbrella of transformational leadership. Many of the important ingredients of mission command such as commander's intent, empowerment, and decentralized authority will reside within the transformational leadership domain, but once in place, the interactions between commanders will be typically transactional and require less explanation and discussion.

Conclusion

Examination of the selected theories above indicates that leaders should adjust their leadership style

to suit their ability, the ability of their subordinates, and the nature of the situation and task. Ideally, this is an automatic, instinctive adjustment rather than a conscious decision. Those looking to excel with mission command should study a broad range of leadership theories and styles, equipping themselves to be responsive to such variables. However, investing time in studying the theories explored in this article would be most beneficial as they align closely with the sentiment of mission command.

Trait theory could be used to establish what qualities and characteristics are most prevalent in those subordinates who thrive in a mission command environment. Commanders could employ this to assess who they are most comfortable delegating authority to under their command. Complementing this, behavioral theory could be leveraged to study commanders who successfully practice mission command to identify the key behaviors of such people. Using an adaptation of Bass's group experimentation technique, commanders could then identify those subordinates who exhibit such behavior patterns and are therefore best suited to freedom of action and to whom authority should be delegated. This type of assessment could be built into both NCO and officer leadership training via experiential learning scenarios, introducing leaders to mission command early in their careers. This would make commanders more comfortable delegating to subordinates and thus mitigate some biases and barriers to mission command.

Situational theory is aligned with the idea of command as a spectrum with detailed command on one end, and mission command on the other. Commanders should consider all situational factors before applying any particular approach to command and leadership

such as subordinate maturity, the assigned mission and tasks, and the operational environment. This will help them to decide where on the spectrum of command they should operate in a given situation. It also means understanding when and where mission command is most appropriate.

The study of transformational theory is likely to have the greatest return on investment for those keen to employ mission command more successfully. Many aspects of transformational leadership, such as building trust, empowering followers, and articulating and pursuing a vision, mirror the principles of mission command; the idea of aligning followers toward a shared vision, for example, echoes the successful communication of a commander's intent. Transformational leaders coach and mentor their followers to develop their own leadership ability and work toward the shared vision, building mutual trust in the process. Furthermore, commanders develop their subordinates to work to achieve higher levels of professional competence (maturity) and thus become more likely to be empowered with delegated decision-making authority—the core of mission command.

Since my light bulb leadership moment with Cowhig all those years ago, I have read widely and deeply on leadership and command in the hope of developing my leadership ability and that of my subordinates, thus becoming a more successful practitioner of mission command. The leadership theories discussed above have characteristics that individually and collectively contribute to an aggregated leadership theory congruent with the essence of mission command. For any commander hoping to develop their leadership philosophy and employ mission command more effectively, studying these theories offers the best chance of success. ■

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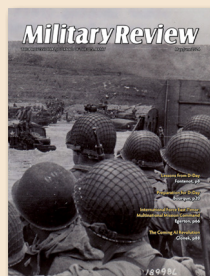
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American tanks from the 803rd Tank Destroyer Battalion, 3rd Armored Division, move up to the front over a narrow muddy road during an Allied offensive in the Hurtgen Forest, Germany, on 18 November 1944. (Photo courtesy of the National Archives)

Reconstituting Partner Forces in Conflict

A Global Unity of Effort

Lt. Col. John T. O'Connell, U.S. Army National Guard

As the U.S. military and allied forces refocus their training and readiness for large-scale conflict, the concept of reconstitution has

been brought to the forefront. Reconstitution, simply put, is the regeneration of combat power following major combat operations.¹ It is as much an art as it is a

science. The fundamental activities of manning, training, equipping, and sustaining units to mission-capable levels have proved necessary throughout history for forces to continue fighting.² Recent conflicts, including the war in Ukraine, have revealed the importance of reconstitution. In many cases, it is more than just having enough resources for a short period to man, train, and equip military units through intense levels of combat. The challenge for the U.S. military is not only preparing its own forces for large-scale combat but also playing an active role in reconstituting partner nation forces engaged in battle.³ This enormous endeavor will involve strategic cooperation to secure agreements among allies and partner nations, expand global sustainment networks, and integrate manpower and training to reconstitute combined combat power at a faster rate than the enemy.

One of the most studied cases of reconstitution in large-scale conflict is the Battle of Hürtgen Forest from the Second World War.⁴ The U.S. Army's V Corps and VII Corps engaged German forces in the fall and winter of 1944 through dense woodland terrain, with several divisions losing thousands of soldiers over the course of four months. Subordinate units eventually developed a system of regenerating combat power by positioning sustainment nodes in rear echelons and rotating personnel and materiel to the front lines, while relieving troops in contact to rear echelons for recuperation.⁵ This system of echeloned support enabled the V Corps and VII Corps to reconstitute division-level combat power and seize key terrain, thereby gaining a foothold into German territory.

The Battle of Hürtgen Forest has generated many important observations that have helped to develop U.S. Army reconstitution doctrine.⁶ However, a closer look into the battle reveals how the U.S. military struggled greatly to sustain its land forces in contact with the German Wehrmacht, with many units barely surviving through austere winter conditions.⁷ Commanders traded quantity over quality by rotating in fresh personnel with very little training, and even pulling troops out of other theaters to reinforce U.S. units in Europe.⁸ Although the United States had a robust industrial base, the sustainment network still struggled to provide enough weapons, artillery ammunition, and vehicle parts to the units in combat. This strain was remedied only slightly by mutual support from logistics basing in

France and Great Britain.⁹ Under these grueling conditions, it was almost a miracle that the U.S. Army was able to reconstitute two corps' worth of combat power in a matter of four months.

In the modern day, conditions are challenging in a much different way. The U.S. military will rarely have large-scale formations directly engaging peer adversaries; rather, partner nation militaries will already be in contact with strategic competitors such as Russia and China, and these partners arguably will not seize or retain the initiative on their own. The defense industrial base that sustained forces in World War II has all but depleted, with resources having largely thinned out since the end of the Cold War.¹⁰ This has required closer cooperation by the United States with NATO and other allies and partners to build a collective network of capabilities and resources that can be used to train, advise, and assist partner nations with reconstituting their forces while in contact with the enemy and with no guarantees of interoperability.

Partners in the Lead, Allies in Support

A deeper look at previous conflicts reveals that most reconstitution efforts involved extensive multinational cooperation, where stronger and more capable nations provided resources to smaller partner nation forces in contact with the enemy. The First World War involved extraordinary cooperation among the United States, France, Britain, and Italy to reconstitute several field armies worth of combat power.¹¹ Britain mobilized a tremendous amount of manpower and materiel to help reconstitute the French Army in the first two years of the war.¹² Even after the United States entered the conflict in 1917, the American Expeditionary Force (AEF) spent several months in theater

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training and equipping partner nation units to reconstitute combined combat power. In some cases, the AEF integrated several of its units with partners to form multinational task forces.¹³ Notable examples included the integration of regiments from the U.S. 93rd Division into the French army, the organizing of the U.S. 27th and 30th Divisions under the British Second Army, and the reinforcement of the Italian army by the U.S. 332nd Infantry Regiment.¹⁴

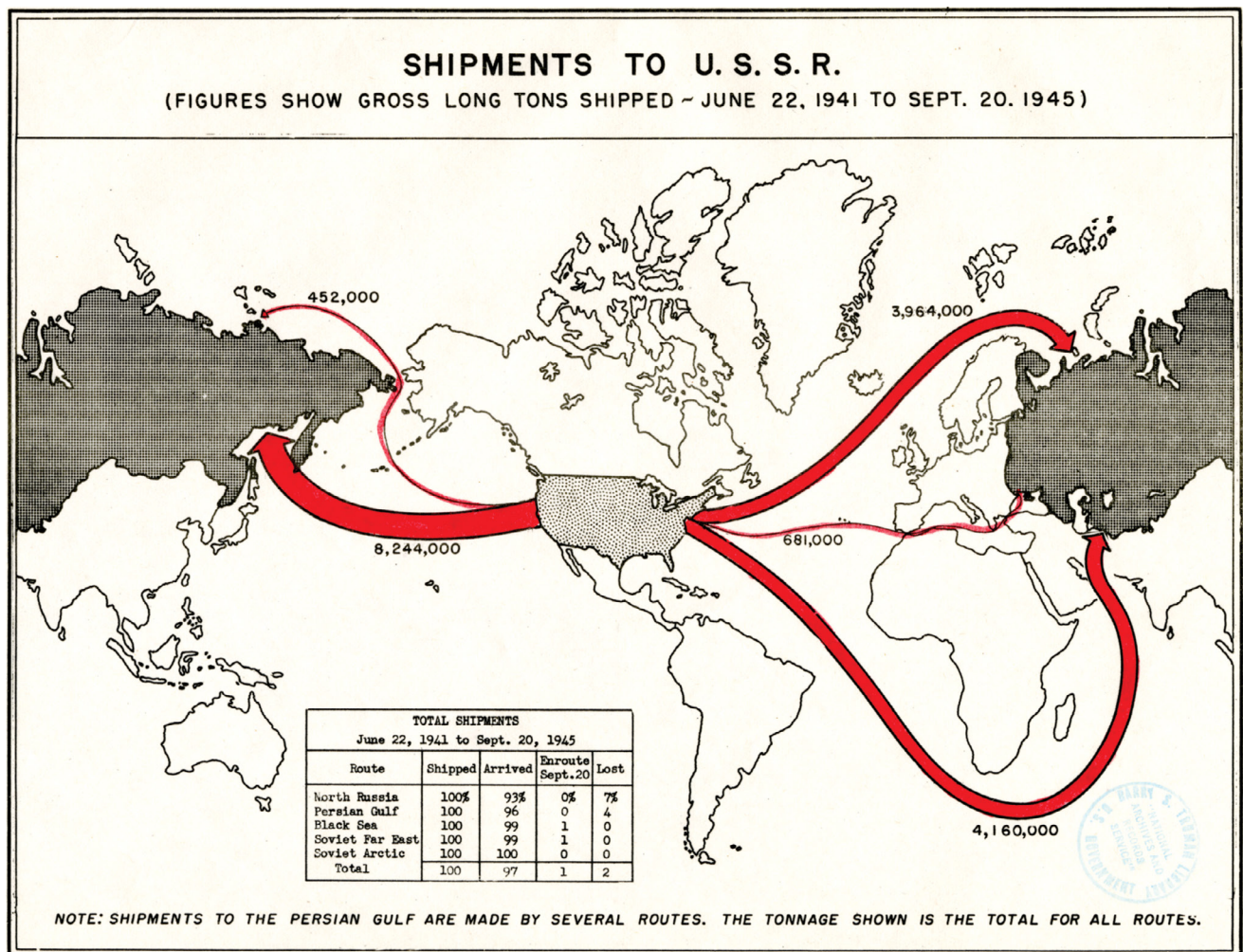
Twenty-two years later, the Second World War once again demonstrated how multinational cooperation among the U.S. military and allies was necessary to reconstitute partner nation forces in multiple theaters of operations. The United States provided massive materiel support to Britain and the Soviet Union through the Lend-Lease program, much of which tested the limits of weapon system interoperability.¹⁵ In the Pacific theater, the U.S. Army, Navy, and Marine Corps established operational basing on several island chains, enabling the Australian armed forces to send replacements to reinforce British forces in Europe, Central Asia, and North Africa.¹⁶ Concurrent to these efforts were herculean initiatives by American and British forces to train and resupply indigenous Chinese, Indian, and Burmese fighters engaged against the Imperial Japanese. As part of this effort, the U.S. Northern Combat Area Command reconstituted thirty-two Chinese Expeditionary Force divisions fighting against the Japanese in Burma from 1943 to 1944. This created time and space for the British to reconstitute the multinational Fourteenth Army in India, which eventually defeated Japanese forces in Burma in 1945.¹⁷

These endeavors to reconstitute partner nation forces would not have succeeded on the battlefield without the support of a few strategic activities. The first of these involved agreements by political and military leaders on the terms in which they would integrate resources to reconstitute partner forces. Following the United States' entry into the First World War, President Woodrow Wilson committed to providing resources to France, Britain, and Italy to reconstitute their militaries. However, Wilson stated that the AEF would only fight in Europe as an all-American task force independent of their partners. This approach was at odds with the positions of French and British leaders, who envisioned a strategy of reconstitution that involved amalgamating individual American soldiers into

French and British regiments.¹⁸ As the AEF arrived in Europe, operational commanders in theater continued to negotiate the terms in which they would combine resources for reconstitution. Gen. John J. Pershing, the AEF commander, eventually compromised with his French and British counterparts, allowing the AEF to provide mutual support to the French, British, and Italian armies that included training and warfighting at the regimental level under a unified command.¹⁹

Similar discourse took place among political and military leaders during the Second World War involving much broader and complex negotiations. With several key allies from the previous war defeated by Axis powers, the United States and Britain sought cooperation with the Soviet Union and China, two actors who had far different interests and aims than Western allies. President Franklin D. Roosevelt and Prime Minister Winston Churchill determined that despite differences in national interests, the Soviet Union and China could generate the required manpower to counterbalance Nazi Germany and Imperial Japan. The United States and Britain thus agreed to provide materiel support to both countries to reconstitute requisite combat power.²⁰ Operational commanders continued to shape cooperative terms for reconstituting partner forces. Gen. Dwight D. Eisenhower, supreme commander of the Allied Expeditionary Force, negotiated the terms in which combined U.S. and British forces would conduct operations under a unified command.²¹ In the Pacific theater, Lt. Gen. Joe Stilwell, the U.S. Northern Combat Area Command commander, negotiated with British and Chinese leaders regarding the scheme of training, advising, and equipping the Chinese Expeditionary Force.²² These resulting compromises, bound by shared understanding and national interests, laid the framework for enduring cooperation.

With agreements in place, the U.S. military and allies engaged in a second strategic activity to enable reconstitution: expanding global sustainment networks. Since frontline partner nations had little to no means to sustain their own industrial bases, more developed allies provided the bulk of materiel support. In the First World War, the newly established United States Shipping Board produced hundreds of new ships between 1917 and 1918 to transport personnel and materiel to support European allies. Once in theater, AEF divisions played a dual role of training for combat



A World War II map details the routes by which supplies were sent from the United States to the USSR. (Map from *Report on War Aid Furnished by the United States to the U.S.S.R., June 22, 1941 - September 20, 1945* [Washington, DC: U.S. Department of State, 1945])

and providing labor to expand seaports in France and Britain.²³ These ports were essential for distributing much-needed weapons and ammunition from the United States to equip units in forward areas. The expansion of ports and influx of resources allowed France and Britain to restart some of their own domestic production of war materiel. New variants of French and British tanks, artillery cannons, and aircraft were produced and fielded to forces in contact, eventually outpacing the German army's abilities to sustain their own forces during the 1918 offensives.²⁴ The flow of supplies across global lines of communication, combined with in-theater regeneration of weapon systems, was critical to reconstituting partner forces.

In the Second World War, sustaining reconstitution operations was multidomain and multimodal.

The maritime network build during the previous war expanded even farther to sustain partner forces in Europe, North Africa, Central Asia, and the Pacific. Under the Lend-Lease Act, global sea lines of communication were used to deliver American tanks, ammunition, and other weapons to Britain, China, the Soviet Union, and other partners engaged in fighting the Axis powers. Overall sustainment via lend-lease totaled over \$35 billion and delivered over thirty thousand aircraft, twenty-six thousand tanks, and 1,400 naval vessels.²⁵ In the Asian and Pacific theaters, U.S. and Allied task forces overcame sustainment challenges through airpower and seapower. With Japanese forces controlling seaports in China and Burma, a combined British and American air task force provided aerial delivery from India to the Chinese Expeditionary Force over the

Himalayas, transporting over 650,000 tons of supplies.²⁶ Concurrently, as U.S. Navy and Marine forces gained footholds in the Pacific islands, Australia expanded its national logistics nodes to reinforce U.S. and partner forces in the region with armaments and equipment.²⁷ These efforts not only sustained reconstitution efforts but also increased pressure on enemy forces.

Although international agreements and global sustainment contributed significantly to reconstituting partner combat power, these elements required a third strategic activity to build cohesive units: integrated manpower and training. Allied distribution of war materiel was not merely a matter of reequipping partner forces; the integration of several new weapon systems into the hands of newly recruited manpower meant that partners would need to adapt their forces to fight in new ways, which therefore required extensive training of novice troops by U.S. and allied forces. Reconstitution in the First World War demonstrated interdependent relationships among U.S. forces, allies, and frontline partners. After it became clear in early 1918 that France, Britain, and Italy would have to rapidly train and equip several new units, and that the AEF would not be able to ready enough divisions on their own, Pershing agreed to integrate AEF manpower with frontline partner units to train for combat.²⁸ The AEF trained with partners at over fifty training sites in France and Britain, building competency for what Pershing called “open warfare.”²⁹ At the same time, AEF soldiers adapted to using French and British weapons and equipment, from heavy artillery cannons all the way down to rifles and bayonets. These training efforts were then tested several months later through combined operations against the Axis forces, with notable battles that included the French 157th Division at the Second Battle of the Marne and the British Second Army at the advance on Flanders.³⁰

In contrast to the First World War, the United States and allies took an economy of force approach to integrate manpower and training for reconstitution during the Second World War. With campaigns waging in four different theaters of operations, the Allies assumed high risk when it came to training newly equipped partners on Western combat systems. Under the alliance’s “Europe First” policy, the U.S. military prioritized manpower and training integration with the British through combined arms warfare, which

involved training army and air forces at several assault centers and airfields in Britain.³¹ Meanwhile, the United States and Britain supported Soviet forces by shipping thousands of Western armored vehicles and munitions with very minimal training or manpower integration, as Roosevelt and Churchill accepted strategic risk based on the Soviet Union’s extensive land and manpower advantages.³² The Pacific theater involved some of the most creative approaches to training and manpower integration for reconstitution. Allied task forces assembled training and logistics camps in China, India, and Burma, employing special advisor units to reconstitute the Fourteenth Army, the Chinese Expeditionary Force, and the multinational Mars Task Force.³³ British Field Marshal William Slim integrated soldiers from each contributing nation across the Fourteenth Army, from the headquarters down to the battalion level. The Fourteenth Army carried its combined manpower from collective unit training into combined arms operations to retake control of the Burma Road.³⁴ Cooperation went beyond training and organization; soldiers solidified connections at a human level and revived partners’ will to fight, achieving what Eisenhower termed “mutual confidence.”³⁵

Reconstitution in Modern Conflict

With the current war in Ukraine, the U.S. military is once again playing a lead role to reconstitute partner nation forces. The Ukrainian armed forces have been engaged in large-scale combat against the Russian armed forces for what is now approaching three years. Following their major counteroffensive operation in 2023, the Ukrainians have suffered tens of thousands of casualties against an embattled Russian force and are beginning to lose more of their territory.³⁶ Gen. Valery Zaluzhny, former chief of staff of the Ukrainian armed forces, publicly stated that Ukraine is in a state of “positional warfare,” and laid out five critical gaps in which Ukrainian forces must reconstitute to regain the initiative.³⁷ In some ways, the Ukrainians face a similar challenge as in the Hürtgen Forest: reconstituting two corps worth of combat power under austere conditions and with strained resources. While some analysts believe that Ukraine should prioritize deep fires and autonomous weapons, others believe that Ukrainian armed forces should focus on strengthening their defensive posture to attrite Russian forces while reconstituting



A stevedore sits in a Bradley Fighting Vehicle before loading it onto the *ARC Wallenius Wilhelmsen* 25 January 2023 at the Transportation Core Dock in North Charleston, South Carolina. The shipment of Bradleys was part of the U.S. military aid package to Ukraine, providing their military with additional offensive and defensive capabilities to protect their borders against Russia's illegal invasion. (Photo by Oz Suguitan, U.S. Transportation Command)

their own. What is evident is that Ukraine is running out of time and resources, and without international support they will be unable to reconstitute their forces to gain an initiative over Russia.³⁸

Unlike the First and Second World Wars, the U.S. military has an opportunity to assist the Ukrainian armed forces in reconstitution without committing any U.S. forces in direct combat. Since the onset of the conflict, senior defense leaders have engaged in strategic dialogue with the Ukrainian general staff to advise and assist the direction of the war effort. Monthly senior-level discussions have taken place through the Ukraine Defense Contact Group, hosted by U.S. Secretary of Defense Lloyd Austin and attended by defense ministers and chiefs of defense from over fifty countries. These strategic discussions among allies, partners, and the Ukrainian Ministry of Defense have enabled operational planning and commitments

of defense articles from around the world. Recently, Austin stated that reconstitution is a key operational objective of the Ukrainian armed forces and U.S. European Command in 2024. In response, the Ukraine Defense Contact Group has organized capability coalition working groups centered on long-term force development initiatives that will contribute toward reconstitution.³⁹ These multinational working groups will be essential for identifying training and equipping solutions as Ukraine reconstitutes its forces while simultaneously defending against Russian attacks.

As agreements develop, operational headquarters in Europe have played critical roles in operationalizing and refining policy and strategic guidance with the Ukrainian armed forces. Since late 2022, Security Assistance Group-Ukraine (SAG-U) has been an essential military organization linking strategic aims with operations in cooperation with the Ukrainians.



Ukrainian armed forces soldiers use a 155 mm M777 howitzer, provided by Western partner states, to repel a Russian attack on 23 November 2022 in the Donetsk region of Ukraine. (Photo by Serhii Nuzhnenko, Radio Free Europe/Radio Liberty via war.ukraine.ua)

Modeled after military advisory groups of previous conflicts, SAG-U is comprised of a multinational staff and actively takes part in equipping, advising, and assisting the Ukrainian armed forces throughout their operations against Russia.⁴⁰ Recently, SAG-U worked with the Ukrainian general staff on planning for future operations, including long-term initiatives for reconstituting their forces. SAG-U's coordination with U.S. European Command and NATO Supreme Headquarters Allied Powers Europe has also been crucial to incorporate interoperability standards with NATO members, as well as align support efforts to Ukraine with theater strategic objectives.⁴¹ Continued cooperation at the strategic and operational levels will be necessary to solidify plans and terms for reconstitution while more broadly sustaining international diplomatic support for Ukraine.

With this, U.S. military and allied lines of sustainment have extended to great lengths to reconstitute

Ukrainian combat power. The United States continues to be the lead nation in both equipping and distribution of military capabilities to Ukraine, donating over \$44 billion worth of defense articles through presidential drawdown authority and other security force assistance programs at a scale not observed since the Second World War.⁴² The U.S. Air Force has spearheaded strategic airlift of weapons and ammunition from the United States to Ukraine, flying hundreds of cargo missions into Europe over the past two years. Transporting these supplies has required close coordination across ports and logistics hubs in the United States and Europe, with agreements for basing and overflight being crucial to these distribution efforts.⁴³ Cooperation from NATO members has also enabled the expansion of logistics depots and facilities in Germany and Poland, providing remote maintenance and distribution services to the Ukrainian armed forces.

While the U.S. military and allied forces have responded rapidly to deliver several thousand tons of supplies to Ukraine, the defense industrial bases that support these herculean efforts have arguably not caught up to the demand for long-term sustainment at this scale. The sheer quantities of ammunition and maintenance parts required to continuously equip the Ukrainian armed forces have exposed fault lines in the U.S. military's sustainment enterprise. While smaller munitions can be sustained at a steady rate, large-caliber artillery and precision-guided munitions have been consumed at a rate that has greatly outpaced domestic production capacity. Although international partners have committed to producing new ammunition and materiel to supplement U.S. security assistance, the U.S. Department of Defense has been very hard pressed to simultaneously outfit the Ukrainian armed forces and the U.S. military, let alone keep up with Russia's defense industry.⁴⁴ Additionally, Russia's use of drone and AI capabilities has presented evolving threats in the operational environment, with some threats not effectively countered by conventional military equipment. This has required the Ukrainian Ministry of Defense to collaborate with allies and partners on developing hybrid capabilities, some of which are produced within Ukraine.⁴⁵ Sustainment on a global scale will undoubtedly require continued collaboration among the United States and allies with Ukraine, and it will likely involve a radical expansion of the international defense industry to compete against Russia.

The integration of new weapon systems from allies and partners has also involved an immense amount of training to fully reconstitute the Ukrainian armed forces into cohesive units. To put things into perspective, since 2022, Ukraine has received over ten variants of air defense platforms, four variants of main battle tanks, and hundreds of types of tracked and armored vehicles.⁴⁶ These new platforms placed in the hands of newly recruited Ukrainian soldiers have required U.S. military units and allied forces to train the Ukrainian armed forces from the individual level all the way up to the brigade headquarters level. The UK has made great strides in providing basic combat training for new Ukrainian soldiers at multiple bases in Europe, with individual system operator training also hosted in several countries.⁴⁷ Critical to these efforts has also been the U.S. Army's Joint Multinational Training

Group-Ukraine, a brigade-level task force that works hand in hand with SAG-U to train Ukrainian headquarters staffs and lead combined arms training exercises in Germany and Poland, including specific blocks of training on reconstitution.⁴⁸

Despite these integrated training initiatives, the U.S. military and allies have not been able to fully resolve Ukraine's manpower issues, which are critical to reconstituting its forces. As casualties continue to mount, the Ukrainians are struggling to recruit and retain requisite manpower at satisfactory levels. The Ukrainian government has recently considered implementing changes to its conscription system to recruit nearly four hundred thousand new soldiers, a proposal that is largely unpopular among the Ukrainian population.⁴⁹ Although some military leaders believe that Ukraine can offset its manpower issues by investing in drones and artificial intelligence, these capabilities cannot fully replace the manpower required to conduct large-scale maneuvers and secure occupied territory.⁵⁰ Previous conflicts demonstrated that the integration of U.S. and allied manpower with partner units significantly contributed to fulfilling reconstitution and regaining the initiative. However, U.S. forces and other allies are constrained by national policy from accompanying the Ukrainians into combat, an action that is arguably necessary to restore a partner nation's will to fight.⁵¹ This is ultimately the line drawn by civilian leaders on how far the U.S. military and its allies will go to reconstitute Ukraine's forces, and it is one that arguably does not have enough popular support from the American people to cross.

As the war in Ukraine and other conflicts persist into the future, the U.S. military will need to continue working with its allies to plan for not only building organic combat power but also reconstituting partner nation forces. Lessons learned from these conflicts will provide insight into considerations for international agreements, sustainment networks, and interoperability. To succeed, these efforts require close cooperation among the United States and allies to compromise on burden sharing, integrate new and emerging capabilities, and accept risk on training, advising, and assisting partners. The cumulative challenge will be to implement a multinational, multifaceted approach that enables partners to reconstitute forces and seize the initiative at a faster pace than the enemy. Achieving these milestones will truly take a global unity of effort. ■

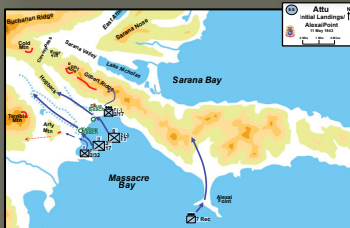
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The Battle for Attu (1943) Virtual Staff Ride



This new virtual staff ride (VSR) from Army University Press's Combat Studies Institute examines the U.S. invasion of Japanese-held Attu Island in the Aleutian Island chain. Ultimately, U.S. forces (primarily 7th Infantry Division) triumphed, but it was a difficult and costly campaign in which weather and terrain were as much a foe as the determined enemy resistance. The study provides relevant insights into numerous aspects of warfare to include operations in a unique arctic environment, joint/amphibious operations, mission command, and many other facets of combat.

The Attu VSR is a four-hour study that uses simulated 3D terrain presented in front of the audience to help immerse participants in the terrain.

To learn more about VSRs, visit <https://www.armyupress.army.mil/Educational-Services/Staff-Ride-Team-Offerings/>.





Soldiers assigned to the 41st Field Artillery Brigade unload an ammunition container from an M270 Multiple Launch Rocket System at a rearm, refuel, and resupply point during Dynamic Front 25 in Rovajärvi, Finland, 7 November 2024. Dynamic Front 25 took place in Finland, Estonia, Germany, Poland, and Romania, and demonstrated NATO's ability to share fire mission target information and operational graphics from the Arctic to the Black Sea. The annual exercise increases the lethality of the alliance through long-distance fires, builds unit readiness in a complex joint, multinational environment, and leverages host-nation capabilities to increase U.S. Army Europe and Africa's operational reach. (Photo by Sgt. Gianna Elle Sulger, U.S. Army)

Black on Ammunition, Green on Forecasting

Ammunition Lessons Learned from a DIVARTY in a Division Warfighter Exercise

Maj. Mikhail "MJ" Jackson, U.S. Army

In the Army, most people naturally think black on ammo is a bad thing. However, what if black on ammo actually means you are doing exactly what you need to do to accomplish the mission? There is an ongoing debate among the sustainment, fires, and movement and maneuver warfighting functions as to what a black status means with respect to ammunition. For the purpose of this article, I define “black on ammo” as it relates to the division artillery (DIVARTY) force’s field artillery headquarters (FFA HQ) mission as the inability to support field artillery tasks against the division commander’s high-payoff target list without resupply.¹

Army Regulation 700-138, *Army Logistics Readiness and Sustainability*, delineates a “green” status as unit quantity that is 90 percent or greater (combat capable), “amber” as 70–89 percent strength (combat capable with minor deficiencies), “red” as 60–69 percent (combat ineffective, unit has major losses of deficiencies), and “black” means a unit quantity is less than 50 percent (at grave risk, not supportable).² In the sustainment community, most sustainers naturally want to keep a stockpile of all supply commodities on hand for replenishment purposes before units go black and, if at all possible, keep commodities above levels of amber, preferably in the green at all times.

As the lead sustainer in the 2nd Infantry DIVARTY in the role of an FFA HQ, I had the unique opportunity to enhance my understanding of the fires’ side of logistics and multiple echelon levels of sustainment. I quickly understood that ammunition may not always be green. In fact, sometimes on-hand quantities might be in the red or black, which is okay if you understand mission requirements, can appropriately forecast ammunition, and can make ammunition adjustments depending on the range to the enemy’s location. In the division’s 2022 Warfighter exercise (WFX 22-02), my sustainment team and I used class V (CLV) ammunition projected volume of fire (VOF) for each phase of the operation to accurately forecast ammunition expenditure (up to ninety-six hours out and tied to the targeting cycle) and help drive the course of action in CLV ammunition expenditure success.

Most sustainers view the replenishment of ammunition and the calculation of the required supply rate (RSR) as a straight-line process. They straightforwardly define the concept of RSR as the quantity of CLV ammunition needed for a specific operation.

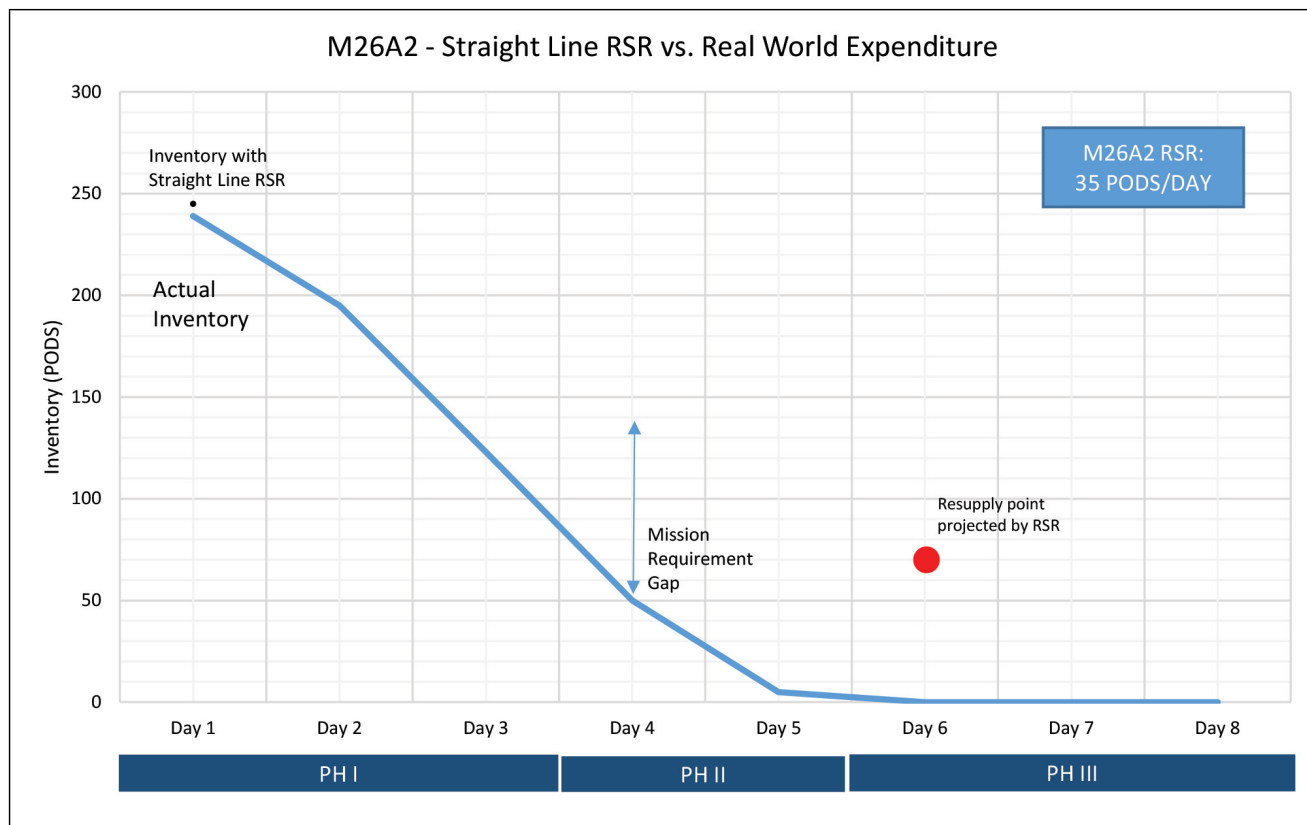
Units evaluate their ammunition needs to maintain tactical operations throughout chosen periods and accordingly establish an RSR. Although managing ammunition through a straight-line approach may work well under certain conditions, it becomes especially critical for artillery units engaged in large-scale combat operations (LSCO) to dynamically forecast their needs. They must consider the various combat phases and the expected VOF.

To elaborate on this, the process begins when sustainers and units analyze the operational goals and the nature of the conflict they are entering. This initial assessment is crucial for determining the basic framework of their ammunition requirements. In traditional scenarios, a linear model of supply might suffice, where the consumption rate is relatively predictable, and resupply can be planned on a regular basis. This model relies on historical data and standard operating procedures to ensure units have enough ammunition for their missions.

However, in more complex environments such as LSCO, the situation on the ground can change rapidly. Artillery units in particular face unique challenges due to the scale of engagements and the strategic importance of their firepower. The dynamic forecasting they are encouraged to perform involves a detailed analysis of the operation’s phases—from initial engagement, through maneuvering, to the final assaults.³ Each phase might require different types and quantities of ammunition, influenced by the enemy’s actions, our strategic decisions, and other factors like weather or terrain.

Forecasting thus becomes a multifaceted task. It’s not just about predicting how many rounds of ammunition will be needed, but understanding when they will be needed, and how best to distribute them across the units involved. This requires a deep collaboration with intelligence units to monitor enemy movements and anticipate changes in the battlefield. Logisticians and

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(Figure by author)

Figure 1. Straight-Line Required Supply Rate (RSR) Forecast versus Real-World Expenditure

planners use this information to adjust their forecasts and supply plans accordingly.

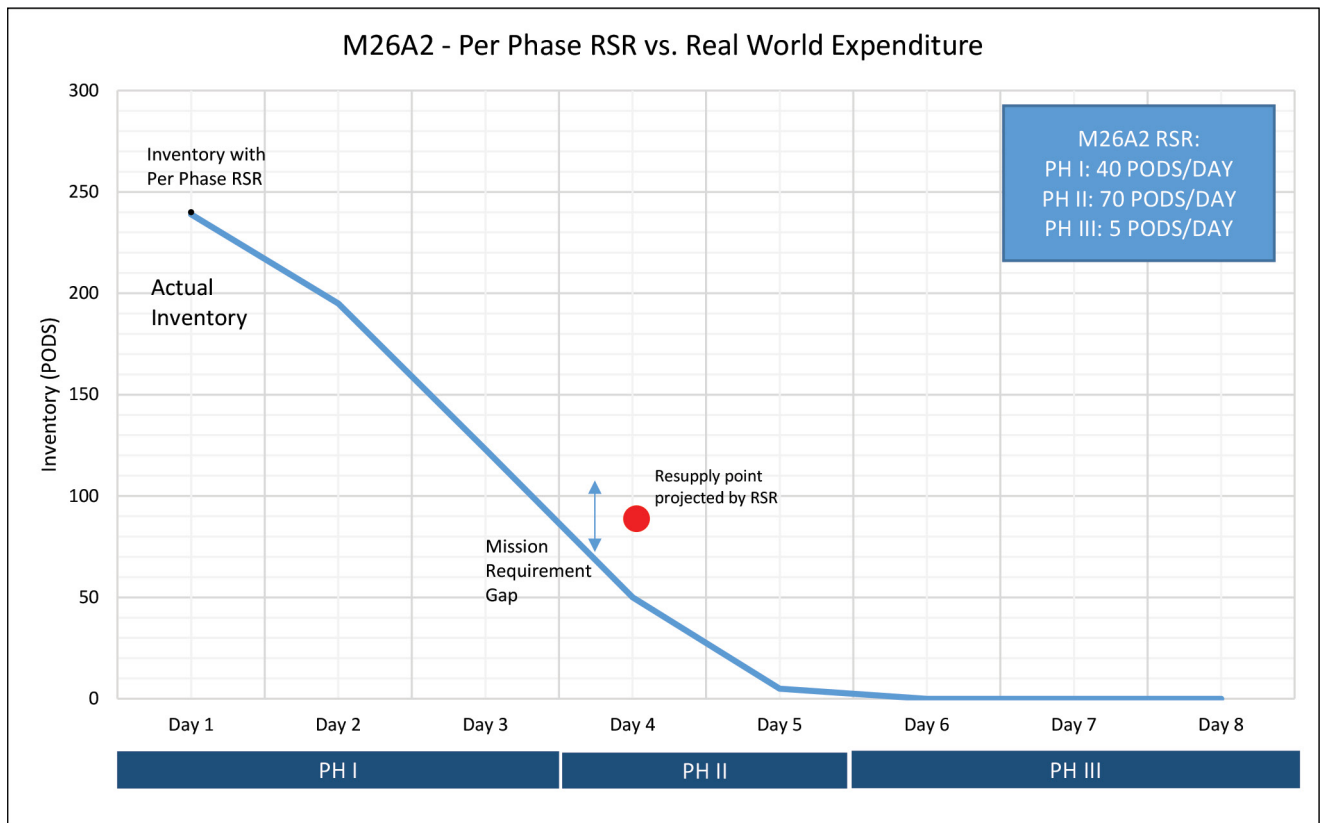
Moreover, the expected VOF plays a critical role in these calculations. VOF is essentially a measure of the intensity of firing expected during an operation. It's impacted by the operation's objectives (e.g., suppressing enemy defenses, supporting an assault, or defending against an attack), the duration of engagement, and the effectiveness of the enemy's countermeasures. Artillery units must ensure they have not just enough ammunition but the right kind of ammunition to achieve their objectives without running into shortages at critical moments.

While the fundamental principles of ammunition resupply might seem straightforward, the reality on modern battlefields demands a far more nuanced approach. Effective ammunition management in LSCO environments is about anticipation, adaptability, and the precise coordination of logistics and combat

operations to meet the challenges of dynamic and often unpredictable combat scenarios.

It's important to expand on this and understand that in the dynamic and often unpredictable environment of LSCO, the demand for ammunition can fluctuate significantly. Artillery units, facing varying intensities of combat, must adjust their supply strategies to ensure they have sufficient ammunition to maintain operational effectiveness. This necessitates a departure from the more linear, predictable models of supply chain management, toward a more flexible and anticipatory approach.

As these units progress through different phases of combat, the nature of their engagements can change, requiring different types and quantities of ammunition. For instance, during an initial offensive phase, the demand for the high volume of fire might be greater to suppress enemy positions. Following this, in a more static defensive phase, the rate of ammunition



(Figure by author)

Figure 2. Per Phase Required Supply Rate (RSR) Forecast versus Real-World Expenditure

consumption might decrease but require precision munitions for targeted strikes.

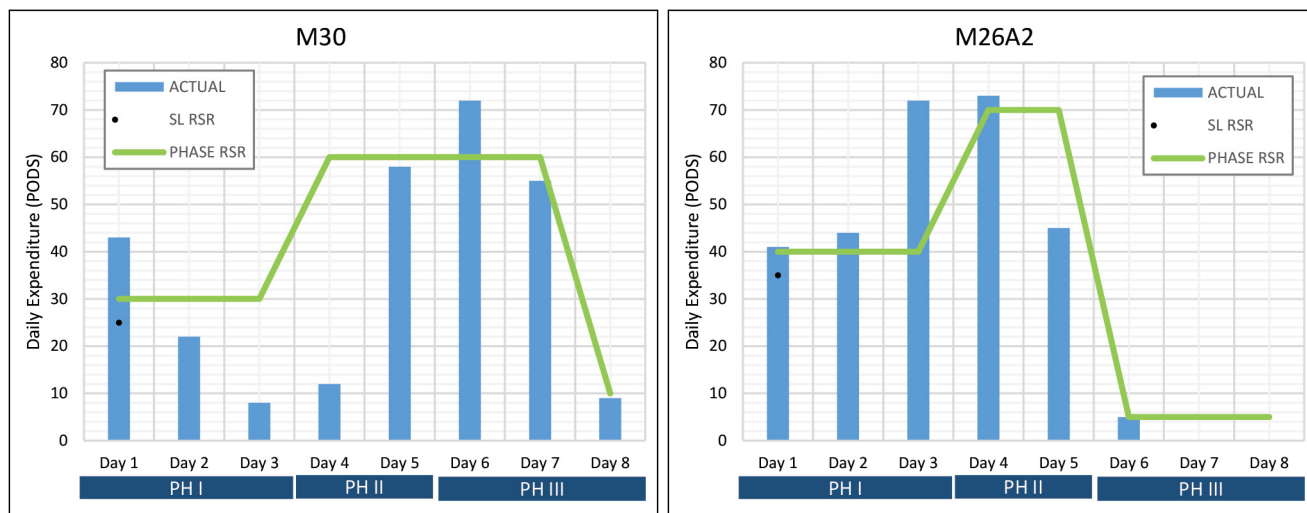
Anticipating the VOF—that is, the intensity and quantity of ammunition required for effective engagement with the enemy—becomes critical. This requires a deep understanding of the operational tempo, enemy capabilities, and the tactical objectives for each phase of the operation. By effectively forecasting these needs, artillery units can tailor their RSR, ensuring that they neither run short of critical munitions nor overburden their supply lines with excessive stockpiles that may not be immediately necessary.

While a straight-line process for calculating and managing ammunition supply might suffice for smaller or more predictable operations, the complex and fluid nature of LSCO demands a more nuanced approach. Sustainers and artillery units must work closely, employing both quantitative models and qualitative judgments, to anticipate and meet the evolving ammunition

needs. This proactive strategy is essential for maintaining the momentum and effectiveness of artillery operations within the broader context of LSCO, ensuring that forces remain prepared and adaptable in the face of changing battlefield dynamics.

Understanding Ammunition by VOF and by Phase of the Operation

Expending rounds against the enemy based on the phase of the operation is an approach that will better describe requirements to ensure mission accomplishment. Figure 1 is visual representation of how many logistics planners view RSR. RSR translates for the duration of an operation, a forecast of ammunition inventory based on a straight line RSR. Figure 2 portrays the recommended approach to view RSR, which is by forecasting inventory over time by phase of the operation. The DIVARTY benefited significantly from this approach during WFX 22-02.



(Figure by author)

Figure 3. Planned versus Actual MLRS Ammunition Expenditure by Type

Projecting RSR by phase of the operation helped us forecast our requirements two days earlier than if we used a straight-line RSR. The difference of two days in LSCO can be the difference between winning and losing. In our case, it meant when we would need a resupply sooner than expected. Our forecasting helped determine the need for resupply in Phase II of the operation versus Phase III. As shown in figure 2, our forecasting also helped us to shorten our mission requirement gap, illustrating our projected ammunition aligned with our projected ammunition requirements. As a DIVARTY, we could forecast how much ammunition we had at all times, and we knew when we would run low and by how much.

Over time, the pattern of ammunition expenditure and VOF more closely represents a bell curve than a straight-line pattern. A straight-line pattern is deceiving across phases of an operation because it gives the impression that ammunition requirements will remain steady throughout. In our WFX, that was clearly not the case. Based on projected VOF, the DIVARTY could tell the critical ammunition like the M30 rockets the and the older M26A2 rockets for the multiple launch rocket system would fluctuate throughout the entire operation. We anticipated we would expend more M30 up front, then transition to M26A2 in following phases as shown in figure 3. Army Techniques Publication 3-09.30, *Observed Fires*, specifies that unlike the traditional free-flight M26 series rockets, whose accuracy degrades as the range to

the target increases, the guided multiple launch rocket system provides consistent improved accuracy from a fifteen kilometer minimum range to a maximum range of more than seventy kilometers.⁴ Thus, the preferred ammunition to shoot is M30 if within range for accuracy and reduction of collateral damage.

What we did not anticipate in the WFX was a controlled supply rate (CSR) imposed on critical ammunition at the sustainment stock level, the source of our ammunition replenishment. This imposed CSR was at an insufficient level to meet our daily requirements. This CSR meant we would go red and black on critical ammunition requirements we needed to support long-range artillery missions. Based on guidance from the commander on how we planned to fight, we had a reliable estimate for when we would run out of ammunition for each critical ammunition. Further, we had a branch plan to allow us to fight using long-range munitions if required. The CSR would increase the risk at a critical portion of the battle that was unacceptable to multiple commanders. The staff's ability to communicate these concerns allowed the risk to remain at an acceptable level.

An FFA HQ requires efficient communication to get the appropriate information needed between different organizational networks. The DIVARTY gathered information at multiple levels to obtain a holistic view and communicate a shared understanding of the process. As a DIVARTY in the role of an FFA HQ, we are in a unique position. We can view sustainment stock

and on-hand quantities across multiple units, including any attached or reinforcing field artillery brigade. The field artillery brigade primarily focuses on what it has on-hand at the gunline and at its sustainment battalion. The sustainment brigade primarily focuses on higher echelon sustainment stock. The DIVARTY occupies the space between. Therefore, we are able to synthesize the two perspectives to get a more holistic assessment.

As an FFA HQ, we actively utilize VOF along with the operational phase to precisely determine forecasted ammunition requirements. The DIVARTY's targeting mission offers a level of predictability that directly informs us of the necessary amount of ammunition required to sustain the battle. We enhance this process by proactively integrating ammunition requirements into our comprehensive planning efforts and branch plans. This integration allows us to adapt to changing conditions and to tailor our approach according to the specific type of operation we are engaged in.

Based on the targeting requirements identified for each phase of the operation, we make informed decisions regarding the types of long-range artillery resources that will be needed. This decision-making process is crucial for ensuring that our operations are not only effective but also efficient, minimizing waste while maximizing impact on the battlefield.⁵

Forecasting Ammunition

For the firing units to successfully meet the maneuver commanders' targeting guidance, the FFA HQ must forecast accurately. This accurate forecasting is not just a perfunctory task; it's a critical component that shapes the description of ammunition requirements. These requirements are detailed not only by the quantity of ammunition requested and used by the unit but also by the specific needs that arise during operations.

The process of forecasting ammunition involves several key factors, primarily the Department of Defense Identification Code, or DoDIC. The DoDIC specifies the exact type of ammunition needed, while inventory tracking systems help assess the quantity needed. This precision ensures that units have the right ammunition, in the right place at the right time, thereby enhancing the effectiveness of military operations.

As a DIVARTY, our role extends beyond mere requests. We consistently communicate our requirements, which are tightly linked to the targeting cycle. This

continual communication is crucial because it allows for a seamless integration of our needs with the overall operational plan. By doing so, we substantially reduce the occurrence of unforecasted requirements. Unforecasted requirements can pose additional and unnecessary risks for sustainment units, who may find themselves in challenging positions trying to fulfill last-minute demands. Hence, our proactive approach in forecasting and communication helps in mitigating these risks, ensuring that our sustainment units are better prepared and not overburdened with unforeseen tasks.

In essence, the precision in forecasting and the continuous communication of ammunition needs are fundamental to the efficient operation of artillery units. These practices ensure that the firing units have the necessary resources to meet their objectives, thereby supporting the broader mission of ensuring security and effectiveness in military operations.

For the initial first two phases of WFX, we planned to rely heavily on M30 ammunition. We knew our forecasted replenishment for M30 for Phases I and II would be high. The high consumption of M30 would allow us to remove the high-payoff targets that posed the highest risk in these phases. With this risk reduced for Phases III and IV, we could transition our expenditures to another type of ammunition. We based consumption rates on defense, offense, and stability operations. Informed by our anticipated targeting success, we forecasted high for offense and relatively lower expenditures for defense.

Our S-2/S-3 high-value target analysis drove out forecast analysis based on the required VOF needed to achieve mission success. We also used counterfire analysis and anticipation to determine how much we would need to defend our division and ourselves. We even further involved ourselves as a S-4 section through our attendance in the DIVARTY targeting meeting, which allowed us to anticipate requirements out to ninety-six hours. Based on forecasted VOF, close coordination with the fire control officer, ammunition expenditure, and the imposed CSR for sustainment stock, we forecasted that we would be in a red or black status on both M30 and M26A2 ammunition by end of Phase III/beginning of Phase IV.

We knew we did not have many options so we quickly made the operational determination that we would not conserve ammunition; rather, we would



A soldier from 3rd Battalion, 19th Airborne Field Artillery Regiment, 3rd Brigade Combat Team, 82nd Airborne Division participates in a live-fire event with an M119 howitzer during the Division Artillery's Best of the Best competition on Fort Bragg, North Carolina, 7 December 2022. Competing soldiers are categorized based on their military occupational specialty and weapon to showcase their talents through precision, speed, and lethality. The team's competition category was the "Best M119 Howitzer." (Photo by Sgt. Emely Opio-Wright, U.S. Army)

use what we had of the M30 first for longer-range artillery then move closer to the enemy for shorter range M26A2 ammunition to achieve similar effects. Tactically, this meant we had to plan to move closer to the forward line of troops to change ammunition type. We also had another course of action to shift to high explosive M31 instead of M30 in the interim when we ran out of both M30 and M26A2, which required a more accurate target location to achieve the same effect. This meant that instead of a six-to-eight-digit grid coordinate, we would need a ten-digit grid coordinate for effective targeting, requiring a lot more accuracy from the division's target detection efforts.

However, perception from a sustainment metrics perspective stated that we were black on ammunition (less than 50 percent). In the eyes of FFA HQ, we ultimately would not be black on ammunition until we absolutely had no ammunition left. This meant sustainment black was our 100 percent, amber was

75 percent of that, and red was less than 50 percent of that. Black for us was no ammo at all. Using this simple metric helped us accurately estimate when the division had positioning and risk decisions to make. The FFA HQ communicated these opportunities through multiple working groups and decision boards at the division and field army levels. These decisions would be made based off the targeting success and the ammunition that remained by phases of the operation. The division needed to win the battle based on ammunition type we had left.

An additional challenge we quickly resolved in the initial phase of calculating ammunition requirements was the way in which we received ammunition reporting requirements. The standardized logistics status document in which units sent up CLV ammunition requirements had ammunition consolidated into one full rollup versus breaking down how much ammunition consumption each unit expended day by day. As

an FFA HQ, our ammunition expenditure strategy calculated ammunition expenditure day by day for an end-of-day individual rocket count. The day-by-day ammunition expenditure count allowed us to communicate accurately how much ammunition the division expended. Additionally, it allowed us to see how much we could anticipate expending. Finally, it allowed us to know how much ammunition remained based on what artillery type we wanted to use. Planning and accurate forecasting was the essential foundation for our ability to use ammunition effectively.

Summary

During our WFX, the success we experienced with ammunition management was directly attributable to clear guidance from leadership and the seamless synchronization of our staff. Unlike many organizations, which often struggle to integrate sustainment and logistics into their combat planning effectively, DIVARTY took a proactive stance. We didn't just include sustainment as a side note in our mission planning; we positioned it at the core of our strategy to ensure the mission's success.

One key to our achievement in this area was our precise forecasting of ammunition needs, extending up to ninety-six hours ahead and intricately linked to our targeting cycle. This foresight allowed us to meticulously align the projected volume of fire for CLV ammunition

with each phase of the operation. This planning was pivotal in determining our course of action and ultimately in the successful expenditure of CLV ammunition.

Traditional sustainment doctrine might label our approach and category of ammunition metrics as "black" on ammunition, indicating a critical shortage or potential shortfall in supply. However, as an FFA HQ, DIVARTY broke the mold. We employed unconventional forecasting techniques and conducted in-depth ammunition analysis, which played a crucial role in navigating potential shortfalls and achieving our mission objectives.

Our innovative approach to ammunition management and the clear articulation of our requirements have set a precedent we believe can benefit other units across the Army, especially in LSCO. The methodologies we developed and employed represent a shift in how sustainment and logistics can be integrated into combat planning, offering a template for success in future operations.

In summary, DIVARTY's success during the WFX was not a happy accident but the result of deliberate planning, innovative thinking, and a holistic approach to sustainment. Our experience demonstrates that embracing sustainment as a fundamental component of mission planning, coupled with innovative forecasting and analysis, can significantly enhance operational effectiveness, a lesson we hope will resonate Army wide. ■

Notes

1. Joint Publication 3-09, *Joint Fire Support* (Washington, DC: U.S. Government Publishing Office [GPO], 2019), 34, https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_09.pdf.

2. Army Regulation 700-138, *Army Logistics Readiness and Sustainability* (Washington, DC: U.S. GPO, 2018), 30, https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN7663_AR700-138_Web_FINAL.pdf.

3. Army Techniques Publication (ATP) 4-35, *Munitions Operations* (Washington, DC: U.S. GPO, 2023), chap. 2, https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN37303-ATP_4-35-000-WEB-1.pdf.

4. ATP 3-09.30, *Observed Fires* (Washington, DC: U.S. GPO, 2017), 6-4, https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN5011_ATP%203-09x30%20FINAL%20WEB.pdf.

5. ATP 3-60, *Targeting* (Washington, DC: U.S. GPO, 2023), 3-3-3-5, https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN39048-FM_3-60-000-WEB-1.pdf.



Col. James Stultz, commander of 2nd Brigade Combat Team, 101st Airborne Division (Air Assault) (2-101), conducts operations during the unit's Joint Readiness Training Center rotation on 22 August 2024 at Fort Johnson, Louisiana. As the first unit in the Army to execute the chief of staff of the Army's experimental modernization concept, called "transformation in contact," 2-101 is now operating with significantly modernized network and command-and-control capabilities designed to counter evolving threats. (Photo by Staff Sgt. Joshua Joyner, U.S. Army)

Achieving Decision Dominance

The Arduous Pursuit of Operationalized Data

Capt. Alexander K. Adkins, U.S. Army

Senior Army leaders established and iterated data-centric policy from as far back as 2021 for the Army to move directly toward rapidly enabling commander decisions with live data to achieve overmatch of our adversaries on future battlefields. The concept of decision dominance rose to prominence in the Army after 16 March 2021, as then Chief of Staff of the Army Gen. James McConville framed the phrase as “a desired state in which commanders sense, understand, decide, act and assess faster and more effectively than their adversaries.”¹ In her 8 February 2022 letter to the force, Secretary of the Army Christine Wormuth outlined her priorities to address the most pressing challenges for the U.S. Army, the second of which was for the Army to become more data-centric to win future conflicts in complex environments.² The *Army Data Plan*, originating from the Office of the Chief Information Officer at Headquarters, Department of the Army (HQDA), set the secretary of the Army’s policies into motion for the Army of 2030 concept, placing “operationalized data-driven decisions that support multidomain operations at echelon” as the top strategic objective.³ With the appointment of the current Chief of Staff of the Army Gen. Randy George, the imperative to further transform the Army to enable warfighting struck home the message that all efforts of the data enterprise must directly enable the warfighter.⁴ The problem facing Army leaders now is how the Army delineates roles and responsibilities for achieving decision dominance with data to empower commanders at echelon.

Decision Dominance Gaps

To comprehend the senior leadership’s objectives, it is essential to first grasp the intended outcome in tangible terms. Army Futures Command (AFC) defines decision dominance as a way for Army forces to make and disseminate better and faster decisions than an adversary, thereby gaining, maintaining, and exploiting the operational initiative.⁵ To affect that outcome, the Army must begin from its existing doctrine describing decision support of commander decision-making through the military decision-making process (MDMP) provided by staff inputs from every warfighting function.⁶ By its design, the MDMP assumes access to finite data, but the ubiquitous presence of data on the modern battlefield risks inundating a staff

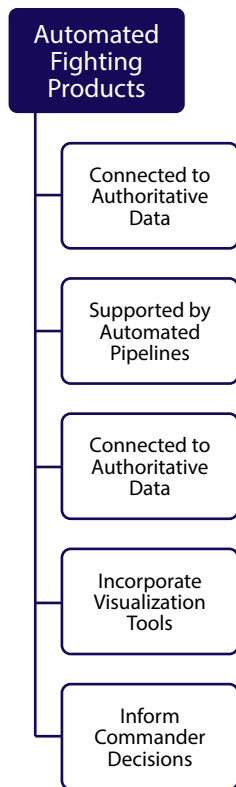
executing the MDMP, possibly leading to “paralysis by analysis.”⁷ Current doctrine fails to prevent data inundation, but the emerging discipline of decision optimization offers a possible solution. This new discipline is an approach to gaining advantage in readiness and warfighting through data science, artificial intelligence (AI), and machine learning (ML).⁸ However, even this further distillation of decision support lacks enough specificity to be actionable at the operational and tactical levels.

An optimized decision requires operationalized data, that is data analyzed and presented in a way to be immediately actionable by those who consume it. Operationalized data is made available to data consumers through the common operational picture (COP) and fighting products. The Army has long used analog fighting products such as operations order shells filled out by hand in the field environment. Within the last quarter century, these analog fighting products evolved into digital fighting products consisting of Excel documents, PowerPoint presentations, and SharePoint pages to collate and share information more rapidly. The bleeding edge of current Army efforts to achieve data centrality is the effort to produce automated fighting products (AFP). As shown in figure 1, an AFP

- consists of commonly accessible staff or leader data visualization tools,

Capt. Alexander K.

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(Figure by author)

Figure 1. Characteristics of Automated Fighting Products

- is supported by an automated data pipeline,
- is connected to live, authoritative data sources,
- reduces the time required to produce staff running estimates, and
- informs commanders' decision-making.

The most notable examples of AFPs from the force today are the automated Power BI and Army Vantage dashboards used to reduce staff burden to produce and brief routine update reports to commanders. The concept of AFPs is agnostic of a unit's choice of data platform, with the only requirement that the data platform is readily accessible, connects a visual display to live data, and produces efficiencies for the unit's associated staff. With this detailed end product in mind, the issue the Army faces is to define what organization is responsible for producing and maintaining AFPs at echelon, which personnel will man those organizations, what training should be in place to enable those organizations, and what doctrine will support those activities.

The Decision Optimization Team at Echelon

Over the past few years, units across the Army at multiple echelons sought to solve this problem internally by developing ad hoc teams, the most prominent of which are innovation cells. Although many of these teams produced myriad material and procedural solutions to tactical problems, the formations lacked a formal structure at echelon to support, resource, and synchronize their activities. To systematically solve this problem set and provide flexible decision optimization capability to commanders, a formal decision optimization team (DOT) must exist at every echelon from division to HQDA. This DOT would likely report directly to the chief of staff for their echelon as part of the special staff. The DOT would be responsible to rapidly provide operationalized data through the integration, analysis, and visualization of live, authoritative data required to enable a commander's decision. To provide this capability the DOT's key tasks would span the disciplines of data engineering, data science, and decision science by leveraging existing and emerging technology such as command-and-control information systems, AI, and ML. This effectively makes DOTs the operational arm of the Army's *Unified Data Reference Architecture* responsible for achieving data mesh by implementing the *Unified Data Reference Architecture* principles, service activities, and data domain processes.⁹ Regardless of the operational environment—whether a garrison, operational, or combat environment—the DOT is responsible for the creation, maintenance, and transition of AFPs for their unit. The DOT provides data integration, assessment, war gaming, simulation support, and process improvement support during the planning and preparation phases of the operations process. During the execution phase, the DOT provides tracking and assessment of upcoming commander decision cycles. Throughout the operations process, the DOT conducts assessments on unit performance for rapid learning and adaptation. The only variance between DOTs at each echelon will be their roles and responsibilities.

Field Manual (FM) 3-0, *Operations*, details the Army's concept to fight large-scale combat operations and the responsibilities and time horizons for each echelon. The table shows time horizon responsibilities for echelons from brigade to theater or field army level.¹⁰

Table. Unit Time Responsibilities by Echelon

Formation	Close Fight Time	Deep Fight Time
Brigade	12–24 hours	24–48 hours
Division	24–48 hours	48–120 hours
Corps	48–120 hours	72–216 hours
Theater Army	72–216 hours	> 216 hours

(Table by author; data analysis based on content from Field Manual 3-0, *Operations* [2022], 6-11)

For an AFP to be useful to inform a commander's decision, a DOT must deploy its AFP during the first two steps of the MDMP so that the rest of the staff can leverage the tool during their analysis and planning. Using the deep-fight time horizons for each echelon, the FM 5-0 (*Planning and Orders Production*) MDMP planning factors, and the one-third/two-thirds rule for development, a division DOT would only have between 2:22 and 7:45 (hours and minutes) to develop and deploy AFPs while in contact.¹¹ This time horizon would only be reasonable for developing minor tools that adjust from existing AFPs. Division combat training center "division in the dirt" rotations emphasized that divisions must rapidly deliver relevant information to the tactical edge to ensure its relevance to the tactical commander.¹² Further, as the unit of action transitions to the division, a division and its subordinate brigades must be consumers rather than creators of AFPs because their cognitive bandwidth will be divided between executing combat operations and conducting survivability moves. Division-level DOTs must be responsible for producing minor, formation-specific addendums to AFPs prior to deployment and during the planning phase of the operations process. Division DOTs implement validated AI and ML tools for operational use, testing, and assessment. Each of these division-level responsibilities hinges on a close relationship with the DOT at their corps headquarters.

As the corps serves as the bridge between the operational and tactical levels, the significance of the DOT at the corps level cannot be understated.¹³ Corps DOTs must be responsible for developing and deploying AFPs tailored to meet the mission sets and capabilities of their formation prior to execution. To reduce the cognitive burden on their subordinate units in combat,

corps DOTs must produce theater agnostic AFP suites that scale down to the company level focused on sensor to shooter data requirements. Although a garrison and combat AFP suite will be different in form and function, the importance of their production and the management of the transition between them to meet operational requirements is persistent. An effective corps AFP incorporates validated AI and ML tools to gain efficiencies in staff decision support activities that a subordinate division or brigade can readily access and use in combat. As the corps level possesses more development time resources, the corps level is the first in a triage of reach-back capability for brigades and divisions to leverage to solve complex decision optimization problems.¹⁴ Significant additions to or revisions of the corps AFP suite, in response to changes in mission variables by the corps DOT, take place in a headquarters further removed from the enemy threat. As corps are the highest echelon headquarters that deploy into a theater in support of large-scale combat operations, their interaction with an Army Service component command (ASCC) DOT will not be habitual and will require a high degree of design thinking at both headquarters to foster flexibility to interoperate.

ASCCs remain oriented on their theater of operations by their nature and are therefore optimally positioned to produce a readily accessible, theater-specific COP platform. Coalition partners and allies integrate with U.S. Army forces at the ASCC level, further reinforcing the requirements for an ASCC to develop, deploy, and maintain a COP on the relevant networks to enable combined, joint combat power synchronization. Having a combined, joint COP for an incoming corps to fall in on in theater reduces the cognitive load on the corps staff, thereby reducing the time required

to commit the corps to combat. The development time horizon for ASCC DOTs enables them to provide reach-back capability to assigned corps for longer lead time AFP, COP, AI, and ML tools during operational and combat environments. The high volume of live data flowing into and through an ASCC headquarters serves as an optimal echelon for the training and validating of AI and ML models and tools. The U.S. Army Pacific Command and the U.S. Central Command developed and employed the Pangea and Maven Smart System platforms respectively to provide their theater specific information requirements in a cloud-based, readily accessible COP. To enable an ASCC to develop a combined, joint COP, they require infrastructure, resourcing, synchronization, and governance provided by the HQDA.

At the HQDA level, the DOT and associated staff inherit the roles and responsibilities of the lower-echelon DOTs while assuming the additional responsibility to synchronize decision optimization efforts within HQDA's operations and resourcing cycles. The HQDA DOT coordinates with the HQDA-level staff directorates to ensure that the network infrastructure, programs of records, and systems of record provide the capabilities required by operational and tactical units to complete their decision optimization support activities. The HQDA DOT provides the governance for the reach-back system down the DOT chain and serves as the gateway to strategic development resources. By providing this oversight, the HQDA DOT ensures that finite strategic development resources are prioritized and delivered to the point of greatest need and ensures that long-term projects are synchronized with operations and resourcing cycles. As AFC develops AI and ML models and tools, the HQDA DOT verifies that those products meet decision optimization requirements and assigns the validation of those products to the appropriate ASCC DOT. Further analysis is required to define the relationship among the HQDA DOT, AFC, and other strategic development assets. Without a DOT at every echelon above division, the decision optimization discipline will struggle to achieve a total Army revolution in decision dominance on future battlefields.

The Available and Future Decision Optimization Workforce

Now with the DOT concept in mind, the next issue to address is who will man the DOTs at echelon.

Currently within the Army, three branches already bear the responsibility for the key tasks that a DOT must execute: functional area (FA) 26B—information network engineer, FA 49—operations research/systems analysis (ORSA), and FA 57—simulations operations.

- FA 26B officers possess much of the knowledge, skills, and attributes required to execute the data engineering requirements of the DOT at echelon as the branch already provides innovative, flexible, and resilient mission command networks backed by operationally useful databases.¹⁵
- The ORSA community performs all three DOT key tasks out of necessity as they provide the capability to rapidly deliver optimization, data analytics, and data visualization through emerging technologies.¹⁶
- Simulation officers, despite lacking extensive technical backgrounds, contribute substantially to commander decision-making by providing knowledge-management-process-analysis expertise, simulation support, and an aptitude for harnessing new technologies to construct a comprehensive COP.¹⁷

Breaking up these DOT tasks into different roles and responsibilities allows deep expertise, more efficient workflows, higher quality work, and innovation. Traditional tasks for these FA officers like information systems management, special data project analysis, and knowledge management program implementation respectively would need reevaluation under the DOT concept. The XVIII Airborne Corps Office of Data Transformation piloted the combination of the FA 26B, FA 49, and FA 57 efforts within their headquarters in a targeted effort to improve the data literacy of the corps, division, and direct reporting unit staffs to great effect, implementing novel data literacy and advanced command-and-control information systems training courses.

The prevalence of personnel from these three branches appears sufficient to meet requirements if properly organized at the ASCC, corps, and division levels. This capability is nonexistent at the HQDA level. For Category A ASCCs, corps, and division headquarters, four to five FA 26Bs, one to two FA 49s, and three to six FA 57s serve across eight different staff sections based on current modified table of organization and equipment.¹⁸ At the HQDA level,



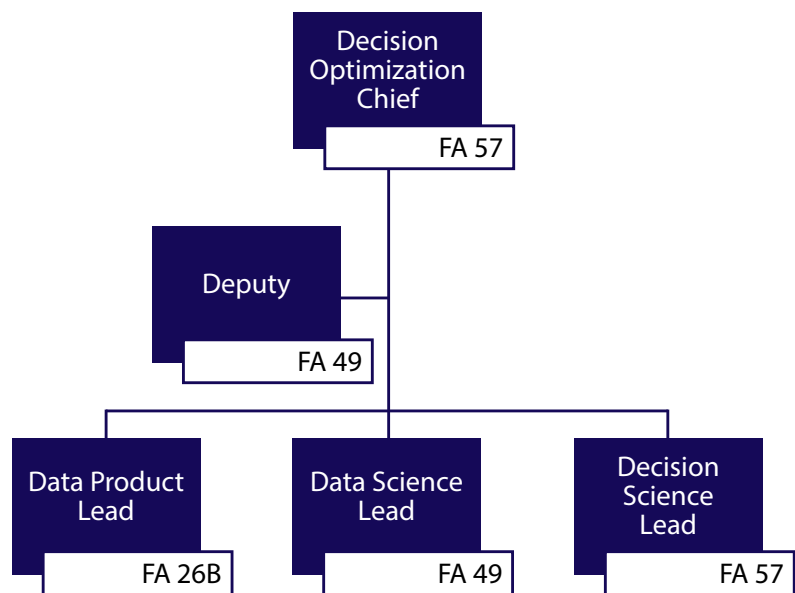
Within thirty days of standing up the Division Innovation Lab in 2022, 82nd Airborne Division soldiers developed over twelve different projects for further test and evaluation. Since its establishment, other recommendations have continued apace. This kind of collaboration on force modernization demonstrates the great potential of ground-level soldier-driven initiatives to upgrade all dimensions of the Army's organization, field operations, doctrine, and equipment. Permanent addition of a decision optimization team to the division structure would build upon the concept, formalizing and helping to instill recognition of the need for such a process as part of future Army culture. (Photo courtesy of the U.S. Army)

the personnel from the three branches required for the DOT are dispersed thinly across the deputy chief of staff G-6, the deputy chief of staff G-8, and the deputy chief of staff G-3/5/7.¹⁹ The new HQDA directorate and associated staff billets could be made available through a bottom-up review of existing billets made obsolete from current technologies and automation. A reorganized DOT at echelon on modified table of organization and equipment would consist of a decision optimization chief, deputy, data product section, data science section, and decision science section (see figure 2). Additional table of distribution and allowances support from Department of the Army civilians, reservists, or contractors may be required to augment the capabilities of the DOT at higher echelons. Some

of the personnel assigned to a DOT at the ASCC and HQDA levels require AI-related additional skill identifiers (ASI) or personnel development skill identifiers to possess the skills required for their AI and ML verification and validation mission. By reorganizing the existing force structure of the FA 26B, FA 49, and FA 57 personnel within the division, corps, and ASCC headquarters, the Army can readily implement a pilot decision optimization program.

Training the Decision Optimization Team

Each of the three functional areas involved in the decision optimization discipline require varying levels of adjustment to their existing professional military



(Figure by author)

Figure 2. A Potential Decision Optimization Team

education (PME) pipeline to meet the future requirements of the DOT concept at echelon. To enable FA 26Bs to assume their data engineering role within the DOT, PME must enable them to serve as an architect, engineer, operator, and maintainer for a data domain's mesh services, responsible for building infrastructure, enhancing data analysis, managing curated data products, and supporting domain expertise with tactical data management. By fiscal year 2025, the U.S. Army Signal School will train 26-series personnel in these disciplines through their PME revisions.²⁰ Existing FA 49 PME proves sufficient to train ORSAs in business intelligence, data integration, data science, and data literacy training capability, enabling them to serve as transformation leaders within their formations. FA 57 PME requires the most adjustment to meet the requirement to provide decision science support to the DOT, despite recent revisions to course curricula. The Army modeling and simulations office must incorporate a broader technical foundation for additional learning—spanning systems engineering, human factors engineering, decision science, data science, computer science, and project management in addition to existing knowledge management instruction. With limited expansion and refocusing of the PME for the three DOT branches to provide a new capability, the Army could deliver trained DOT personnel as early as

fiscal year 2025 to man the reorganized DOTs at the division and corps levels.

Once formed, the Army requires a systematic training and validation strategy for the DOTs at echelon. The integrated weapons training strategy or the military intelligence training strategy serves as appropriate training models for the DOT at echelon by making use of the commonly understood gunnery tables.²¹ This gunnery program must aim to deliver algorithmic warfare capability ranging from executing individual tasks through whole-of-staff collective training tasks.²² The individual training gate must train and validate individual members of the DOT in the execution of their assigned tasks within the team by employing validated algorithm-based tools as if they were an assigned weapon system.

As part of the validation process for an AI and ML tool, a six-table gunnery progression must accompany the deployment of the tool to the force. Gate two of the gunnery table must cover the six-tables to progress the individuals of the DOT into a validated team to provide their decision optimization capability. Gates three and four could nest within the existing mission command digital master gunnery tables that model the training and validation of staff collective training.²³ By using the integrated weapons training strategy or military intelligence training strategy methodology as a model, this approach would emplace decision optimization as a discipline to train, certify, and employ algorithmic warfare at echelon.

A gunnery program requires an institutionally trained master gunner to certify soldiers on the tools used to optimize decisions, advise commanders on the effective employment of those tools, and develop unit training plans for DOTs.²⁴ No course provides this capability, but the decision optimization proponent could develop and implement such a course. Development and appointment of a decision optimization proponent requires further research and analysis. An algorithmic warfare master gunner course would aim to produce leaders to drive decision optimization operations by leveraging existing and emerging technology to develop AFPs that enable effective commander

decision-making at the speed of combat. A generation of detailed terminal learning objectives, enabling learning objectives, and program of instruction for the algorithmic warfare master gunner course requires further analysis. Using a five-week construct and a crawl-walk-run methodology, students of the course would build a technical foundation and progressively test their ability to leverage technology during practical exercises of increasing complexity. Weeks one and two provide the foundation of unit training management, the military decision-making process, data integration, data analysis, computer science, decision science, human factors design, and project management. The third week provides students with a survey of available decision optimization tools with use-cases for their employment. During week four, instructors guide students through building AFPs to meet information requirements using the tools surveyed during the previous week. The final week consists of practical exercises requiring students to form DOT-augmented staffs, develop their own AFPs, conduct the military decision-making process, and execute a simulated mission using their own AFPs. By the end of this course, newly minted algorithmic warfare master gunners receive an ASI and return to their units fully prepared to execute decision optimization.

Decision Optimization Doctrine

Current doctrine outlines the staff's role in decision support activities through the military decision-making process and the rapid decision-making and synchronization process but does not codify the decision optimization concept.²⁵ The decision support proponent must develop an Army doctrinal publication (ADP) and a series of Army techniques publications (ATP) that comprehensively detail decision optimization activities and methods to effectively employ decision optimization techniques. A decision optimization ADP must codify the purpose, structure, and key tasks of the DOT as well as their roles and responsibilities at echelon. Most importantly, the ADP must cover the triaging of complex decision optimization tasks to ensure DOTs at echelon possess the appropriate authorities to prioritize and allocate resources. The nature of decision optimization activities most readily aligns to the three or six-series of publications. Once published, the decision optimization ADP must be integrated into FM 3-0, FM 5-0, and FM 6-0, *Commander and Staff*

Organization and Operations, to ensure decision optimization activities synchronize with existing decision support doctrine. Writers must give special attention to detail the interactions among the commander, the DOT, and each section of the staff to break existing decision support cycles to realize the full capability of decision optimization activities.

FA 57s utilize ATP 6-01.1, *Knowledge Management*, to inform their current role in staff decision support activities through systems science, but this publication alone is insufficient to institutionalize decision science as one of their competencies.²⁶ Decision science requires an additional ATP within the six-series of publications to establish the framework for the deliberate analysis and enhancement of decision-making through data product orchestration within a military context with accompanying methods for implementation.²⁷ Further detail on the discipline of decision science requires further study and analysis. With a FA 57 adjustment to their competencies from providing decision support through knowledge management to providing decision science, the simulations branch would be the optimal proponent for decision science for the Army.

Finally, to formally train and validate members of DOTs at echelon, the Army requires a training circular (TC) establishing algorithmic warfare gunnery program in doctrine. This TC is most appropriate for the six-series of publications and should detail how to train the decision optimization discipline. Every gate and table must provide a systemic approach to train from the individual through team level using existing automation, AI, and ML tools to develop and implement AFPs, enabling decision optimization activities. A unit algorithmic warfare master gunner program within the TC must provide the duties, responsibilities, and training methodology to train DOTs on their complex tasks. What constitutes a qualification event at each gate is beyond the scope of this article and requires further analysis.

Recommended Way Ahead

To implement the above outlined plan, a four-phase approach over a five-year time horizon provides the decision optimization capability to the Army via a sustainable model. The office of primary

responsibility for this multiyear effort should be the Mission Command Center of Excellence as that organization pioneered the concept of decision optimization. Supporting offices of coordinating responsibility include the FA 26B proponent, FA 49 proponent, FA 57 proponent, the knowledge management proponent, the Signal School, Army chief information officer, and Army chief data and analytics officer. At end state, the Army possesses a cadre of decision optimization professionals at echelon, provided by a robust institutional and operational training pipeline, that enables Army formations to adapt to their operational environment faster than the enemy, achieving decision dominance on the battlefield.

The first phase of the plan consists of reorganization and execution of a pilot program. This phase begins with the current disposition and organization of the data workforce. Key tasks for this phase are the designation and reorganization of pilot DOTs within the XVIII Airborne Corps and an Army National Guard division, appointment of a pilot assessment team, assessment of DOT lessons and best practices, and the generation of an assessment report for the pilot program. This phase ends with a completed assessment plan of the pilot program one fiscal year from program inception.

Phase two consists of revision of decision optimization training paths and doctrinal publications. This phase begins following the publication of the pilot program assessment report. Key tasks for this phase are the development of new doctrine based on the assessment report, revision of existing doctrine to integrate the new doctrinal publications, the revision of associated branch PME, the development of new institutional PME program of instruction for the algorithmic warfare master gunner course, and the submission of the program objective memorandum for out-year resourcing. At the end of this phase, institutional training is resourced and supported by doctrine.

Phase three consists of the expansion of the DOT program at echelon. This phase begins as resources and doctrine become available for the decision optimization concept. Key tasks for this phase are the implementation of institutional PME for the DOT, revision for the expanded DOT modified table of organization and equipment at the ASCC and HQDA level, and to man the DOT from division through ASCC in accordance

with Army manning guidance. This phase ends as DOTs across the Army, from division through ASCC receive decision optimization-trained FA 26B, FA 49, and FA 57 personnel.

The final phase consists of a validation of the decision optimization concept. This phase begins when DOTs from division through ASCC are manned with institutionally trained personnel. Key tasks for this phase are the assessment of decision optimization training pipelines, assessment of the ASCC and HQDA DOTs, validation of the decision optimization team at echelon through a Warfighter exercise, a “dirt CTC rotation,” and the generation of a program assessment report. This phase ends upon reaching the program’s end state.

Cost of Inaction

Recent events taught the Army the value of operationalizing data through AFPs hard-won while fighting through the chaotic conditions of COVID-19 tracking, the Hamid Karzai International Airport noncombatant evacuation, tracking military aid shipments to Ukraine, and ongoing conflicts around the world. The speed and precision required to execute these operations spawned multiyear efforts to produce COP tools, AFPs, and innovation cells just coming into broader Army use today. Without a programmatic approach to achieving decision dominance, tactical commanders will continue the current asynchronous approach to innovate methods to achieve local decision dominance. That approach during large-scale combat operations will levy unrealistic expectations on tactical units while in combat as strategic resources will be underutilized at the point of need. Leaders unwilling to change would do well to remember Gen. Eric Shinseki’s statement that “if you dislike change, you’re going to dislike irrelevance even more.”²⁸ Being irrelevant on future battlefields in this regard could be the difference between victory and defeat. If the Army wants to break out of the current decision cycles that place it at parity with peers and near-peers, it must invest in the decision optimization discipline. ■

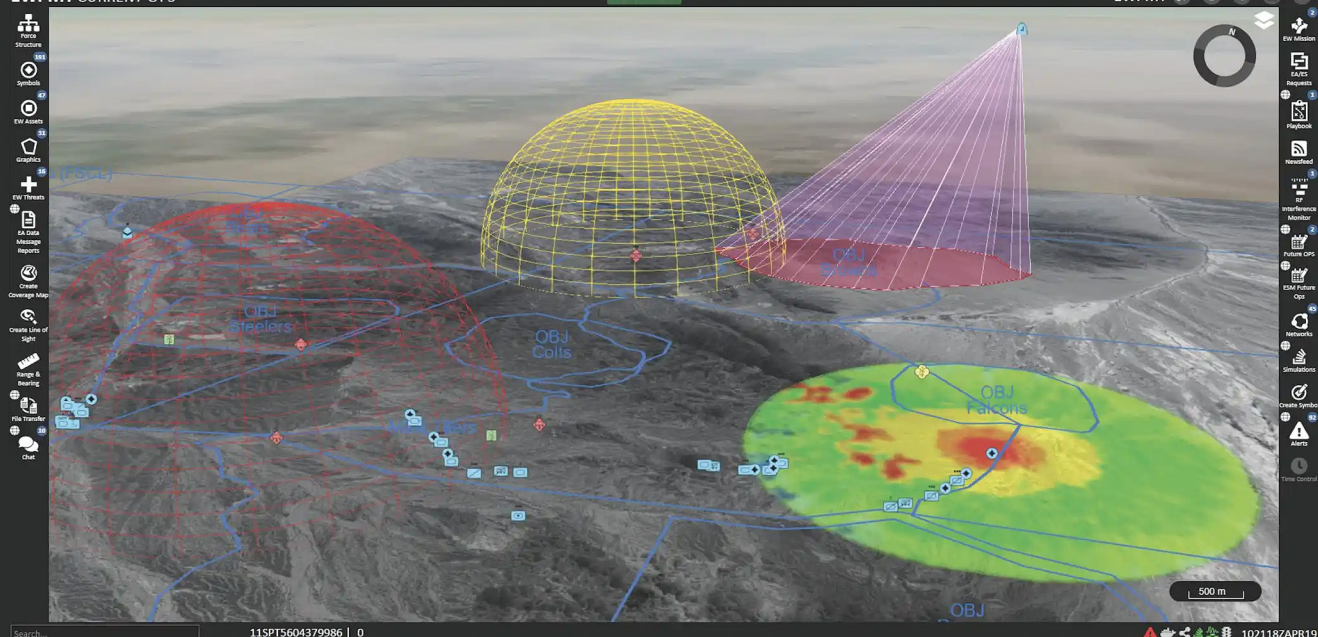
This article and its concepts would not have been possible without the support, editing, and mentorship of Lt. Col. Melissa Sayers, First Army ORSA; Lt. Col. Michael Burns, First Army G-6; and Lt. Col. Matthew Goncalves,

XVIII Airborne Corps knowledge management chief. The feedback provided by Lt. Col. (Ret.) Matt Mackey, Lt. Col. Sean Calleja-Springer, Maj. Nathan Roubicek, Maj. Jeremy

Arnold, and Maj. Bobby Spencer provided the invaluable insights needed to round out the rough edges. Thank you all for your time and support.

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A screenshot taken from the Army's Electronic Warfare Planning Management Tool shows both threat and friendly electromagnetic spectrum data. During Combat Support Training Exercise 86-24-02, the 86th Training Division exercised its ability to conduct large-scale combat operations in a multidomain environment when its cyber or electromagnetic capabilities were denied or degraded. (Image courtesy of the U.S. Army)

Operating in a Multidomain Environment

Combat Support Training Exercise 86-24-02

Col. Jon V. Erickson, U.S. Army Reserve

To counter Army superiority in the land, sea, air, and space domains, America's adversaries have invested in cyber and electromagnetic activities (CEMA) capabilities to create multiple, simultaneous,

and continuous threats in cyberspace and the electromagnetic spectrum (EMS). Adversarial capabilities have also created an operating environment, as described in Field Manual (FM) 3-0, *Operations*, in

which friendly forces are under constant observation and operating against a threat that is able to gain and maintain contact in multiple domains across the three dimensions of physical, information, and human.¹ This extended battlefield creates risks to Army forces, especially during the opening phases of an operation, where “Army units may find themselves facing superior threats in terms of both numbers and capabilities ... [and] must be prepared to fight while relatively isolated.”² Faced with near-peer threats capable of challenging Army forces in multiple domains, the Army developed its newest warfighting doctrine to address this operating environment, culminating in FM 3-0.

To support FM 3-0’s multidomain operations (MDO) concept, the 86th Training Division (TD) has been modernizing its training environment to allow Army units to practice operating in a dynamic and complex multidomain training environment against a peer adversary. In this first MDO iteration, the 86th TD focused on creating and executing CEMA effects because they are a critical element of MDO but also due to their proliferation, requiring leaders who can operate in a contested and congested cyber and EM environment. As the 86th opposing forces demonstrated, in the cyber domain there is no longer any fully secure area. Just as importantly though, units who participate in a combat support training exercise (CSTX) come away from the exercise with the ability to use their home-station training to continue to refine how they conduct operations when the use of cyber or electromagnetic capabilities have been denied or degraded.

Setting Up a Multidomain Training Environment

The 86th TD created a multidomain training environment during CSTX 86-24-02 to prepare soldiers to operate in an environment in which they are constantly observed and challenged in the physical, human, and information dimensions of multiple domains. Training units received multiple opportunities to execute their warfighting functions in an immersive training environment that simulated the rigors of executing large-scale combat operations (LSCO) against a peer threat. As much as possible, the 86th TD executed live effects to assist leaders in understanding how to identify, protect, and defend friendly forces against an adversary operating in multiple domains and to mitigate the

adversary’s impact on the Army’s ability to execute its warfighting functions.

In the CSTX training scenario, rear operations played a key role during the Army’s transition from defensive to offensive operations, as forward operating units consumed more fuel and ammunition, required more maintenance and logistics support, and experienced more casualties. The adversary sought to attack the Army’s sustainment-and-force-generation capacity in the rear, as they understood that the Army’s sustainment capabilities determine the limits of depth and endurance of an Army operation. To maximize the effectiveness of its own combat capabilities, the adversary employed MDO to create windows of opportunity.

One of the key tenets of MDO is convergence—where actions are synchronized against combinations of objectives to achieve the desired overall effect.³ Before conducting a large-scale kinetic attack, the adversary employed irregular warfare tactics to harass, probe, and gather intelligence. The adversary employed numerous forms of contact across multiple domains to maintain constant observation of friendly forces to understand U.S. capabilities, readiness status, and intentions.

As an example of the forms of contact deployed against Army units (see figure), the adversary (1) employed proxy groups to conduct phishing email campaigns, electronic access, and signals intelligence gathering; (2) supported businesses and insider threats who could provide human intelligence gathering and electronic access methods; (3) executed aerial signals collection and intelligence, surveillance,

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Reconnaissance and intelligence gathering				Setting conditions		"Window of opportunity"			Disinformation
Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
S-2 Report: Phishing campaign	S-2 Report: SMS/text message attacks	Internet: Cyber attacks	Internet: Power outages	Action: Email phishing attacks	Action: Email phishing attacks	Action: UAS attack on logistics unit	S-2 Report: TAA identification via cell phone intercept	Objective 1: Neutralize Army C2 capabilities	Objective 3: Continue disinformation
S-2 Report: Electronics shop ties to adversary	S-2 Report: Adversary DDoS TTP	Internet: Dissemination of enemy flyer	Internet: Social media sightings of UAS	Internet: More social media sightings of UAS	S-2 Report: Local gov't impacted by phishing attacks	S-2 Report: Army share intel on phishing attacks	S-2 Report: Local gov't block IP address belonging to power plant	Action 1: DDoS attack on TAA Action 2: FM radio jam	Internet: Blame US for hospital attack
Internet: Electronics shop offering discounted electronics	Internet: Increased UAS activity	Internet: UAS protection advisory			Internet: Social media sightings of UAS operator	S-2 Report: Civil unrest due to power issues Internet: More DDoS attacks	Internet: Blame US for DDoS Internet: UAS attack on logistics unit	Objective 2: Launch kinetic attacks Action 3: Kinetic attack on TAAs	

C2—command and control
DDoS—distributed denial-of-service
TAA—tactical assembly area

TTP—tactic, technique, and procedure
UAS—unmanned aircraft system

(Figure by author)

Figure. Adversary Forms of Contact

and reconnaissance; and (4) dropped off packages containing an electronic collection device.

Once the adversary had collected enough intelligence, it launched a conventional attack toward the end of the exercise. To create a relative advantage, the adversary focused on multiple supporting objectives against the Army—neutralize its command-and-control capabilities, launch kinetic strikes, and continue executing its disinformation campaign—to achieve its campaign objectives. First, the adversary employed multiple means of cyberattacks, such as an email phishing campaign to gain access to key IT systems. The adversary then combined the denial of those key IT systems with radio jamming to achieve the first objective of neutralizing the Army's command-and-control capabilities. Once achieved, the adversary then executed its second objective of conducting lethal kinetic attacks against the Army's rear operations to force the Army to reach its culminating point sooner. The third objective was for the adversary to continue its disinformation campaign against the Army to erode the positive views of the United States by the host-nation citizens. The intended overall effect of the adversary's actions was to erode the Army's

combat power while delegitimizing the Army's presence among the local nationals and host-nation government.

While the theme of cyber pervades throughout the adversary's activities, intelligence operations drove their decision-making processes on how and where to best apply its limited combat power against the Army's weaknesses. The adversary largely relied upon easy to execute CEMA attacks and information warfare to set the conditions for its conventional attack.

For many adversaries, the use of inexpensive unmanned aircraft systems (UAS) able to support a diverse array of capabilities—such as intelligence, surveillance, and reconnaissance; signals/EMS collection; and fire control—will require Army leaders to develop a counter-UAS (C-UAS) plan. Minimizing the impact of a UAS on Army operations requires providing signal officers with the training and capabilities to account for EMS emissions. EMS emissions are the radiation and wireless electronic signals that emanate from devices that are simply turned on or wirelessly communicating. Army leaders must account for EMS emissions that all electronic devices emit by developing EMS emission control measures, which can include the following:

- minimizing length, frequency, and power of radio transmissions;
- establishing and enforcing the primary, alternate, contingency, and emergency communication (PACE) plan;
- using remote antennas; and
- dispersing formations and command posts.⁴

The 86th TD partnered with the Air Force's Spectrum Awareness and Resolution Team to map units' EM footprints, bringing capabilities that—in conjunction with wireless device detection provided by the 86th TD—would allow a commander to visualize their electromagnetic battlespace. Training units at CSTX understood how developing C-UAS and EMS emission control measures were important success factors in the new operating environment. For C-UAS, cover and concealment were additional measures some units took to protect their command posts. To limit EMS emissions, the 86th TD put out guidance to limit cell phone use during the day, but this was far from successful, as the cyber opposing force was able to successfully collect metadata from a large number of wireless devices and deceive users into connecting to malicious hot spots.

Home-Station Training to Prepare for the New Operational Environment

As the Army prepares to conduct LSCO, it is even more critical for Army Reserve units to participate in combat support training exercises in Fort Hunter-Liggett, California, or Fort McCoy, Wisconsin. The speed and pace of LSCO demands combat support and combat sustainment support units that can operate with speed, tempo, and flexibility to extend operational reach and prolong endurance. It is only at CSTX and combat training centers that units can practice operating at echelon, stress their own capabilities, and appropriately stimulate their mission command information systems to coordinate and execute their warfighting functions.

The inability to stress capabilities was most noticeable when units were forced to exercise their PACE communications plans—as many were unable or limited in their ability to communicate when the adversary conducted denial of service attacks that took down fiber connectivity to the network. Participation in these exercises had the second-order effect of allowing unit

commanders to review and update their home-station training to support the warfighter in a contested environment where their activities will be constantly observed in cyber, electromagnetic, air, and space. At the same time, the 86th TD's master scenario event list is tailored to support the unit commander's specific training objectives in a realistic and tough training environment.

The 86th TD conducted training workshops and visits throughout the year to ensure all training units understood that they would be operating in a multi-domain training environment in which they would be continually challenged to execute their warfighting functions against a peer adversary. One unit that particularly stood out was the 439th Multi-Functional Medical Battalion (MMB), and one reason was their signal officer's (SIGO) use of home-station training to set the conditions for success during their CSTX rotation.

Attending all the 86th TD's planning workshops as both the SIGO and trusted agent for the 439th MMB, 1st Lt. Bagdwal understood that he would be operating in a contested cyber and EM training environment. Bagdwal was in a prime position to ensure his commander would be able to maintain communications under multiple attack scenarios. At the planning workshops, 1st Lt. Bagdwal read the signal annexes for the 25th Infantry Division and the Combined Forces Land Component Command, which guided his training efforts from building his team's individual competencies to collective signal tasks such as setting up a battalion tactical operations center. Not receiving support from the few tactical communications nodes at the exercise made the 439th's communications plans tougher to maintain. Additionally, their unit was not fielded with solutions, such as the Joint Battle Command Platform, to provide contingent communications. Given the limited communication capabilities, the lieutenant's actions during CSTX made it even more remarkable that he was quickly able to overcome these challenges to ensure his commander could still communicate.

Once the 439th MMB arrived in theater and set up its field hospital on tactical assembly area (TAA) Justice, the unit operated under constant observation in multiple domains through aerial reconnaissance from adversary drones, reconnaissance activities through the EM spectrum such as EM emissions from

tactical radios and mobile devices, active device collection by rogue hotspots masquerading as free Wi-Fi hotspots, packages delivered to the TAA containing a wireless data collection device, and adversaries selling compromised cell phone sim cards at a local electronics shop to eavesdrop on conversations or text messages.

After actively and passively surveilling TAA Justice, the adversary attempted to black out communications for the 439th, hitting them with a denial-of-service attack that took down network access for their mission command information systems followed by jamming the frequency of the 439th's command net for their tactical radios. These simultaneous attacks took out the 439th's primary and alternate communications. Bagdwal recognized both attacks and began to execute his PACE plan. Bagdwal prioritized his efforts on reestablishing tactical radio communications with higher command. First, the lieutenant validated with the on-site observer-coach/trainer (OC/T) that their radio encryption keys were not compromised. Once the OC/Ts validated encryption keys were not compromised, the lieutenant coordinated with his S-3 to migrate the tactical operations center to the preplanned alternate radio frequency and, once radio communications were reestablished, relayed to their higher the new frequencies for the 439th. Next, the lieutenant determined that the denial-of-service attack only took down his classified communications and that the 439th could still communicate on their unclassified systems. In a span of fifteen minutes, the SIGO was able to preserve the commander's communication capabilities and coordinate with higher. A general observation out of CSTX-86-24-02 was that training units that did not write an annex H, read their signal operating instructions, or conduct home-station training to prepare for CSTX were greatly challenged with executing their warfighting functions in a multidomain environment without direct support from the 86th TD G-6 staff.

Lessons Learned for Rotational Training Units

The challenges faced by the 439th MMB across multiple domains are but some of many hurdles that future commanders must confront and can overcome. The battlefield now extends into the virtual cyberspace and information environment. Modern militaries are employing information warfare, space, and CEMA

capabilities to degrade their adversary's ability to achieve their own objectives or influence the adversary's actions. Soldiers and leaders must be prepared to operate in an unreliable and contested electromagnetic spectrum in which radio communications might not work; GPS might either jammed or providing inaccurate position, navigation, and timing; and use of a cell phone could result in deaths. Additionally, adversaries are exploiting the information dimension to influence the perceptions, decision-making, and behavior of individuals and groups to shape the operational environment to the adversary's favor with minimal expenditure of resources.

The following highlights the challenges that some units coming to CSTX must prepare for using home-station training time.

Communications security (COMSEC) challenges and Level 1 Warrior Skills. Many of the training units were challenged with finding a key management infrastructure operation account manager, previously known as a COMSEC account manager, to provide COMSEC. Additionally, most training units are not practiced in handling COMSEC or filling devices with the keys. Many of these are level 1 tasks that all soldiers should know and not just the signal personnel.

The lack of training was apparent to the 86th TD when training units made mistakes on their combat-net radios. Mistakes included setting the frequency-hopping radios to the wrong time, resulting in disconnected radio networks; setting radios to frequency hop master status, creating additional radio networks; emplacing antennas in locations that were ineffective; pushing too much or too little power to the radio systems; and more.

Create, implement, and test PACE plan. It was obvious that many training units arrived without working modified tables of organization and equipment needed to communicate during CSTX. Common issues included not bringing radios or antennas, not bringing batteries, broken equipment, not bringing the crimper tools needed to make network cable ends, etc.

Additionally, several training units did not arrive with an adequate number of trained signal personnel. Of the signal personnel available, many were not practiced in performing their tasks and battle drills. Training units are strongly recommended to provide attention and focus on precombat checks, precombat inspections, preventative maintenance checks and services, and training on their communications equipment



A small quadcopter drone lifts off to conduct a simulated convoy attack during Warrior Exercise 86-21-03, at Fort McCoy, Wisconsin. The 86th Training Division's counter-unmanned aircraft system capabilities were repeatedly tested during the division's Combat Support Training Exercise 86-22-02 in August 2022. (Photo by Sgt. William A. Parsons, 214th Mobile Public Affairs Detachment)

throughout the training year before arrival to CSTX. Doing so would ensure units have a viable primary, alternate, contingent, and emergency communications plan during their home-station training versus one that has only been exercised in PowerPoint briefs.

Practice responding to jamming. Units can easily replicate jamming by “hot mic’ing” their own radios. Units are supposed to drive their vehicles every month and can use this time to emplace and practice their battle drills for when their convoy is experiencing a jamming event. Additionally, events such as this would test the viability of the unit’s signal operating instructions in addition to their PACE plan.

Planning and executing home-station training events. Commanders and their G-3/S-3 staff can set the tone for training by requiring soldiers to exercise their signal equipment such as their combat-net radios on convoys or simply during battle assembly weekends in the parking lots. Additionally, the commander can

support their S-6 by carving out time in the training calendar for their signal personnel to conduct signal-specific training.

A biannual “signal rodeo” event in which all communications equipment is used can quickly validate a unit’s mission status and proficiency at installing and operating the equipment. Additionally, during the signal rodeo, the S-3 and S-6 can coordinate to practice their procedure for receiving COMSEC, and soldiers can practice loading COMSEC in their own radios. Moreover, the S-4 can support the S-6 with facilitating the repair of signal equipment that is not fully mission capable.

Takeaways and Resource Needs for Future Training Exercises

The 86th TD was able to deliver a realistic and relevant training environment in its first iteration, preparing soldiers and their leaders to execute their warfighting functions in a multidomain environment. Units like

the 439th MMB experienced what it was like to operate in an environment where capabilities were degraded, disrupted, or denied in both the cyber and EM domains. Units with a functional and redundant communication plan, such as the 439th, experienced the most realistic MDO training environment but were able to stay in constant contact across multiple domains. Operating in a contested CEMA training environment conferred the basic skills to allow commanders to maintain command and control by recognizing, reporting, and responding to cyber and EM anomalies such as a lack of internet access and electromagnetic interference.

The 86th TD establishing a challenging MDO training environment for CSTX 86-24-02, but there are many areas for improvement that other training units and centers can implement. Some areas will require further enhancement, and other areas will require tangible resources.

Transforming the TD's cyber assessment and OC/T team to a CEMA effects team. The main driver for this change is that the CEMA team knew the realistic cyber and electromagnetic effects that a unit could experience and the appropriate actions to take. The 86th TD CEMA effects team functioned as an extension of the effects and enablers team, creating effects in the master scenario event list (MSEL) and implementing them in the training environment. Doing so allowed training units to experience operating in a contested environment across multiple domains. Effectively creating electromagnetic effects will require, at a minimum, one soldier who is familiar with, if not trained, in EMS management. The 86th CEMA team was able to focus on executing live effects only because the 84th training command provided cyber assessment and OC/T individuals who assessed the training unit's ability to perform their warfighting functions while experiencing cyber and EM effects.

PACE plan. The 86th TD CEMA effects team executed live cyber and EM effects to force units to exercise their PACE plans. The CEMA team's attacks were concentrated into three distinct categories of reconnaissance, intrusion, and denial. This simulated an adversary's steps to deny, degrade, or disrupt the Army's ability to command and control through cyberspace or the electromagnetic spectrum.

For reconnaissance, all training divisions, specifically the opposing force, should be fielded with a capability

to detect wireless devices. The 86th TD employed an open-source wireless geographic logging engine application to provide data points to the OC/Ts and the division G-2. This would later be shared with commanders and senior leaders of the rotational training units for their awareness of how many wireless devices were beaconing the unit's location in the EM spectrum. Additionally, the Air Force's Spectrum Awareness and Resolution Team mapped the electromagnetic footprint, bringing capabilities that, in conjunction with wireless device detection, would allow a commander to visualize their electromagnetic battlespace.

In terms of intrusion, a mission training complex or simulation office should have a capability for CEMA teams to send phishing emails as part of a phishing campaign and provide metrics on user engagement. All training divisions should have a wireless auditing solution that mimics wireless networks but functions as a rogue access point, training end users to not connect to unsecured public wireless networks. The CEMA team employed the rogue access point in a couple ways. In one scenario, it functioned as a rogue access point and was hidden in a delivery box for drop-off at various units to test that unit's physical security vulnerabilities and collect device information. In other scenarios, the rogue access point would be set up right after a denial of service or radio interference to entice users to connect.

The last attack method was denial. Methods include FM radio interference and network denial through a simulated denial of service attack. The type and mix of attacks were dependent upon the training unit's communications posture and the OC/T's confidence in the signal team. To conduct radio interference but also minimize the training unit's ability to identify the source of the jamming, the 86th TD employed a portable FM radio manpack operating on the same frequency as the target. The 86th TD CEMA team would then hold the hand mic and play an adversary's national anthem to ensure the training unit understood they were experiencing a radio jamming attack scenario. In the future, the opposing force should be outfitted with a manpack radio and the training unit's signal operating instructions so they can simulate radio jamming.

Challenging versus frustrating a unit. The goal for the CEMA team was to create a stressing effect that would challenge a unit's ability to execute its warfighting functions versus a frustrating effect that a unit

could not do anything against. To achieve this goal, all three CEMA attack methods were synchronized, coordinated, and nested in the master scenario event list to ensure training platform partners—effects and enablers, OC/Ts, exercise control, G-6, and others—all knew whether communications issues were the result of an attack by the CEMA effects team or due to the equipment itself. One important reason for coordinating throughout the exercise is to, for example, ensure there is an OC/T in the area to assess and be aware of when an effect is executed. Another reason is that executing a radio jamming effect when the unit is still trying to establish radio communications has no effect. Worse, when a unit finally establishes network connectivity only to experience a network denial effect shortly thereafter creates confusion as to the reason and wastes valuable training time. Learning from CSTX-86-23-02, the CEMA team ensured every effect that could impact the unit was entered into the MSEL. For added precaution, effects that did not impact the unit, such as passively gathering electronic devices near a TAA or mapping the EM footprint, were also entered on the MSEL to ensure training platform partners had awareness of the CEMA team's presence and reason. An example of the benefit of this coordination is that when a network denial effect was executed, the G-6 help desk was aware and could role-play their part in the event.

Next-generation constructive environment. To continue pushing forward on the development of the Army's next-generation constructive environment, where a simulation engine is driving the Warfighter

exercise, the 86th TD partnered with the Army Reserve Cyber Protection Brigade; the U.S. Army Combat Capabilities Development Command; and the Program Executive Office Simulation, Training and Instrumentation. The combined team successfully executed a proof of concept to capture and record the activities of a cyber protection team (CPT) to then emulate in a cyber simulation platform. The goal is to capture the activities of an on-mission CPT to then be "replayed" in the simulation platform for future training exercises as a virtual CPT. And if the simulation platform is connected to the exercise network, then the virtual CPT can create live cyber effects on the training audience. This solution provides training audiences the opportunity to experience an on-mission CPT and minimizes the need to physically send a CPT to an exercise, thereby providing the CPT more training time.

The 86th TD recognizes that the key to countering near-peer threats requires mastering MDO. The 86th TD created and executed a world-class exercise in which training units were exposed to a multidomain environment in support of LSCO. Additionally, the 86th views CSTX as an opportunity for capability providers to field test new capabilities, such as with U.S. Army Combat Capabilities Development Command testing its cyber simulation platform. The innovation and new capabilities that the 86th TD invested into its training platform for CSTX-86-24-02 resulted in soldiers and their leaders understanding how to execute their warfighting functions in a contested and congested multidomain training environment. ■

Notes

1. Field Manual 3-0, *Operations* (Washington, DC: U.S. Government Publishing Office, 2022), 1-4, https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN36290-FM_3-0-000-WEB-2.pdf.

2. Ibid.

3. Ibid., 3-3.

4. Ibid., 3-12.



An RTX graphic illustrates “effectors, a term for missiles, mortars, and non-kinetic weapons that defeat targets and create data of their own.” (Illustration courtesy of Raytheon [RTX])

The Problem with Convergence

Dispelling the Illusion Surrounding the Tactical Application of Offensive Space and Cyberspace Capabilities

Maj. Trevor M. Brown, U.S. Army

Any sufficiently advanced technology is indistinguishable from magic.

—Arthur C. Clarke's Third Law

By the time the most recent update to Field Manual (FM) 3-0, *Operations*, was published in October 2022, convergence had already come to occupy a prominent position within the U.S. Army's lexicon. The term had been introduced in Training and Doctrine Command Pamphlet 525-3-1, *Multi-Domain Operations 2028*, published in 2018, and the Army's highest-profile venue for demonstrating emerging technologies had been named Project Convergence since 2020.¹ FM 3-0 officially codified convergence as one of four operational tenets underpinning the conduct of the U.S. Army's operational concept.² Although convergence encapsulates all domains, the concept has widely been viewed by tactical commanders as the principal means of incorporating offensive effects from the newly recognized warfighting domains of space and cyberspace. Yet in many of these formations, exactly what convergence is and how it should be incorporated into operations below the division level remained shrouded in speculation and mystery. Convergence—particularly when associated with the space and cyberspace domains—remained ethereal and distant akin to magic.

Although convergence continues to be a useful concept in shaping theater army and corps operations, its inclusion as a tenet of broader Army operations does more harm than good. The sheer complexity of achieving convergence remains at odds with the principle of simplicity and risks undermining mission command. As it is currently defined, convergence also only applies directly to a limited cross section of the broader force and its impact on echelons at and below the division level remains opaque. Finally, the understanding of convergence among the Army's tactical formations—particularly within the context of space and cyberspace—continues to be muddled and regularly distorted. Leaders at all echelons should approach the offensive space and cyberspace capabilities frequently associated with convergence as nothing more than an extension of combined arms. The rigors of large-scale combat operations (LSCO) dictate that Army leaders remain prepared to rapidly exploit opportunities by understanding and maximizing the utility of all

capabilities at their disposal regardless of domain. No magic is required.

Easier Said Than Done

Everything in war is very simple. But the simplest thing is difficult.

—Carl Von Clausewitz, *On War*³

In many ways, the term convergence embodies the very spirit of multidomain operations (MDO). FM 3-0 defines convergence as

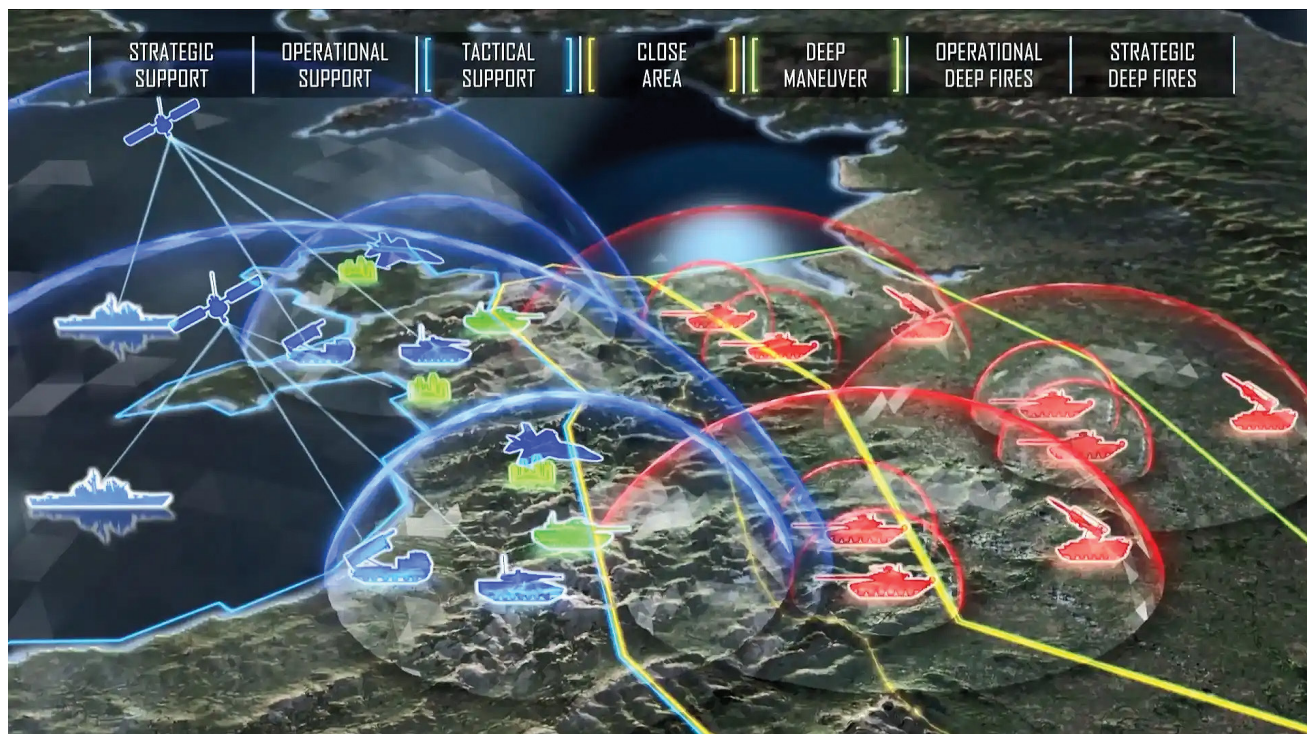
an outcome created by the concerted employment of capabilities from multiple domains and echelons against combinations of decisive points in any domain to create effects against a system, formation, decision maker, or in a specific geographic area.⁴

This definition evokes the broader concepts of mass and combined arms but remains sufficiently narrow to remain distinct. As FM 3-0 describes, it balances the principles of mass, objective, and economy of force.⁵ The synchronization of multiechelon and multidomain effects in space and time is central to the entire MDO concept, and FM 3-0's definition of convergence sufficiently encapsulates this approach. The most significant problem with convergence is best illustrated by the inclusion of the word “concerted” in the term's definition.

Achieving convergence as envisioned by FM 3-0 requires incredibly concerted efforts—not just in the “employment of capabilities” but across the full breadth of planning and intelligence activities required to employ these capabilities effectively.

FM 3-0 fails to fully address, much less reconcile, the inexorable tension between the principle of simplicity and the enormous complexity required to employ multidomain and multiechelon effects in this “concerted” manner.⁶ Combined arms

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The Waypoint 2028–29 initiative is a modernization effort to prepare the Army to be fully capable of multidomain operations by the end of the decade. (Illustration courtesy of U.S. Army Training and Doctrine Command)

is already hard. One needs to look no further than Russia's disastrous 2022 invasion of Ukraine or any of the Army's combat training centers to see this harsh reality on full display. Integrating offensive space and cyberspace capabilities makes this already challenging activity significantly more difficult. When considered within the bounds of current joint force capabilities, the integration of offensive space and cyberspace capabilities during LSCO pushes convergence to the very brink of feasibility for units below the corps echelon.

Although never stated explicitly in FM 3-0, the sheer complexity of achieving convergence virtually necessitates U.S. forces maintaining consistent initiative over its enemies during LSCO. Such a scenario, however desirable it may be, seems unlikely. Most foreseeable contingencies in which the U.S. Army would be drawn into LSCO are in response to adversaries' actions, ceding initiative—at least temporarily—at the very outset of a conflict. Even once a conflict is underway, history has consistently demonstrated the degree to which tactical initiative can shift precipitously between combatants. Convergence may not require deliberate planning or maintaining the initiative in theory. In practice, however,

all echelons will be incentivized to seek accrued advantage through relatively methodical planning processes intended to maximize effects within the ethereal domains of space and cyberspace. While FM 3-0 does not prescribe delayed action in achieving convergence, the potentiality—even likelihood—of such an outcome must be addressed directly in doctrine.

Army elements that have been conditioned to seek convergence within these domains risk creating a cascade of indecision as planning and command and control (C2) struggle to maintain pace with rapid changes on the battlefield. The implicit rigidity of convergence not only risks U.S. Army formations during periods in which they have ceded the initiative but, more broadly, incumbers commanders' ability to execute orders in accordance with the principles of mission command. Subordinate elements risk ceding their ability to exploit unanticipated successes and rapidly adapt to changing conditions within the operational environment if they are conditioned to await synchronized effects from higher echelons. Reliance on convergence at the tactical level virtually assures decision paralysis when applied to dynamic conditions, as leaders risk foregoing

the expedient actions necessary to regain the initiative over enemy forces in anticipation of achieving decisive effects in exchange for delayed action. While such effects may be achieved from either higher or lower echelons in accordance with doctrine, delays associated with coordinating for higher echelon effects may prove particularly damaging to gaining or maintaining momentum. Nowhere is this truer than within the space and cyberspace domains.

Herein lies the natural tension between the tenets of convergence and agility. When a commander attempts to apply agility, described as “the ability to move forces and adjust their dispositions and activities more rapidly than the enemy,” as a means of overcoming the challenges in implementing the “concerted employment of capabilities” necessary to achieve convergence, the tension between these tenets becomes clear.⁷ Should a commander seek to achieve convergence even at the cost of agility? The answer is no doubt dependent on the situation. Convergence may be a very useful concept when applied to an Army element contributing to joint efforts to penetrate enemy antiaccess/area denial (A2/AD) architectures. Attempts to achieve convergence may be less desirable, however, under more permissive conditions such as stability operations or during periods of dynamic maneuver in LSCO. Doctrine must address this dilemma head-on, providing commanders with guidance regarding the difficult decisions they must ultimately make by accounting for this tension within the context of risk—both to their formations and to mission accomplishment.

FM 3-0 does an admirable job of introducing some of the risks and challenges associated with convergence. It directly addresses this tension by describing the need for “balance” between the synchronization required to achieve convergence, agility, and initiative. It correctly concludes that commanders must “never surrender the initiative for the sake of synchronization.”⁸ The FM also succinctly describes several of the challenges confronting Army leaders attempting to achieve multidomain convergence in paragraph 3-22.⁹

Despite FM 3-0’s acknowledgment of the challenges confronting convergence efforts, however, the underlying risk associated with achieving convergence in the space and cyberspace domains is far more integral to the concept than the FM allows. The technologies necessary to implement convergence to the scale

envisioned by FM 3-0 suffer from diverse challenges including immaturity, lack of integration, and inadequate distribution. These obstacles are particularly acute within the domains of space and cyberspace and are unlikely to be sufficiently addressed within the next decade given pervasive delays in fielding new equipment. Worse still, the primary solution to overcome the challenges of overly centralized C2, degraded communications, and a dynamic operational environment are entirely paradoxical. The mission type orders and decentralized execution it prescribes to overcome these obstacles is an approach that is deeply ingrained in both the Army’s doctrine and historical experience. There is, however, an inevitable tension between mission command and centralized C2 that convergence merely highlights. Commanders’ ability to balance the often laborious, centralized planning processes demanded to achieve convergence with the flexibility required to enable mission command warrants further debate.

While convergence may not be as diametrically opposed to mission command as it is to simplicity, significant tension remains within the dynamic between these two concepts as well. Once again, this is particularly true when applied to the space and cyberspace domains. The allocation, coordination, and deconfliction of limited space and cyberspace enablers requires a considerable degree of centralized control. Commanders have already been incentivized to pursue the further centralization of C2 as they seek to exploit the often fleeting and elusive opportunities generated by convergence. Mission command will struggle to remain relevant in an environment where subordinate commands are afforded only limited awareness of convergence activities within these domains and possess even less ability to independently exploit their effects.

Put succinctly, attempts by corps and higher echelons to achieve convergence dynamically are unlikely to be both timely and effective. This is particularly true for the cyberspace and space domains where planners must overcome significant obstacles including specialized intelligence requirements, intelligence gain-loss assessments, legal authorities, murky measures of effectiveness, technical limitations, limited organic capabilities, and rigorous competition for joint force assets. While these complications are by no means unique to convergence and merely reflect ongoing challenges across the joint force, the inclusion

of convergence as an operational tenet should bring this reality to the forefront of intellectual debate within the U.S. Army. Given the implicit complexity of achieving convergence in the space and cyberspace domains, FM 3-0 appears at odds with its own guidance when it seemingly forewarns “the more compli-

division level in achieving convergence is less clear, however, and interpretations vary.

Certainly, one could expect a brigade to contribute its organic and assigned assets to achieve convergence as directed by its higher headquarters. In terms of offensive space and cyberspace effects, a brigade’s role in

“Convergence is unique among the four tenets of multidomain operations in that it is not clearly applicable across all echelons.”

cated a plan is, the more vulnerable it is to friction.”¹⁰ Unfortunately for planners serving above the brigade echelon, convergence within these domains remains the very embodiment of friction.

A Tenet for Some, Not for All

Convergence is unique among the four tenets of multidomain operations in that it is not clearly applicable across all echelons. Unlike agility, endurance, and depth, which are desirable—or at least aspirational—attributes for any Army element from the land component command to the infantry company, the breadth of convergence’s applicability remains murky. It may be argued that operational tenets vary in their applicability between echelons. A corps, for example, may struggle to achieve agility due to its size and complexity. A company, on the other hand, may lack the organic assets to achieve endurance over extended periods of sustained combat. This view, however, overlooks the degree to which tenets are viewed as aspirational. Commanders at all echelons should seek to incorporate each of the operational tenets within the scope of their unit’s capabilities as prescribed by FM 3-0. Convergence should be no exception to this guidance.

Unlike for the other three tenets, FM 3-0 is quite prescriptive regarding the echelons at which convergence efforts should be focused. It describes the corps as the echelon “best positioned” to achieve convergence and the division as the lowest tactical echelon at which multidomain convergence can be achieved during LSCO.¹¹ Meanwhile, theaters set conditions for convergence—particularly in the domains of space and cyberspace. The role of elements below the

achieving convergence can be reasonably interpreted as simply remaining prepared to exploit effects when generated by higher echelons. Regardless of their role in coordinating space and cyberspace effects, it remains unclear whether brigade commanders or those of their subordinate echelons should seek to achieve convergence in general or merely understand their role in achieving their higher command’s intent. On the one hand, this prescriptive approach is useful in guiding the conduct of convergence efforts above the brigade echelon. On the other hand, such an approach further muddles the breadth of convergence’s applicability as an operational tenet.

The inclusion of convergence as a central tenet of the Army’s operating concept is particularly confusing given that FM 3-0 states that tenets “should be built into *all* [author’s emphasis] plans and operations.”¹² Brigades and subordinate echelons simply do not possess the expertise, systems, authorities, or time to plan for convergence activities in the space and cyberspace domains. This does not mean that echelons below the division level should not take the space and cyberspace domains into consideration when planning. It is worth distinguishing here between warfighting domains and these domains’ role in achieving convergence. Brigades and their subordinate echelons have a variety of space and cyberspace considerations that must be accounted for during their respective planning processes (maintaining satellite communications, securing network-enabled devices, etc.). These echelons do not, however, possess the ability to contribute significantly to achieving convergence through the provision of effects within the space or cyberspace domains.



Participants at Cyber Guard 2016 work through a 16 June 2016 training scenario during the nine-day exercise in Suffolk, Virginia. Air Force Brig. Gen. Charles Moore, the Joint Staff's deputy director of global operations, told Congress on 22 June that Cyber Guard and exercises like it test the abilities of Cyber Mission Force teams to defend Defense Department networks. (Photo by Petty Officer 2nd Class Jesse A. Hyatt, U.S. Department of Defense)

If, as previously noted, a brigade's role is simply to remain prepared to exploit effects they can neither influence nor integrate into planning, convergence is not particularly useful as a tenet. Below the division level, convergence cannot accurately inform commanders' decision-making or course-of-action analysis as prescribed by FM 3-0.¹³ cursory knowledge of convergence at these echelons is therefore simply a matter of situational awareness. Convergence may possess utility as a concept, but it does not warrant inclusion as an operational tenet. To most of the U.S. Army, convergence in the space and cyberspace domains remains relegated to the mysterious higher headquarters, a faraway land of fairy tales and unintelligible operation orders that might as well be spell scrolls.

Behind the Emerald Curtain

Despite recent attempts to reduce classification levels across the Department of Defense, the

technical capabilities most frequently associated with convergence in space and cyberspace remain shrouded in mystery for most leaders serving in the Army's tactical formations. Classification, compartmentalization, and technical complexity have created a vacuum in operational understanding that is filled by a wide spectrum of conjecture ranging from dismissive hand-waving of U.S. joint force capabilities to outright delusional expectations about what convergence can be expected to achieve in support of Army objectives. Convergence is something concocted in the windowless rooms of higher headquarters' higher headquarters—something simultaneously arcane and incomprehensible. To inform the force beyond these vault doors, well-intentioned planners often discuss convergence in terms of desired effects rather than the technical means used to achieve them. This sidesteps concerns regarding classification but creates its own problems.

By conceptualizing convergence as a desired end state rather than a complex and imperfect activity that may or may not produce a desired effect, planners inadvertently rob tactical leaders of the ability to account for a variety of factors such as the activity's likelihood of success, second/third order effects, and risk of fratricide. Such

is critical in guiding commanders' understanding of convergence. Unfortunately, such knowledge not only rarely exists for space and cyberspace capabilities at the tactical level, but misconceptions regarding these domains are also frequently reinforced through well-intentioned efforts to integrate space and cyberspace

“Offensive space and cyberspace capabilities are real, and they will play an important role in future conflicts. The current immaturity and the limitations of these capabilities, however, should give tactical commanders pause when considering their effects decisive or even reliable.”

an approach is akin to describing artillery as a series of mysterious explosions or an unmanned aircraft system as an elevated video feed. One simply cannot account for the impacts of that which they are neither habitually exposed nor adequately informed.

Even worse, a purely effects-based understanding of space and cyberspace capabilities inherently assumes efficacy and often grossly distorts potential impacts. The complexity of integrating these capabilities into training and gaps in simulations architecture ensure that these misplaced expectations are inadvertently reinforced throughout training. The practice of “white carding” effects and relying on vaguely defined space and cyberspace capabilities to overcome complex problems has become ubiquitous within Army exercises at all echelons.¹⁴

This is particularly, although not exclusively, true of home-station command post exercises and Warfighters, which are solely reliant on war gaming and divorced from the myriad complexities of real-world operational environments.¹⁵ The majority of space and cyberspace capabilities continue to languish within the seam between the simulated environments relied upon to train echelons above brigade and the field exercises of their subordinate units. This not a problem that doctrine can be expected to resolve, but it is a reality for which doctrine must account.

A basic understanding of combined arms, increasing over the course of a soldier's career, provides valuable context to their decision-making. This knowledge

effects into planning and training at all levels.

In its current conceptualization, convergence risks becoming the magic wand relied upon to dispel tactical leaders' most challenging problems through the employment of nebulously defined offensive space and cyberspace effects, thereby absolving them of their responsibility to think through how best to overcome challenges using available resources. Offensive space and cyberspace capabilities are real, and they will play an important role in future conflicts. The current immaturity and the limitations of these capabilities, however, should give tactical commanders pause when considering their effects decisive or even reliable. Tactical commanders—particularly below the division level—should consider a plan to be suitable, acceptable, and feasible independent of space and cyberspace effects except under unique conditions warranting the acceptance of particularly high risk.

Dispelling the Convergence Illusion

Losing an illusion makes you wiser than finding a truth.

—Ludwig Börne¹⁶

Although convergence still has a role to play within FM 3-0, it should be removed as a tenet of operations. The FM's discussion of convergence and its current definition provide valuable context to understanding the Army's role in unified action, which is worth retaining. Overall, however, convergence's

inclusion in FM 3-0 should be limited to an overview. Convergence should feature far more prominently within Army Techniques Publication (ATP) 3-91, *Division Operations*; ATP 3-92, *Corps Operations*; and ATP 3-93, *Theater Army Operations*, where a thorough discussion of applications at the echelons above brigade is warranted.¹⁷ Discussion of convergence within FM 3-0 should also include an expanded discussion of the inherent tension between the centralized C2 required to facilitate convergence and the mission command needed to preserve agility. Army Doctrine Publication 6-0, *Mission Command: Command and Control of Army Forces*, and FM 6-0, *Commander and Staff Organization and Operations*, currently provide an excellent discussion of the tension between mission command and centralized C2 in general.¹⁸ These considerations should be applied to the tension between agility and the increasing need to achieve convergence to enable Army operations during LSCO. Balancing these conflicting tenets must be a deliberate, risk-based decision made by commanders based on the unique operational variables confronting their units. If modified, FM 3-0 can play a critical role in conditioning Army leaders to anticipate the necessity of making these decisions.

Convergence does not require replacement by an alternative operational tenet. Combined arms already encompass all aspects of convergence that are universally applicable across echelons including cross-domain effects.¹⁹ Further specificity associated with convergence can be expounded upon within ATP 3-91, ATP 3-92, and ATP 3-93 where the capacity to identify and evaluate potential decisive points is more feasible and relevant. FM 3-0 already includes a useful discussion of combined arms' application within MDO, which is often overshadowed by the more prominently featured tenet of convergence. This discussion should be further expounded upon to include the integration of offensive space and cyberspace capabilities to create and exploit relative advantages against enemy forces. Commanders across the Army will be best prepared to exploit opportunities within MDO when these domains are presented within the familiar context of combined arms.

Expansion of FM 3-0's discussion of offensive space and cyberspace capabilities within the context of combined arms will be insufficient to dispel the

aura of magic surrounding these capabilities on its own. Army leaders will continue to struggle with the employment of these emerging capabilities as long as they remain unfamiliar with the unique dynamics of the space and cyberspace domains. The Army should therefore seek to maximize soldiers' exposure to these domains throughout the duration of their careers to develop leaders that are well-acquainted with space- and cyberspace-enabled technologies. This approach requires a wide variety of reforms including more agile integration of commercial off-the-shelf technologies, improved simulations architecture, more thoughtful exercise design, reductions in classified/compartimentalized information, and targeted personnel management that rewards development of these vital skills. Such efforts should be applied at the lowest echelons and as broadly as possible.

An Alternative Approach

A good plan violently executed now is better than a perfect plan executed next week.

—George S. Patton²⁰

Convergence, when applied beyond the relatively narrow context of corps and theater levels, assumes too much in execution provided the current state of joint force capabilities within the space and cyberspace domains. Convergence in the space and cyberspace domains requires robust C2, dynamic and reliable intelligence, and subordinate elements that are adequately postured to exploit fleeting opportunities. During LSCO, the Army is likely to be confronted by strained and intermittent communications as well as a capable and adaptive enemy. Meanwhile, its subordinate units will be best postured to exploit opportunities within the domains with which they are the most familiar. Overreliance on convergence—particularly in the space and cyberspace domains—risks holding initiative hostage to cumbersome staff processes, unproven technologies, and uneven C2 architecture that will be under enormous strain during LSCO. All these factors translate to unacceptable delays in operational tempo, which is contradictory to the very intent of convergence and affords U.S. enemies the opportunity to regroup, adapt tactics, and reallocate forces, thus negating the U.S. joint force's attempts to accrue advantage over time.

An alternate view of convergence would be to assume that FM 3-0 has its focus backward. Under this approach, space and cyberspace effects coordinated at echelons above brigade and currently associated with convergence would be focused on exploiting opportunities generated by Army maneuver elements and the joint force rather than generating opportunities for exploitation. This change seems simple but has significant ramifications. As the elements charged with generating opportunities, reliance on mission command within the Army's tactical echelons would be reinforced rather than weakened. Intelligence processes would necessarily be brought into better alignment with these same elements.

The Army's focus of information collection and fire support would likely be drawn closer to the front lines. This change, however, would not necessitate a shift away from each echelon's respective "deep" areas as currently defined in FM 3-0, chapter 6, to remain effective.²¹ Maintaining effective information collection and fires within these ranges will maximize the contributions of staffs serving below the corps echelon while fully exploiting the operational reach of existing Army capabilities. Such an approach would contribute to unified action by exerting continual pressure on the enemy's forward echelons while maximizing support to localized maneuver of ground forces. Subordinates would be empowered to execute increased disciplined initiative, maximizing the Army's return on investment across the U.S. Army's highly professionalized force—its most decisive advantage in modern warfare.

Convergence as described in FM 3-0 is reliant upon an incredibly thorough understanding of enemy forces, which is difficult to achieve against a peer enemy, particularly when factors such as obfuscation, deception, and counter-reconnaissance are considered. Identifying opportunities within a relatively stable environment presents some unique opportunities for exploitation but is far less efficient than when an enemy exposes vulnerability through friction on the battlefield. Few activities inject more friction than combined arms warfare.

An approach to convergence that seeks to exploit rather than generate opportunities for exploitation better aligns with the Army's role as the most tactically oriented service in the joint force. The other services can be expected to continually seek to maximize their

contributions to unified action through focus within their respective domains. The Army should maintain the same level of focus regarding dominance within the land domain.

While FM 3-0 has taken a significant step forward by integrating space and cyberspace as warfighting domains, the Army must not risk losing its focus on enabling maneuver in the land domain in favor of generating A2/AD opportunities via convergence. The joint force must be trusted to play their respective roles within the context of unified action. Put differently, the U.S. Army risks losing sight of enabling its own subordinate echelons—those responsible for conducting ground maneuver—in favor of pursuing convergence. This may be a worthwhile goal for the service provided the rapidly evolving nature of conflict, but it is also one that the Army is insufficiently postured to conduct in space and cyberspace. The ongoing Russo-Ukrainian war has repeatedly demonstrated the limited utility of well-integrated effects from multiple domains when insufficient forces exist to effectively exploit the opportunities these effects generate.²² Overreliance on these capabilities beyond the operational reach of Army maneuver elements risks permitting conflicts to devolve into grinding attritional warfare that favors U.S. adversaries.

The U.S. Army remains a force that is trained, organized, and equipped to engage in maneuver warfare. The service has long assumed risk in the protection warfighting function in favor of continued investments in maneuver warfare capability. One need only look at the roles of the "Big Five" platforms that dominate Army formations to illustrate this point.²³ The constraints associated with the Army's current force structure, in addition to the immaturity of offensive space and cyberspace capabilities, should not be taken lightly. To risk any reduction in tempo and agility during LSCO—even that which is merely implicit—is to risk defeat. An approach to convergence that emphasizes support to exploitation of opportunities in the land domain reduces this risk by leveraging the advantages of the U.S. Army as it exists today and is likely to exist for the foreseeable future.

Of course, such an approach assumes its own risks. If the Army shifts its focus toward exploiting opportunities within the tactical fight, gaps may appear within enemy support areas that other services are

incapable of addressing in a timely manner. The joint force will already be hard pressed to meet the enormous challenges within the maritime, air, space, and cyberspace domains during LSCO. Conventional forces may also be exposed to risk deemed unacceptable given current force generation challenges, advance-

Conclusion

By affording offensive space and cyberspace capabilities the qualities of magic, the Army has unwittingly stifled leaders' ability to understand the concept of convergence and improve its implementation. For most soldiers who reside within the Army's tactical echelons,

“The revision of U.S. Army doctrine alone will be insufficient to address the many challenges associated with the employment of offensive space and cyberspace capabilities, but it is a vital starting point for further reforms.”

ments in automation and precision fires, and logistical hurdles. The Army's multidomain integration with the joint force may very well be reduced under such an approach, as Army staffs prioritize support to their subordinate echelons when conditions permit such freedom of action.

These are valid concerns that may supersede the potential advantages accrued by this alternate approach to convergence. The distinction between these two approaches may even prove irrelevant in practice. These differing interpretations of what convergence should be, however, are merely intended to spark an intellectual debate about the role of convergence in U.S. Army doctrine that is both warranted and overdue. The result of such a debate is likely to benefit the Army regardless of its outcome.

Convergence is ultimately a framework for gaining relative military advantage in the face of considerable challenges present within the current operational environment. It remains critical that Army leaders understand the doctrinal framework for achieving this result regardless of any perceived insufficiencies in the concept. Space and cyberspace are merely components of this framework, serving to instigate broader questions about the role of convergence in MDO. The relationship between convergence and the offensive application of these domains is integrally intertwined. Additional clarity regarding convergence will undoubtedly shed additional light on the proper employment of offensive space and cyberspace capabilities in future Army operations.

convergence is a paradox—an operational tenet that leaders must simultaneously seek to integrate into all planning and yet must accept will generally remain somebody else's responsibility. The aura of magic surrounding the space and cyberspace components of convergence is thus preserved by the virtually impenetrable barriers of classification, compartmentalization, technical jargon, convoluted authorities, and the sort of corrosive speculation that feeds off unmoored optimism. Conditioning leaders to withhold action as they wait for conditions to be set by capabilities of which they are inadequately informed is an exercise in faith that invites disaster and undermines the very foundations of mission command.

While convergence retains value as a technique for overcoming enemy A2/AD architectures at the theater and corps echelons, it makes little sense as an operational tenet. Reducing the role of convergence and deepening FM 3-0's discussion of combined arms will strengthen the MDO framework and better clarify tactical echelons' roles in exploiting the opportunities convergence seeks to create. The revision of U.S. Army doctrine alone will be insufficient to address the many challenges associated with the employment of offensive space and cyberspace capabilities, but it is a vital starting point for further reforms. These revisions, in addition to a candid debate regarding the applicability of convergence more broadly, will empower Army leaders to peer behind the emerald curtain and see the true nature of these emerging domains. When they finally do, they'll discover that no magic awaits

them in space or cyberspace, only a Gordian knot of tangled risks and opportunities in near equal measure.

The emerald curtain affords no safety, only a pretext for self-delusion. ■

Notes

Epigraph. Arthur C. Clarke, *Profiles of the Future: An Inquiry into the Limits of the Possible*, rev. ed. (New York: Popular Library, 1977), 39.

1. U.S. Army Training and Doctrine Command (TRADOC) Pamphlet (TP) 525-3-1, *The U.S. Army in Multi-Domain Operations 2028* (Fort Eustis, VA: TRADOC, December 2018), vii. TP 525-3-1 defines convergence as the “rapid and continuous integration of capabilities in all domains, the EMS [electromagnetic spectrum], and information environment that optimizes effects to overmatch the enemy through cross-domain synergy and multiple forms of attack all enabled by mission command and disciplined initiative.” This definition was later altered in Field Manual (FM) 3-0, *Operations* (Washington, DC: U.S. Government Publishing Office [GPO], 2022), 3-3. TP 525-3-1’s definition is considerably broader than FM 3-0’s and includes the EMS and information environment, which the TRADOC pamphlet leaves unmentioned. The inclusion of “integration of capabilities in all domains” has also resulted in lingering confusion regarding convergence as defined in the 2022 publication of FM 3-0.

2. FM 3-0, *Operations*, 3-2–3-5.

3. Carl Von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984), 119.

4. FM 3-0, *Operations*, 3-3.

5. *Ibid.* The FM clearly addresses convergence’s relationship with mass, economy of force, and objective. Of the remaining six principles of warfare, the term’s compliance with the principle of simplicity is by far the most concerning.

6. *Ibid.*

7. *Ibid.*

8. *Ibid.*, 3-5.

9. *Ibid.*, 3-6.

10. *Ibid.*, A-4.

11. *Ibid.*, 2-19.

12. *Ibid.*, 3-2.

13. *Ibid.*

14. Jon Harper, “Just In: Army Struggling to Simulate All-Domain Warfare,” *National Defense*, 18 October 2021, <https://www.nationaldefensemagazine.org/articles/2021/10/18/army-struggling-to-simulate-all-domain-warfare>. In the article, Col. Christopher Budihas, director of the Maneuver Battle Lab, describes “white-carding” as a scenario inject—often written on a physical 3x5 card—which is not integrated into the training simulation. He acknowledges the deficiencies in this methodology and requests assistance from industry in developing better solutions for effects associated with space, cyber, and electromagnetic spectrum.

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Warfighter simulation architecture “doesn’t do space and it doesn’t do cyber at all.”

16. Susan Ratcliffe, ed., *Oxford Essential Quotations*, 6th ed. (New York: Oxford University Press, 2018), <https://www.oxfordreference.com/display/10.1093/acref/9780191866692.001.0001/q-oro-ed6-00020959?rskey=fGZMYT&result=8>.

17. Army Techniques Publication (ATP) 3-91, *Division Operations* (Washington, DC: U.S. GPO, 2014); ATP 3-92, *Corps Operations* (Washington, DC: U.S. GPO, 2016); ATP 3-93, *Theater Army Operations* (Washington, DC: U.S. GPO, 2021). None of these publications incorporate language associated with convergence, and all are in dire need of an update following the major structural changes included in *Army Force Structure Transformation* (Washington, DC: Headquarters, Department of the Army, February 2024), <https://api.army.mil/e2/c/downloads/2024/02/27/091989c9/army-white-paper-army-force-structure-transformation.pdf>.

18. Army Doctrine Publication 6-0, *Mission Command: Command and Control of Army Forces* (Washington DC: U.S. GPO, 2019), 3-1–3-3; FM 6-0, *Commander and Staff Organization and Operations* (Washington DC: U.S. GPO, 2022), 1-1–1-3.

19. FM 3-0, *Operations*, 3-1.

20. Ratcliffe, *Oxford Essential Quotations*, <https://www.oxfordreference.com/display/10.1093/acref/9780191866692.001.0001/q-oro-ed6-00016315?rskey=OojzB&result=2>.

21. FM 3-0, *Operations*, 6-8, 6-11. Figure 6-1, “Doctrinal Template of Depths and Frontages,” and figure 6-2, “Notional Roles and Responsibilities in Terms of Time, Space, and Purpose,” provide a useful framework for the employment of effects to achieve convergence regardless of whether the existing framework or a modified, exploitation-centric framework are adopted. This article does not propose any reduction in higher echelons’ responsibility to employ organic assets to disrupt enemy freedom of movement and shape the operational environment within these frameworks.

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Homeland Joint Interagency Task Force

Can It Better Deliver Planning, Coordination, and Information Sharing Protocols to Counter Transnational Criminal Threats?

Cmdr. Jonathan K. Corrado, PhD, U.S. Navy Reserve

According to the U.S. National Security Council, the transnational criminal organization (TCO) Los Zetas freely operated over the span of eight years using drug kingpin Ayman Joumaa to launder illicit drugs and cash into the United States.¹ Joumaa successfully coordinated the movement of large amounts of cocaine from Colombia through Mexico to the United States. In another elaborate scheme to conceal drug revenues, Joumaa paid Hezbollah to transport and launder cash from Lebanon to the United States for the purchase of preowned vehicles.² The purchased vehicles were subsequently shipped and sold to West Africa.³ Following the sales, the cash was transferred back to Hezbollah in Lebanon.⁴ Los Zetas's protracted freedom of maneuver, collaboration with known terrorist organizations, and operational reach into the United States demonstrates one example of the significant threat TCOs pose to U.S. national security. More importantly, it exposes the problem that the U.S. government (USG) engenders by implementing a flawed strategy to combat TCOs. A review of U.S. policy and associated communications on the topic of TCOs reveals that the USG has not

issued an overarching mandate to combat TCOs in the United States.⁵ Consequently, a U.S. piecemeal strategy has developed that fails to provide required unity of command. Defense and law enforcement organizations do not collaborate or share information toward the common objective of combating TCOs in the United States. Inadequate resources and tools preclude successful eradication of TCOs.⁶

The Department of Defense (DOD) created an overarching authority in Joint Interagency Task Force (JIATF) South to lead the fight against TCOs in the Caribbean Sea, the Gulf of Mexico, and the eastern Pacific. JIATF South serves as a fusion center to detect and monitor narcotic trafficking and threats across a forty-two million square-mile area. It is primarily a consolidated information brokerage house that coordinates efforts among the Coast Guard, the U.S. Drug Enforcement Agency, the FBI, and Colombian and Costa Rican law enforcement. Its mission is not to go after drugs per se but to go after the organizations perpetuating the drug trade. The JIATF South organization—a multiservice, multiagency task force in conjunction with Partner Nations—leverages



Air Force Lt. Col. Yadira Greeson, the Joint Interagency Task Force (JIATF) South air component coordination element liaison officer, explains the process of tracking illicit traffickers at the JIATF South joint operations center at Naval Air Station Key West, Florida, 13 July 2018. (Photo by Staff Sgt. Marianique Santos, U.S. Air Force)

all-domain capabilities to promote an environment of peace and stability in their areas of responsibility.⁷ The JIATF is responsible for detecting targets, monitoring their efforts, and then interdicting these with a host of resources. Although primarily focused on the illegal drug trade, it also covers other TCO operations. JIATF South is credited with 50 percent of all drug interdictions in the world.⁸ Based on the success of JIATF South, the DOD should form a JIATF North to combat the growing threat imposed by TCOs in the United States.⁹

Transnational Criminal Organizations

Transnational criminal organizations are self-perpetuating associations operating across national borders that use violence and corruption and exploit transnational commerce and communications to protect and disguise their illicit, profit-driven activities.¹⁰ Similarly,

in his 2011 strategy to combat TCOs, then-President Barack Obama defined them as “those self-perpetuating associations of individuals who operate transnationally for the purpose of obtaining power, influence, monetary and/or commercial gains, wholly or in part by illegal means, while protecting their activities through a pattern of corruption and/or violence, or while protecting their illegal activities through a transnational organizational structure and the exploitation of transnational commerce or communication mechanisms.”¹¹ Although TCOs commit a number of crimes, most common are cybercrime, human smuggling, and money laundering, in addition to the trafficking of body parts, drugs, endangered species, humans, nuclear material, and weapons.¹² Other transnational organized crime (TOC) includes counterfeit goods, cultural and wildlife property smuggling, extortion, and illegal gambling.¹³ The kidnappings associated with illicit trafficking, murder, and violence of these criminal organizations have challenged the



personal security of citizens and regional security as well as the legitimacy, sovereignty, and stability of key U.S. partner states.¹⁴ The most common illicit activities in the United States are drug trafficking and the trafficking of illegal weapons, which are sometimes used to conduct terrorist acts.¹⁵

Yurri A. Voronin, a professor of criminal law at Urals State Law Academy in Yekaterinburg, Russia, proclaimed that transnational crime rings are not only becoming more universal but are also becoming more powerful as their mobility expands and transcends across states and other countries.¹⁶ As a result, the threats imposed by TCOs tend to cross diplomatic, intelligence, law enforcement, and military jurisdictions, making them a significant problem in the United States.¹⁷ The advent and expansion of TOC penetrates state institutions, corrupting and threatening governance and national security.¹⁸ Moreover, TCO networks pose threats to the overall economy, which affects strategic markets and U.S. competitiveness.

Furthermore, serious threats such as the nexus of crime, terror, and insurgency; trafficking and transportation of individuals against their will; and weapons trafficking have also been identified.¹⁹ U.S.-based TCOs

The crew of the Coast Guard Cutter *James* poses with more than 33,200 pounds of cocaine and 12,400 pounds of marijuana worth approximately \$448 million in Port Everglades, Florida, on 27 October 2023. The offloaded drugs were interdicted during thirteen separate cases in the international waters of the Eastern Pacific Ocean and the Caribbean Sea. U.S. agencies from the Departments of Defense, Justice, and Homeland Security cooperated in the effort to combat transnational organized crime. The Coast Guard, Navy, Customs and Border Protection, the Federal Bureau of Investigation, the Drug Enforcement Administration, and Immigration and Customs Enforcement, along with allied militaries and international partner agencies, play a role in counterdrug operations. (Photo by Petty Officer 3rd Class Eric Rodriguez, U.S. Coast Guard)

and networks contribute to significant increases in illicit criminal activities and therefore “threaten U.S. interests by forging alliances with corrupt elements of national governments and using the power and influence of those elements to further their criminal activities. In some cases, national governments exploit these relationships to further their interests to the detriment of the United States.”²⁰ Janice Ayala, Department of Homeland Security director of the Joint Task Force for Investigations, reported in an April 2017 congressional hearing that TCOs are located in every city in the United States.²¹

U.S. business leaders fear that firms and large corporations are placed at a competitive disadvantage by TCOs. These illicit organizations cost legitimate U.S. businesses billions of dollars annually.²² TCOs target some regions of the country more than others. For example, research indicates that they are more prevalent among bordering states, commonly referred to as partner states.²³ In accordance with research findings conducted by the National Institute of Justice, organized crime groups in the United States have increased their involvement and participation in human smuggling and drug trafficking through Mexico.²⁴ Furthermore, despite increased border security, TCOs operate using the most sophisticated measures of counter-detection along border states, significantly decreasing and/or eliminating their risk of detection in the United States.²⁵

Ineffective Piecemeal Strategy Against TCOs

Clearly, U.S. piecemeal strategy over time has had a limited effect on the ability of TCOs to successfully operate and grow. As early as the nineteenth century, the USG began its fight against TCOs as it sought to develop a strategy to limit the Sicilian Mafia from doing business with Italian American organized criminals.²⁶ Between 1960 and 1990, Presidents Richard Nixon and Ronald Reagan, respectively, recognized international drug trafficking as the number one enemy to the United States and developed strategic initiatives to deal with it. In 2000, President Bill Clinton published the *International Crime Threat Assessment*, and in 2008, President George W. Bush implemented codified strategy to combat TCOs.²⁷ In a 2011 publication titled *The Strategy to Combat TCO: Addressing Converging Threats to National Security*, the USG identified TCO as a problem and developed a strategy to address it.²⁸

Unfortunately, the DOD released two of its own strategic documents in 2011, both of which largely failed to build upon the 2011 strategy against TCOs. The document *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* fails to reference TCOs while the *Capstone Concept for Joint Operations: Joint Force 2020* only acknowledges TCO as a feature of such a strategic environment.²⁹ The DOD's strategy failed by not adequately driving authorities in the right direction to effectively counter TCO, not providing detailed information of how the department would reach its desired end state,

and failing to identify specific implementation information.³⁰ In February 2017, President Donald Trump signed an executive order titled "Enforcing Federal Law with Respect to Transnational Criminal Organizations and Preventing International Trafficking," which focuses on increasing resources to combat TCOs, enhancing law enforcement's capability to share information, and increasing cooperation with global partners.³¹

No Overarching Authority to Combat TCOs

JIATF South serves as the overarching authority to combat TCOs in its area of operations, but the USG has no similar mandate for a single overarching authority to counter TCOs in the United States. Because it has failed to mandate such authority, gaps in responsibility or unnecessary redundancy in application of capabilities exist. For example, the fiscal year 2013 National Defense Authorization Act designates law enforcement agencies as the lead in counter-narcotic-related activities and permits joint task force commanders to provide support to them.³² On the contrary, Title 10 authority contains the provision for the DOD to act as the sole lead agency responsible for detecting and monitoring the transit (maritime and aerial) of varying illegal drugs into the United States when actions are in alignment with local, federal, and state law enforcement.³³ Moreover, Title 10 grants the DOD the authority to capture, divert, intercept, or seize any aircraft or vessels that are considered beyond U.S. geographic limits.³⁴ In some cases, overlapping authorities mandate multiple agencies to lead the fight against TCOs and their associated criminal activities such as counternarcotics, counterterrorism, and cybercrime. This overlap may be justifiably predicated on the notion that counternarcotics and counterterrorism authorities are critical activities mitigating TCO crime; however, overlapping authorities such as these result in highly disjointed efforts and a lack of coordination and unity of effort, and they contribute to the continuation of successful TCO operations.³⁵

Lack of Collaboration Toward a Common Objective

Another result from a lack of a centralized authority is a lack of collaboration among governmental agencies in the fight against TCOs. Renee Novakoff suggests

that the consequences of their unbridled criminal activity are so severe that they warrant a federal fusion center to lead all counter TCO agency efforts currently employed.³⁶ A mechanism does not exist as it does in the JIATF South area of operations, which serves like such a fusion center and effectively incentivizes coordination among various government agencies. Under the current configuration, U.S.-based organizations like the FBI, Drug Enforcement Agency, and the National Guard are more inclined to act autonomously and less inclined to join efforts, knowledge, and resources.

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Reserve, has served at sea as a nuclear officer, in several amphibious operations billets, and as an operational level of warfare staff planner on the Joint Staff and U.S. Naval Forces Central Command Staff. He is a qualified surface warfare officer and Seabee combat warfare officer. He holds a BS in mechanical engineering from the Virginia Military Institute, a masters in engineering management from Old Dominion University, and a PhD in systems engineering from Colorado State University, in addition to completing Joint Professional Military Education Phases I and II, and graduating from the Air War College. As a civilian, he works in the nuclear and defense industries and has several fields of research interest, including nuclear engineering, systems engineering, and human performance/error, and has several technical publications in these fields.

United we stand, and divided we fall.

Resources or Tools to Counter TCOs

Although not unlimited, the federal government has a vast array of budgetary funding within its agencies to address TCOs. Moreover, there are tools, resources, and capabilities either under discussion or currently available that can defeat or mitigate the impact of TCOs. For example, presidential executive orders or laws can impose sanctions that block the ownership of property or prohibit transactions by TCOs. Seizing or blocking the property or bank accounts of TCOs and associated personnel at every opportunity could choke them off financially. Additionally, legislation that expands the authority of law enforcement to investigate, interdict, and prosecute TCO networks can step up the

pressure on these organizations. Giving law enforcement more tools and sharing information, such as that gained from military spy satellites or eavesdropping on TCO communications, can better allow situational awareness of the threats. Another tool may include changes to the Immigration and Nationality Act to deny TCO criminals or associated members entry into the United States. If TCOs are not physically on the ground within our borders, there is an additional dimension of distance that allows for more opportunity to discover illegal activity, or it simply keeps them at distance. Also, rewards programs that incentivize the international community to turn on TCOs so that arrests and convictions can be made have proven themselves for decades.³⁷ Money is a great motivator. Although not an all-encompassing list of options, all the avenues discussed here can be utilized to counter TCOs.

A footnote that must be addressed is the content of Title 10. Although Title 10 allows the DOD to provide training opportunities and to share equipment and facilities with law enforcement agencies, the military is excluded from partaking in law enforcement actions. Furthermore, Title 10 guides the DOD to enhance the provision of information gathered and collected in both training and operations that are of relevance to any federal or state law violations within a given jurisdiction.³⁸

In accordance with Title 32, state governors who have a secretary of defense-approved plan pertaining to counternarcotics are permitted to receive funding from the DOD.³⁹ This funding enables state governors to employ National Guard units to conduct counternarcotics-related activities. Due to the array of resources and global presence, these authorities rely on the DOD to significantly contribute to countering TOC.⁴⁰

Recommendations

Gangs, organized crime groups and networks, and terrorists must fund their efforts and therefore actively engage in illicit activities, further contributing to domestic TCOs. Since these entities are persistent and growing, it is recommended that one policy and organization be generated that can allow for information sharing so that the TCO threat can be properly managed. The best current example of such a successful organization is JIATF South. A similar JIATF North organization would be able to focus on the exploitation of organizational boundaries to ensure that TCOs aren't operating in the space

between DOD and civil law enforcement authorities within the United States. The interconnection inherent between narcotics or terrorism and other criminally based activities allows the DOD the opportunity to counter TOC under these authorities.⁴¹

The development of a JIATF North against TOC will synchronize governmental authorities with counternarcotics and counterterrorism organizations against TCOs. A JIATF North would enhance the effectiveness of governance, civil support, and security as well as improve cooperation to counter state actors that threaten U.S. interests. As this article indicates, the JIATF South played an important role in U.S. strategy and offered some good lessons learned to help with a model for JIATF North. First, a mandate from higher authority is needed. The secretary of defense or equivalent should initiate these efforts.⁴² Second, a strategy is needed that provides required unity of command; the USG has not assigned a distinct, clearly defined mission statement on how to address TCOs. Third, a partnership of organizations is needed to be built that can share strengths and close gaps in weaknesses toward a common objective. Last, the resources or tools of the USG are needed to provide the necessary reinforcement and sustenance for sustained operations. This is more than financial; it would also include the capabilities, personnel, and the time required to make an impact on TOCs.⁴³ Within the domestic JIATF, the U.S. Northern Command should delegate command to law enforcement agencies that focus on counternarcotics. Including military capabilities in support of counternarcotics and counterterrorism activities would enhance the endeavors of domestic law enforcement

agencies. The JIATF should work in partnerships with the DOD, law enforcement agencies, the National Guard Bureau, and U.S. Special Operations Command to enhance their acquisition of intelligence and information sharing on local, state, and federal levels. This would lead to a better understanding of TOC, and it would provide one distinct yet clearly defined operational commander to ensure a whole-of-government approach to combating TOC.

Conclusion

Domestic TOC is a growing challenge in the United States. TCOs and other crime groups based in the United States participate in illicit activities that threaten the economy, governance, strategic markets, and U.S. competitiveness, and their efforts are further amplified by expanding economic, information, and transportation networks. To combat the increased prevalence of TCOs, Obama signed a strategy for the USG to combat TCOs. The current USG counter-TOC strategy is measured in accordance with a few key objectives that aim to mitigate such crime. USG agencies currently conducting counternarcotics and counterterrorism operations provide the DOD with an opportunity to help counter TOC. It is imperative for a JIATF to enhance the provision and integration of planning, coordination and information sharing among agencies; collaboration with domestic partners is needed to ensure adherence to a whole-of-government approach to combat TCOs. One distinct yet clearly defined operational commander—a geographic combatant command—should focus on disparate agencies and their alignment with authorities and capabilities to combat asymmetric threats from TCOs. ■

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Texas Army National Guard soldiers respond to sensors triggered by illegal immigrants using known routes to gain access to the United States on 22 October 2023 along the U.S.-Mexico border. The Guardsmen deployed in support of Operation Lone Star worked with law enforcement partners from the Texas Department of Public Safety to deter illegal border crossings into Texas. (Photo by Spc. Dakota Bradford, Texas Army National Guard)

Can the President Federalize the National Guard?

Lt. Col. Ryan P. Hovatter, Florida Army National Guard

The migrant crisis has been growing for the past several years, but a more recent predicament was the rift between the federal government and the state of Texas over the governor's use of the Texas National Guard (TXNG) to enforce his policies in seeming defiance of court orders. The fight was between the Biden administration and Texas governor Gregg Abbott, who was critical of the administration's management of immigration and the border. Abbott started Operation Lone Star less than two months after President Joseph R. Biden took office in 2021.¹ At the height of the confrontation in the first few months of 2024, several politicians called for the president to assert federal authority over the border and to even take control of the TXNG.

Abbott began Operation Lone Star as a state-funded operation to enforce immigration law. The operation was performed by the TXNG, the Texas State Guard, and Texas state law enforcement agencies.² On the one hand, the state supported the U.S. Customs and Border Protection agency in enforcing immigration law, but on the other hand, Abbott used his state forces in ways that countered Biden administration policies.

The National Guard frequently works alongside state and federal authorities during disaster response or civil disturbances. The Department of Defense calls these missions defense in support of civil authorities (or simply, DSCA).³ Governors usually keep National Guard troops under their control during DSCA operations, and there is good reason. If National Guard troops were under federal control, they would be unable to act as law enforcement. In the 1992 response to Hurricane Andrew—one of the most devastating storms in U.S. history—the Department of Defense wanted to federalize the Florida National Guard to simplify the chain of command.⁴ The Florida governor and the chief of the National Guard Bureau insisted that the governor retain the Florida National Guard under state control so they could perform vital law enforcement missions.⁵ Had the Guard troops been federalized, the Posse Comitatus Act, which prohibits use of the federal military from acting as executors of the law, would have prevented them from arresting lawbreakers.⁶

Texas Blocks Federal Agents' Border Access

Although Abbott was a vocal opponent of the administration's policies, TXNG troops appeared to be

working cooperatively with U.S. Customs and Border Protection and other federal and local law enforcement. Historically, there is seldom animosity between the National Guard and law enforcement, especially since many National Guard troops are employed in their civilian jobs by law enforcement agencies.

After TXNG troops blocked U.S. Border Patrol (USBP) agents from entering a public park along the Mexican border on 12 January 2024, however, the relationship between the TXNG and federal law enforcement significantly changed.⁷ On Abbott's order, the TXNG seized Shelby Park in Eagle Pass, Texas, and blocked the park's access by erecting crude barriers consisting of shipping containers and mounds of concertina wire around it.⁸ TXNG troops also emplaced buoys in the river to discourage swimmers and razor wire on the bank to halt those brave enough to hazard the swim. The buildup of barriers and floats had been long in the works, but the total seizure of the park was sudden. Eagle Pass mayor Rolando Salinas Jr. expressed frustration over the politicization of immigration and of the governor's indefinite seizure of the city's park without the city's consent. Shelby Park is a forty-seven-acre public park containing running trails, a boat ramp, and even a golf course along the Rio Grande River.⁹ It is where the small city holds public events like the International Nacho Festival and the International Friendship Festival, which both celebrate the population's Mexican roots. Salinas said of the park's seizure, "It is not a decision that we agreed to. This is not something that we wanted. This is not something that we asked for as a city."¹⁰ However, the mayor and city council decided not to pursue a lawsuit against the state.

U.S. Customs and Border Protection accused the TXNG of blocking access to the park and river where USBP agents said they needed to use a boat ramp to detain and potentially treat some immigrants caught in the wire on the U.S. side of the river. To add to the urgency, a mother and her two small children lay dead on the other side of the wire, having drowned while attempting to cross.¹¹ The state of Texas countered by accusing the federal government of destroying state property, failing to control immigration, and impeding on their state sovereignty.¹²

Less than two weeks later, the U.S. Supreme Court issued an order that effectively allowed USBP, under

the Department of Homeland Security (DHS) to cut or remove concertina wire.¹³ It may seem like this happened suddenly, but the legal course began in October 2022 when Texas sued the federal government for destroying its property after USBP agents cut and removed wire. In the first court case, the district judge ruled that Texas did not present sufficient evidence to prove that DHS had violated law, and opined that USBP could cut and remove wire.¹⁴ The state appealed to the U.S. Court of Appeals for the Fifth Circuit, claiming that USBP was removing wire to create paths for migrants and had even used a forklift to destroy concertina wire.¹⁵ The court granted an emergency temporary restraining order against DHS on 30 October to give time for the court to review the appeal.¹⁶ The court stressed that the temporary restraining order did not apply when migrant lives were in danger, that USBP could cut or remove wire in a medical emergency, but it firmly stated that removing wire to prevent future medical emergencies was not allowed. The court also issued an injunction on the lower court's ruling until an appeal could be resolved.¹⁷ The U.S. Supreme Court picked up the case and issued a succinct order on 22 January 2024 vacating the Fifth Circuit's injunction, which meant the first ruling stood.

Media reports stated that the Supreme Court's order upheld the precedence that the federal government, not the state, has sole authority in securing the national border and authorizes the federal government to cut or remove wire along the national border.¹⁸ In the weeks following the seizure of Shelby Park and the Supreme Court order, every Republican governor (except Vermont) voiced their support for Abbott and some went so far as to promise deploying some of their own National Guard troops to support Operation Lone Star.¹⁹ To counter this, Reps. Greg Casar and Joaquin Castro—both Texans—called for the president to federalize the TXNG to remove them from Abbott's control.²⁰ Adding to their voices was former Texas representative Beto O'Rourke who, on the social media platform X, wrote that "Abbott is using the Texas Guard to defy a Supreme Court ruling. When Gov. Faubus did this in 1957, Eisenhower federalized the Guard to ensure compliance with the law. Biden must follow this example of bold, decisive leadership to end this crisis before it gets worse."²¹

Historical Precedents for Federalizing the National Guard

There are two ideas that should be discussed. The first is simple. Other states can send their National Guard under state control to Texas. Congress granted consent to states to enter into mutual aid agreements, called Emergency Management Assistance Compacts, with each other in 1996. The Emergency Management Assistance Compacts law explicitly authorizes the use of a state's National Guard when a governor declares a disaster and requests support from another state.²² The purpose of these compacts is to give governors more options in times of crisis. Again, it should be noted that while federal troops could support in a crisis, they cannot perform law enforcement in the United States. Furthermore, federal troops work for federal commanders, but other state National Guard troops would report to the governor of the supported state.

The second point needs more explanation and historical context. The president can "call forth" the National Guard of any state or territory to enforce federal authority or suppress domestic violence. There are only four precedents within the last century where a president has taken the National Guard away from a rogue governor. These instances occurred in the decade after the U.S. Supreme Court declared in 1954 that racially separate schools, no matter how "equal," were unconstitutional in *Brown v. the Topeka Board of Education*.²³ It took a couple of years for the majority of states to

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comply with the court's monumental decision and, in some cases, there was minor violent opposition. In fact, it was just two years after the decision that the governors of Kentucky and Tennessee used their National Guard troops to assist in school desegregation.²⁴ But the most familiar instances of National Guard troops in school desegregation revolve around the few governors who chose to defy the law.

The first and most famous instance occurred in Little Rock, Arkansas, in 1957. It was on this occasion that President Dwight D. Eisenhower called forth the Arkansas National Guard to remove them from under the power of the Arkansas governor who sought to keep public schools segregated. Eisenhower set a precedent in dealing with intransigent governors that was only followed by one other. President John F. Kennedy called forth the Mississippi National Guard in 1962 and the Alabama National Guard twice in 1963 to enforce compliance with the law.

All four of these instances have had incredible lasting impacts, not only in use of the National Guard but also in American society. All four revolved around

Arkansas soldiers from the 101st Airborne Division escort Black students in September 1957 to Central High School in Little Rock, Arkansas, after the state's governor, Orville Faubus, tried to enforce segregation. (Photo courtesy of the National Archives)

the protection of equal rights of American citizens. Politicians and journalists tend to focus on the first instance and fail to tie the 1957 federalization with the other three instances.²⁵ It is worth delving into the details of Eisenhower's decision to understand the similarities and differences between the events of 1957 and 2024.

Arkansas's Governor Faubus Defies the Supreme Court

Arkansas governor Orville Faubus chose to make a defiant stand for racial segregation at Little Rock in 1957, openly defying the court's decision. Faubus employed his state's National Guard to keep nine Black students from attending Little Rock Central High on the first day of school (4 September 1957).²⁶ Faubus told the public and Eisenhower that he was merely



trying to keep the peace as a mob of segregationists gathered outside of the school.

Federal district Judge Ronald Davies weighed in, declaring that the governor had defied the law in obstructing integration and issued a 20 September injunction ordering Faubus to remove the National Guard and refrain from any further obstruction. Faubus continued to defy the law, placing Eisenhower in a position where he had to act.

Eisenhower had one option to remove the National Guard from Faubus's control. The president could issue an executive order based on the Insurrection Act of 1807, codified in Title 10 of the U.S. Code under sections 332 to 334 (since renumbered as 252 to 254). Section 332, regarding the "use of militia and armed forces to enforce Federal authority," authorized the president to call into federal service the National Guard of any state "and use such of the armed forces, as he considers necessary to enforce those laws" when he considered that unlawful obstructions made it impracticable to enforce the law by ordinary judicial proceedings.²⁷ Section 333, "Interference with State and Federal Law," similarly authorized the president to use the militia or the armed forces, or both, to suppress domestic

Soldiers and tents are seen on a field across from Baxter Hall 4 October 1962 where James Meredith lived. Meredith was the first Black student to attend the University of Mississippi. President John F. Kennedy activated the entirety of the Mississippi National Guard to quell violence. (Photo by Marion S. Trikosko via the U.S. News & World Report Magazine Photograph Collection at the Library of Congress)

violence or conspiracy, which "hinders the execution of the laws" and when "any part or class of its people is deprived of a right, privilege, immunity, or protection named in the Constitution."²⁸ Section 334 gave the president authority to order the mob to disperse.²⁹

Invoking these sections of the Insurrection Act, Eisenhower issued Executive Order 10730 on 24 September, the first federalization of the militia for domestic disturbance since 1867, and the first time the president used an executive order and a proclamation to call out troops for this purpose.³⁰ The order directed the Arkansas National Guard into federal service and to "take all appropriate steps to enforce any orders of the United States District Court" with respect to the enrollment and attendance at Little Rock's public schools.³¹

The unprecedented executive order placed the Arkansas Guardsmen in a dilemma where they had to



choose to either follow orders of their governor or their president. Since the 1933 National Guard Mobilization Act, National Guard troops have been an integral component of the U.S. Army and have had a dual-oath to their governor and to the president.³² The oath, which has only had minor revisions since 1933, states that an officer will “support and defend the Constitution of the United States and the Constitution of the State of _____ against all enemies, foreign and domestic; that I will bear true faith and allegiance to the same; that I will obey the orders of the President of the United States and the Governor.”³³

The decision must have weighed heavily on the Arkansas adjutant general, Maj. Gen. Sherman T. Clinger. The oath does not raise the obligation to obey the orders of the president over the governor, but it states above all that an officer will support and defend the constitutions of the United States and the state. What may have convinced Clinger to obey the president over the governor was the fact that the courts had declared the governor’s actions unconstitutional. While neither the governor nor lieutenant governor responded to Eisenhower’s order, Clinger did and proved that National Guard troops would obey the president.³⁴ The

Attempting to block integration at the University of Alabama on 11 June 1963, Alabama Gov. George Wallace stood defiantly at the door while confronted by Deputy U.S. Attorney General Nicholas Katzenbach. Wallace’s adjutant general would order his removal, stating, “It is my sad duty to ask you to step aside under the orders of the President of the United States.” (Photo by Warren K. Leffler via the U.S. News & World Report Magazine Photograph Collection at the Library of Congress)

issue may seem clear in hindsight, but desegregation was hotly contested then. Many in the Department of Defense privately feared that the National Guard troops would ignore the president’s order and continue to obey their governor. Twelve years after the Little Rock confrontation, Maj. Gen. Winston P. Wilson, chief of the National Guard Bureau, remarked on the loyalty of Guardsmen, stating that “many of them believe in segregation, but they follow orders from the president and do their duty.”³⁵

Further Federalizations of the National Guard

A U.S. president has only invoked their authority to call forth the National Guard and the armed forces to enforce federal authority under section 332 in

four instances.³⁶ All were to ensure the lawful desegregation of schools. Eisenhower paved the way with his executive order federalizing the entire Arkansas National Guard to remove them from their governor's use. President John F. Kennedy followed suit and activated a state's entire National Guard on three occasions: once in 1962 to quell violence when the first Black Mississippi college student, James Meredith, matriculated at the University of Mississippi; and twice more in 1963 to ensure school integration in Alabama.³⁷ It was in this last call up under the Insurrection Act in June 1963 that Brig. Gen. Henry V. Graham, a career Alabama Guardsman who was once the governor's adjutant general, stood before his governor who was blocking the entrance of two Black students from the University of Alabama, saluted and said, "It is my sad duty to ask you to step aside under the orders of the President of the United States."³⁸ The National Guard followed the orders of the president on all four occasions where the president took them from under the governor's control.

Differences in the Supreme Court Decisions of 1954 and 2024

While there are some similarities between today, mainly defiant governors making a stand for state sovereignty or state's rights, there are many differences. The main difference is that the Supreme Court in 1954 issued a substantial decision that declared segregation unconstitutional. A federal judge then removed any ambiguity by declaring that Faubus was obstructing justice. The Supreme Court's order in January 2024 consisted of only three sentences, two of which merely stated that the case was brought to the court and that four members disagreed. The court did not even take the time to write an opinion. The only meaningful sentence dryly stated, "The December 19, 2023 order of the United States Court of Appeals for the Fifth Circuit, case No. 23-50869, is vacated."³⁹ This is hardly the same conviction produced by the 1954 Supreme Court.

As Joseph Nunn, of the Brennan Center for Justice, noted shortly after the decision, "The Supreme Court has not ordered Texas to do anything. Rather, the Court has simply vacated the Fifth Circuit injunction that barred CBP agents from cutting through Texas's razor wire. CBP is now free to cut through the wire,

but Texas is equally free—at least under the Supreme Court's ruling—to put it back up. There is currently no court order in place for Texas to violate."⁴⁰

The most important argument for calling forth the National Guard was for the president to affirm the power of the court and reassert federal responsibility over the border. That would be a long struggle, however. Even after keeping the Arkansas National Guard on federal orders for eight months, it did not completely resolve segregation. Within months after the federalized troops withdrew, Faubus closed all four of Little Rock's public high schools in 1958, in order to circumvent the court's order.⁴¹ An entire year existed where Black children and the majority of White children in the city did not attend school. The only option Faubus left for White families was to enroll their children into private schools, which he incorrectly claimed the federal government could not force to integrate.⁴² The struggle for federal supremacy regarding integration continued until 1963, spanning nearly six years and two very different presidential administrations under differing parties.

An additional problem with calling forth the TXNG would be that the president may have had to call forth the National Guard of other states, like Florida, whose governor promised to send one thousand troops to Texas for Abbott's use. Eisenhower and Kennedy were able to deal with one state and its National Guard at a time.⁴³ The situation in Texas involves not only the TXNG but also other contributing states' National Guards as well.

Eisenhower's decisive action in 1957 did not end the standoff immediately and was only used as Eisenhower's last resort. Nunn described the president's option of invoking the Insurrection Act as using a "nuclear bomb" to show its last resort use and political fallout.⁴⁴ However, unlike the actual nuclear bombs that ended the Second World War, Eisenhower's use of the Insurrection Act did not end the war on segregation. The Arkansas governor found other ways to challenge federal authority and when he was finally subdued, Kennedy had to federalize troops in two more states to assert it. These four instances should not be taken individually. Another way to frame the past is that a moderate Republican Eisenhower and a Democratic Kennedy used the federalization of the National Guard sparingly as a tool

to combat conservative governors in Southern states over the course of six long years who were in clear violation of specific law. The historical evidence shows

that, while it is well within the president's constitutional powers to federalize a state's National Guard to uphold the law, it is an uncommon practice. ■

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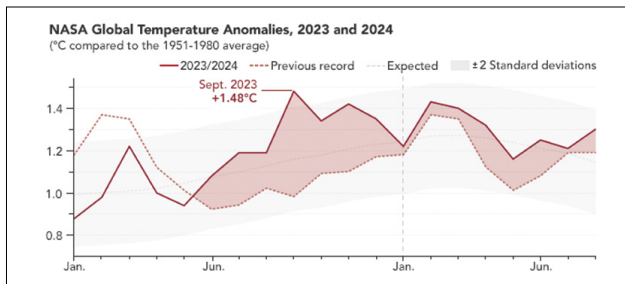
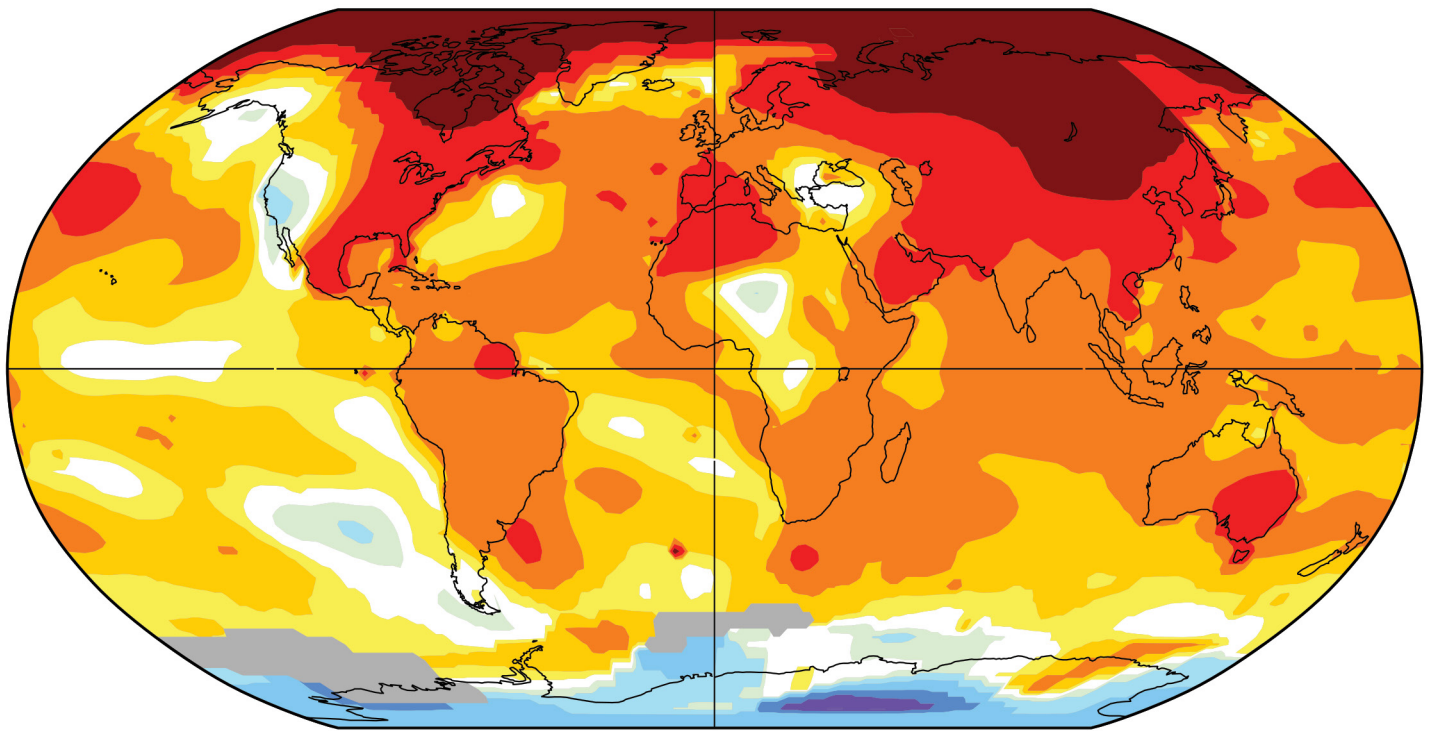
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In 2024, global temperatures for June through August were the hottest on record, narrowly topping the same period in 2023. The exceptional heat extended throughout other seasons too, with global temperatures breaking records for fifteen straight months from June 2023 to August 2024. The chart to the left shows how global temperatures calculated from January 2023 to August 2024 differed from NASA's baseline (1951–1980). Although temperature anomalies in 2024 were closer to past anomalies, they continued to break records through August 2024. (Map and chart from the NASA Goddard Institute for Space Studies)

Preparing for Hot Conflicts

Army Training and Operations in a Warming World

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July 2024 was the warmest month ever recorded since widespread reliable recordkeeping began 173 years ago, and the world is now approximately 2.1°F warmer compared to average temperatures between 1850 and 1900.¹ Extreme environmental heat presents a growing challenge to service member health and performance during operations and training. U.S. Secretary of Defense Lloyd Austin has called climate change an “existential threat” to national security—a strong statement from a senior military leader.² Operationally, an 82°F day may be thought to have no more impact than an 80°F day. However, small changes to average *global* temperatures create much larger variations in extreme local temperatures, evidenced by worldwide recent “record-shattering” new extreme temperatures.³ In the diverse regions where the Army operates, there is high confidence that hotter *local* temperatures will continue to occur more frequently and be more extreme than previously recorded.⁴ Therefore, it is imperative that military leaders understand how the future operational environment will be impacted.

Global climate change, a concept difficult to appreciate in a practical context, will affect the day-to-day training and operations for soldiers in numerous ways. Here, we present an overview of how extreme temperatures impacted U.S. and allied operations over the last twenty years. Additionally, we provide an analysis of the relevance of extreme temperatures to the individual soldier and the operational Army. This analysis predicts that extreme temperatures will vary in intensity locally and heat waves will increase in frequency and intensity until midcentury and likely much longer.

This article is not a treatise on the science behind climate change, nor does it describe all the ways a changing climate will affect national security. These topics are covered at length by others; for military-relevant details, the reader should begin with NATO, Department of Defense (DOD), and individual service documents (e.g., the 2021 “DOD Climate Adaptation Plan,” 2022 *United States Army Climate Strategy*, or 2023 *NATO Climate Change and Security Impact Assessment*).⁵

For simplicity, this article uses the broad term “heat casualty” to refer to soldiers experiencing heat illness during operations or training. Various classifications of heat illnesses, their causes, and preventative measures are described later in the article.

Operational Implications of Extreme Heat

A worst-case heat risk scenario might be a short-notice deployment to an austere urban environment during a humid heat wave. Maximum summer temperatures in many cities already exceed 120°F, and heat-island effects can compound this by adding more than 10°F in some urban locations.⁶ Acclimatization by progressively increasing work effort in new, hot environments over two weeks is recommended to reduce heat casualties. However, initial response forces likely do not have time for structured acclimatizing to local conditions. Air conditioning in the deployed environment may also be nonexistent, especially if the local power grid is destroyed, leaving just the handful of environmental control units brought with the initial force. Operational considerations likely will require the initial responding force to secure key sites and patrol wearing full kit. Although nighttime temperatures may bring some relief, and operations are likely to be conducted at night whenever possible, this presents a trade-off with rest cycles as sleeping during the daytime heat can impact sleep and recovery.⁷ In such a scenario, heat quickly becomes a critical operational factor.

The Army has guidelines for operating in the heat, but these work-rest cycles designed to maximize performance while also mitigating against heat casualty risk cannot be followed if the military situation does not allow it.⁸ This complication was observed by a British military doctor in southern Iraq who described that although temperatures well exceeded thresholds to trigger work-rest cycle guidelines during most of the day, military necessity required continuous operations. Even low-risk duties performed in extreme temperatures became high risk as pragmatism and an emphasis on treating heat casualties effectively overtook work-rest cycle recommendations as the way to balance operational necessity with heat casualty risk.⁹

Operational impacts of such a scenario extend to mission planning. Patrolling with gear or other “heavy work” can inhibit the body’s ability to shed heat fast enough to prevent core temperature from rising when wet bulb globe temperature (WBGT) index exceeds about 78°F.¹⁰ At this temperature, the Army’s heat stress control manual recommends continuous heavy exertional efforts such as patrolling be limited to two hours or less. Such limitations might not be practical

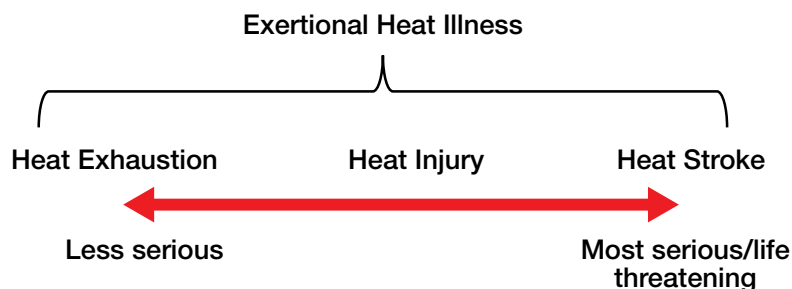
Table 1. Select Resources Describing the Effects of Heat on Recent U.S. and Allied Military Operations

Study or Report Name	Study / Operation Location	Country	Findings / Discussion
Military Surveillance Monthly Report	U.S. Installations (later years include CENTCOM specific breakdown)	USA	Annual descriptions of heat illness rates in the U.S. military.
Heat Stress Mitigation for Leopard 2C Tank Crews	Afghanistan	Canada	Tank crew members are likely to be "operationally impaired" when operating in hot conditions around Kandahar, AF, without microclimate cooling inside the vehicle.
Heat Illness Experience at BHM Shaibah, Basra, during Operation TELIC: May-June 2003	Northern Kuwait and Southern Iraq	United Kingdom	622 patients (56% of the role 3 admissions) had heat-related illness at British Military Hospital Shaibah over a 9-week period in summer 2003.
Heat Illness in the Army in Cyprus	Cyprus	United Kingdom	Soldiers rotating into Cyprus for training had higher rates of heat illness, with inadequate acclimatization being the leading factor, especially in the summer. Rotational units did not have time to fully acclimatize, although heat injuries were generally mild.
EX SAIF SEREEA II - The Field Hospital Clinical Report	Oman	United Kingdom	Heat illness was the second-greatest cause of hospital admissions, although cases were generally mild.
Effects of Heat: UK Exercise Saif Sareea 3 and Interpreting Military Climatic Guidance	Oman	United Kingdom	Twenty-four heat-related illnesses presented to the role 1 reception station; organic cooling equipment in the role 1 was unable to sufficiently cool the station and the purchase of supplemental air conditioners was required.
Heat Illness on Operation Telic in Summer 2003: The Experience of the Heat Illness Treatment Unit in Northern Kuwait	Kuwait	United Kingdom	A heat illness rate of 50/1000 deploying service members was observed over a one-month period during which British service members rotated into Iraq to relieve the initial occupation forces.
The Role of the Physician in Modern Military Operations: 12 Months Experience in Southern Iraq	Iraq	United Kingdom	Medical admissions during the first 12 months of the Iraq war were generally split equally between medical and surgical admissions except during the summer when new, unacclimatized troops arrived into the theater and medical admissions related to heat illness rose sharply. Heat illness was the second greatest cause of medical admissions, with an average in hospital stay of 2.9 days.
A 2-Year Review of the General Internal Medicine Admissions to the British Role 3 Hospital in Camp Bastion, Afghanistan	Afghanistan	United Kingdom	Heat illness was the second-greatest cause of service member admissions to the internal medicine section at this role 3.
Injury and Illness Casualty Distribution Among U.S. Army and Marine Corps Personnel During Operation Iraqi Freedom	Iraq	USA	Heat injury accounted for 1.2% of all non-battlefield injuries requiring hospitalization during OIF1 and OIF2.
<i>Vanguard of Valor Series, Volumes I-III</i>	Afghanistan	USA	Official historical accounts of tactical actions in Afghanistan. In many accounts, the effects of heat on operations is described, such as small units becoming operationally ineffective due to heat casualties and the deliberate decision to slow or shorten movement through rough terrain to prevent heat injury.
U.S. Marines in Battle: Al-Najaf	Iraq	USA	Official historical accounts of operations during August 2004 in the city of Al-Najaf. Describes operational decisions made to prevent heat casualties during the battle.

(Table by authors)

for an initial responding force as exceeding 78°F on the WBGT index is common even in current non-heat wave summer conditions. For example, since 2009, Fort Moore in Georgia experiences about half of all hours in July and August at or above this threshold.¹¹ Guidance suggests additional constraints on military

operations at higher temperatures, recommending time spent on continuous patrol be less than one hour when the WBGT exceeds 88°F. Above 90°F, "training may require extreme modifications or temporary suspension."¹² The challenge is that some activities, such as security, *cannot* be suspended. Thus, operations in



(Figure by authors; modified from Lt. Col. [Dr.] DeGroot's presentation to the 2024 Army Heat Forum)

Figure. Types of Exertional Heat Illness Common in Soldiers

extreme temperatures struggle to balance the risk of heat casualties with mission requirements.

In nonpermissive environments, heat casualty prevention is deprioritized compared to immediate military necessity, which may increase the risk for larger numbers of heat casualties. A NATO report found that in August 2004, 10 percent of the force engaged in Najaf, Iraq, became “incapacitated from heat stress and [were] evacuated.”¹³ During that battle, temperatures reached 130°F, and thirst was at times a higher priority than enemy fire. Tanks crews rotated by section to recover from the heat and were administered intravenous fluids to help prevent heat casualties, with some crew members hanging two or three IV bags inside their tanks while fighting.¹⁴ Similar situations were observed during dismounted engagements in Afghanistan, where maneuver was slowed by heat and necessary treatment of heat casualties.¹⁵

Vehicle crew members, who compared with dismounted soldiers operate with relatively less physical exertion, can also become heat casualties. A 2007 Canadian Army study found expected temperatures inside the Leopard 2C tanks operating around Kandahar to be higher than 145°F, conditions that would render the crew “operationally impaired within 1-2 hours.”¹⁶ Microclimate cooling using air-cooled vests was recommended to improve operational effectiveness, but whole-vehicle cooling was considered impractical. In armored personnel carriers, dismounts may not have access to cooling vests and are likely to remain challenged by high temperatures during transport.

In permissive or semipermissive environments, heat illness may contribute to a substantial portion of overall casualties. During 2003 in southern Iraq, 161 of 766 British soldiers admitted to the field hospital for

heat illness were evacuated back to the United Kingdom, with this “large number of personnel being evacuated [causing] concern amongst the operational staff.”¹⁷ In Afghanistan, heat illness was the second most common reason for internal medicine admissions at the Role 3 British hospital in Camp Bastion.¹⁸ Based on British experiences, during summer expeditionary operations in austere environments “approximately 50 per 1,000 troops deployed” can be expected to be heat casualties in the first ten to fourteen days

of operations.¹⁹ This rate would result in the temporary loss of more than a company equivalent of soldiers during the first two weeks of a brigade-size response. Most heat casualties can expect to return to duty but require a period of recuperation; although nearly 80 percent were discharged back to their unit, the average hospital stay for a British heat casualty during the first twelve months of conflict in Iraq was 2.9 days followed by an additional limited-duty profile period.²⁰ Table 1 provides a list of select studies and reports that describe heat casualties in military operations.

How Extreme Heat Negatively Affects Soldier Health and Performance

“Heat illness” is the general term in medical literature for negative heat-related health outcomes. Exertional heat illness exists on a spectrum with myriad signs and symptoms (see the figure).²¹ Heat exhaustion is considered the least severe form of exertional heat illness, and soldiers typically return to duty after a few days of recovery. Heat injury is characterized by hyperthermia, that is, an elevated body core temperature, with evidence of end-organ damage (e.g., kidneys, liver, muscle, gastrointestinal) and may require two weeks or more for recovery depending on the extent of the injury. Heat stroke is a severe and potentially fatal form of exertional heat illness that presents with hyperthermia (usually > 104°F rectal temperature) and central nervous system disturbances and may cause multiorgan damage or failure. After a heat stroke, Army Regulation 40-501, *Standards of Medical Fitness*, proscribes a ten-week return-to-duty process that may be lengthened (or shortened) based on medical provider judgment.²²

Table 2. Wet Bulb Globe Temperature (WBGT) Index

Heat Cat	WBGT Index, °F	Easy Work		Moderate Work		Heavy Work		Very Heavy Work	
		Work (min)	Water Intake qt/hr	Work (min)	Water Intake qt/hr	Work (min)	Water Intake qt/hr	Work (min)	Water Intake qt/hr
1	78° - 81.9°	NL	1/2	NL	3/4	100	3/4	45	3/4
2	82° - 84.9°	NL	1/2	NL	1	70	1	40	1
3	85° - 87.9°	NL	3/4	NL	1	60	1	25	1
4	88° - 89.9°	NL	3/4	180	1 1/4	50	1 1/4	20	1 1/4
5	> 90°	NL	1	70	1 1/2	45	1 1/2	20	1 1/2

Cat: Category | min: minutes | qt/hr: quart per hour | NL: no limit | WBGT: wet bulb globe temperature

Easy Work = weapons maintenance, marksmanship training, drill and ceremony

Moderate Work = patrolling with a 30-pound load, low and high crawl, digging a defensive position

Heavy Work = patrolling with a 45-pound load, 4-person litter carry (180 pounds), jogging 4 mph

Very Heavy Work = 2-person litter carry (150 pounds), move under direct fire, obstacle course

(Table by Defense Health Agency)

Every soldier has the fundamental limitation of being human, subject to a physiological ceiling for adapting to extreme environments that cannot be overcome by fitness or motivation. Soldiers must prevent their body core temperature from rising excessively or risk death by heat stroke. This can become challenging when performing tasks such as patrolling, conducting physical training, and other daily work. Metabolic rates increase in proportion to exercise intensity during physical activity, with some metabolic energy converted into mechanical energy but most released as heat produced by working skeletal muscles during exercise.²³ Working at the same rate, a soldier with better movement economy, not aerobic fitness, will produce less metabolic heat and have smaller heat storage compared to a less efficient counterpart.²⁴

Increased heat storage during physical work challenges soldier health and performance. During physical work in hot environments, cardiac output (i.e., the amount of blood pumped by the heart per minute) increases to support the metabolic demand of working muscles.²⁵ However, to support thermoregulation in these conditions, blood flow is also redirected away from visceral organs to support thermoregulation and heat loss mechanisms.²⁶ The risk of non-heat stroke end-organ damage is increased with hyperthermia and dehydration, believed to primarily occur due to this reduced blood flow to these vital organs.²⁷ During exertional heat stroke, elevated body temperature is accompanied by central nervous system dysfunction (e.g.,

delirium and combativeness), often with end-organ damage similar to that observed with heat injury.

Unfortunately for soldiers, the laws of physics limit heat loss rates when high temperatures occur with high humidity. Sweating is the most effective form of heat dissipation, with heat drawn from the skin as sweat evaporates. The ability to lose heat via sweating can be impaired by high humidity, low air velocity, or clothing, especially impermeable clothing like chemical, biological, radiological, nuclear, and explosive (CBRNE) protective equipment. This creates conditions under which unrestrained increases in body core temperature occur that cannot be compensated by physiological processes like sweating, and the risk of exertional heat illness is significantly increased.

In temperatures measured by the wet-bulb thermometer—which, like a sweating human, is cooled by evaporation—work becomes difficult above a wet bulb temperature of 88°F and potentially fatal at temperatures not much higher (see table 2).²⁸ Historically, a wet bulb temperature of 95°F was proposed as the theoretical thermal human survival limit. At this threshold, heat loss from the body effectively stops but heat storage from the environment and metabolism continues, leading to heat illness.²⁹ Recent studies have challenged this 95°F limit by finding that much lower wet bulb temperatures (~81°F) create conditions under which heat loss can't keep pace with heat generated from low intensity activities like walking.³⁰ To account for the cooling power of sweat and the influence of humidity,



along with the need to consider solar radiation (which adds an additional heat burden) and wind speed (which can promote cooling), the military uses the WBGT index to classify dangerously high heat. Spikes in soldier heat casualties have been associated with periods of raised humidity even as ambient temperatures remained relatively constant, and humid Army installations in the South and Southeast routinely have greater rates of heat illness than hotter but drier locations in the desert Southwest.³¹

As body core temperature rises, especially with intense physical activity during high WBGT, heat stroke risk is increased. During training, heat stroke is almost exclusively of the exertional variety. Pacing strategies, such as slowing down or utilizing work-rest cycles, can effectively mitigate excessive heat strain and help to prevent exertional heat stroke.³² However, these strategies are not always an option. No soldier wants to quit on their teammates or themselves, leading to the paradox that high motivation is a heat stroke risk factor in soldiers.³³ Timed ruck marches and runs are some of the events with the highest incidence of heat casualties.³⁴ Fear of falling out, getting cut from a course for missing a

Lance Cpl. Andrew Howe of Company C, 1st Battalion, Royal Anglian, is given fluids intravenously by a combat medic as treatment for heat exhaustion in a ruined compound during a firefight with Taliban fighters in Kajaki, Helmand Province, Afghanistan, on 6 July 2007. (Photo by Jason P. Howe)

standard, or motivation to lead from the front can cause a soldier to override their natural protective instinct to slow down. Fort Moore, Georgia, has the highest reported incidence of heat stroke across all U.S. military installations—fifty-six cases in 2023—due to a combination of environmental conditions (e.g., temperature and humidity) and motivational factors (training effort during infantry, armor, airborne and Ranger courses). Of note, the higher incidence of exertional heat stroke at Fort Moore is partly from the enhanced recognition and accurate reporting of cases due to ongoing training and support provided by the Army Heat Center within Martin Army Community Hospital.

During operations, nonexertional heat illness contributes to a large proportion of heat casualties, especially during the first couple weeks deployed in a hot environment. As the name suggests, these heat illnesses

aren't associated with heavy work, and acclimatization and environmental factors are more relevant than working effort. The British Army, analyzing heat casualties during operations in Oman, Afghanistan, and Iraq, found nonexertional heat illnesses accounted for most (up to 86 percent) cases observed in soldiers recently arriving to the area of operations.³⁵

An Ever-Hotter Battlefield

Climate change impacts in one part of the world can lead to ripple effects around the world, affecting U.S. security and economic interests. Climate change is expected to contribute to political and social instability and, in some cases, conflict, affecting a wide range of U.S. national security interests.³⁶ Given the Army's worldwide presence, soldiers will be required to operate in parts of the world where the impacts of climate change are most severe. Average global temperatures have increased by over 2°F, and this increase elicits greater temperature extremes.³⁷ Heat waves will significantly affect future Army operations as they increase in frequency, duration, and intensity.³⁸ Presently, heat waves across the United States are twice as common and the heat wave season is thirty days longer than it was in the 1980s.³⁹ Even under relatively optimistic projections, heat waves like those that killed tens of thousands in Europe in 2003 and Russia in 2010 are likely to occur in the United States in the coming decades and more often in other parts of the world.⁴⁰ Worldwide, heat waves with an intensity that occurred on average once every ten years will be 5.6 times as likely and nearly +5°F more intense (above already hot historical maximum temperatures) when the world experiences an additional 2°F of warming.⁴¹ Put plainly, the frequency of exceptionally hot days is rising much faster than gradual warming of global temperature would suggest.

Heat waves directly impact operations. Black flag days, when the Army's top heat safety threshold is exceeded, result in training modification or rescheduling.⁴² In summer 2023, Joint Base San Antonio, Texas, experienced seventy-four days of 100+ degree weather, and over *half* of all hours in the month of July experienced temperatures exceeding the "heat risk" threshold set by the National Weather Service.⁴³ Combat medic trainees removed vests and helmets as temperatures climbed and afternoon missions were cancelled.⁴⁴ At the Joint Readiness Training Center in Louisiana,

the most common summer training injuries that 1st Battalion, 5th Aviation Regiment's medevac unit responds to are heat related.⁴⁵ Over the last five years, 84 percent of the installations tracked by the Defense Centers for Public Health had more exceptionally hot heat risk days than the fifteen-year average.⁴⁶

Abroad, heat waves increasingly affect areas critical to U.S. security interests, including where soldiers are currently or have recently deployed. Last year, Basra exceeded 123°F, and Baghdad reached 120°F. A 2024 RAND corporation study points to the multiple recent heat waves in Basra and Baghdad as a contributing factor to insecurity and rioting. The study finds parts of Syria and Jordan may experience "extreme danger" heat classification, defined as periods when heat stroke is highly likely, for fifteen or more days per year by midcentury. In fact, "nearly all countries in the [CENTCOM] AOR are increasingly exposed to extreme heat," and Iran may experience an incredible thirty additional days at the extreme danger threshold.⁴⁷ Globally, at least twenty-three countries have already recorded maximum temperatures above 122°F.⁴⁸

Ever increasing temperatures will be the norm for the foreseeable future. Heat waves are predicted to significantly increase over most of Africa, South America, and Southeast Asia in the near term, with heat wave events rare or unprecedented today becoming normal in some future scenarios.⁴⁹ Estimates using current warming trends project an additional 2.0–4.5°F increase in global average temperature this century above the approximately 2°F already experienced.⁵⁰ At a global 3.6°F increase (approximately half of which has already occurred), the frequency of extreme heat waves is expected to double over most of the world and affect nearly 40 percent of world population once every five years.⁵¹

Adapting to Ensure Future Readiness

Military operations won't stop on account of extreme heat, yet human physiology limits how far a soldier can push before becoming a heat casualty. Future conditions will increase challenges for soldiers operating during heat waves more intense than those experienced during home station training. The remainder of this article proposes adaptation measures to ensure the Army can fight and win wars in the future, hotter operational environment.

To an extent, adaptations already occurring have proved successful in reducing the most severe heat illness. In 2022, U.S. Army Training and Doctrine Command (TRADOC) recorded the lowest number of heat strokes in the last ten years (ninety total), and 2023 had the third lowest (111), even as those years had the seventh and third highest rate of heat illness overall.⁵² This reduction to the most severe form of heat illness during training is likely due to a combination of safety measures, policies, command emphasis, and widespread adoption of techniques like arm immersion cooling.⁵³ Perhaps the best example of heat stroke mitigation is the 47 percent decrease in this condition at Fort Moore, Georgia, since the Army Heat Center stood up there in 2019.⁵⁴ Similar efforts at other training installations may yield similar results for other training programs.

While heat illness is an acknowledged and mitigated risk in TRADOC, training programs in TRADOC are highly structured and facilitate relatively easy adoption of risk mitigation practices. Less attention has been given to how the operational Army can adapt to rising heat. Rapid, initial responses during real-world operations have less flexibility to incorporate safety precautions implemented in training. Even the Army's medical manual on heat illness prevention acknowledges "work cycles should be customized for the environment, task, and military situation *when possible* [emphasis added]."⁵⁵

The most basic, and one of the most

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effective, risk mitigation method is to address individual risk factors associated with heat illness. For soldiers, modifiable risk factors include physical fitness and body mass. Higher body mass index increases risk for exertional heat stroke, while more fit individuals have lower risk of heat illness.⁵⁶ The physiological reasons are many, but in general terms, excess body fat impairs heat loss and increases heat storage, while increased cardiovascular fitness is associated with increased sweat rate and blood flow that can help shed excess body heat.⁵⁷ Three other individual factors are worth mentioning: hydration, medication, and motivation. Unsurprisingly, a dehydrated soldier is more susceptible to heat illness and end-organ damage, although hydration alone does not prevent it.⁵⁸ Medication is more complicated and may not be controllable if a soldier requires certain prescriptions, but it is important to note that some classes of common medications can reduce the body's ability to shed heat.⁵⁹ Lastly, high internal motivation to excel in soldiers has recently been demonstrated to be an important risk factor for exertional heat stroke, especially during high risk events such as timed runs or rucking.⁶⁰

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For units, the most effective available adaptation is acclimatizing all members to the heat. Ten to fourteen days of progressively longer work in the heat promotes physiologically protective adaptations within the body. The rates of these cardiovascular and thermoregulatory adaptations vary, but maximum benefits are achieved after about the second week, and fit soldiers acclimatize fastest.⁶¹ In some military situations, acclimatization can be challenging or even impossible; for example, it would be impractical for paratroopers stationed at Joint Base Elmendorf-Richardson, Alaska, to properly heat acclimatize prior to a jump onto an airfield in tropical Guam (as was conducted in June 2020). Acclimatization efforts, typically a structured program of physical training/work in the heat, must be balanced against predeployment tasks, time available, and the risk of overtraining. NATO recommendations call for two hours per day of cardiovascular endurance exercise in the heat to achieve acclimatization.⁶² Despite the challenges, acclimatization programs should be conducted whenever possible before deploying to hot environments. If unable to acclimatize predeployment, the first two

Soldiers from 1st Battalion, 501st Parachute Infantry Regiment, assist a fellow soldier who suffered heat stroke 24 August 2007 while conducting a foot patrol south of Baghdad during Operation Gecko. (Photo by David Furst, Agence France-Presse)

weeks in the hot environment should be structured to provide gradual acclimatization whenever practical.⁶³

Operationally, units can adapt to extreme heat by operating primarily at night. During extreme heat waves, operating at night may be the only practical way to reduce an unacceptably high risk of heat casualties during missions. Fortunately, this adaptation aligns well with elements of the soldier lethality concept defined in the 2019 *Army Modernization Strategy*, specifically the development and fielding of next-generation night vision.⁶⁴ The Army has always claimed to own the night, and in future operating conditions where extreme heat degrades daytime operations, fighting at night may be the norm. Predeployment training should reflect this, with nighttime training emphasized, at least during the summer. Further, heat casualty identification and response should be a battle drill rehearsed prior to deployment by every soldier with an emphasis on a “cool first, transport

second” approach based on the need to rapidly reduce body core temperature in a heat casualty.

Logistically, adaptations for operating in hot environments fall into two categories: unit equipment and medical equipment. For unit equipment, air conditioning in vehicles must be operational. Every troop-carrying vehicle should be equipped with coolers for ice sheets. Ice making equipment should be obtained and prioritized for early deployment; it is notable the 2023 National Defense Authorization Act lists containerized ice making systems as a directed priority item for National Guard and Army Reserve procurement alongside aircraft, drones, and communication equipment.⁶⁵ Ice machines may not rank highly as a capability considered critical for operations, but they can save lives by providing the means to restock ice sheets and medical sites for fast cooling of heat casualties, particularly when ice cannot be sourced locally. Ice packs should be stocked with the assumption that use for cooling (especially in the absence of ice production) will consume greater than normal quantities of this mundane medical supply in hot environments, and a platoon can more easily distribute many ice packs among soldiers instead of carrying larger ice blanket coolers during dismounted operations.

For the medical community, the British example of an enhanced Role 1 in Kuwait is illuminating.⁶⁶ This enhanced Role 1 included a heat illness unit to support troops deploying to Iraq in summer 2003 that was equipped with nonstandard items like spray bottles and electric fans to cool heat casualties. The heat illness unit handled three hundred heat-related casualties in one month of operation and provides a template for modifying U.S. Role 1 facilities deploying to hot environments. During operations in Oman, British medical personnel discovered the environmental control unit (ECU) organic to the medical tent was unable to adequately cool the interior, resulting in temperatures regularly exceeding 86°F; local air conditioners were purchased to supplement the inadequate ECU.⁶⁷ Similarly, British Land Rover battlefield ambulances used in Kuwait were unable to cool the patient compartment below 95°F even when operating at full capacity and were supplemented with a nontactical air-conditioned vehicle. While it is unclear if U.S. ECUs and field ambulances have more robust air conditioning systems, effective air

conditioning must be a consideration for medical teams deploying in hot environments.

During severe future heat waves, current equipment may prove inadequate. Humid heat approaching the limits of human tolerance may already be occurring for short durations in a few hot coastal locations; some future projections anticipate this condition will regularly occur in parts of the world soon after 2050.⁶⁸ In such conditions, more extreme adaptations may need to be developed. One potential is personal biometric sensors. Wearable devices to predict imminent heat stroke have already been developed by the U.S. Army Research Institute of Environmental Medicine and employed in select training groups.⁶⁹ Advanced development of such sensors could integrate directly into a soldier’s equipment, allowing real-time assessment of core temperature and predicting imminent heat casualties. Understanding just how hard a unit can push before taking heat casualties may extend the operational range of soldiers. Coupled with personal cooling devices, future soldiers may be able to operate in conditions that an adversary can’t, gaining a distinct tactical advantage. Although variations of personal cooling technology exist, such equipment is not currently issued, and some systems (such as small personal air conditioners) are practical only with CBRNE or explosive ordnance disposal suits. Further refinement may lead to practical individual cooling systems to augment the body’s natural cooling ability. Small, unmanned ground vehicles can assist with heat management by hauling heavy supplies during patrols, reducing effort (and therefore heat generated) by soldiers who would otherwise carry the equipment. This technology is also not advanced enough for field deployment but may soon be. If operational environments reach conditions where even moderate physical effort results in a dangerous body core temperature increase, a more robotic future may be the only practical way to conduct daytime operations. It remains to be seen if such autonomous systems can be developed and fielded before soldiers must operate in such an extreme environment.

Conclusion

Climate change will continue to adversely affect temperatures, creating future operating conditions more extreme than those the Army has experience operating in. Seemingly small increasing global

temperatures will result in heat waves occurring more frequently, at greater intensity, and in parts of the world that have not experienced extreme temperatures. Although extreme heat has always been a challenge, soldiers will be expected to operate in conditions that are hotter, and hotter for longer, than historically experienced during previous campaigns or training.

Extreme heat degrades both individual soldier and unit effectiveness. Physiology, physics, and experience all show that hot—especially hot and humid—weather increases the risk for heat casualties, including potentially fatal heat stroke. For individual soldiers, both exertional and nonexertional heat illness present risk. Exertional heat illness accounts for many of the heat injuries experienced during training when working effort generates large metabolic heat loads, particularly during runs and ruck marches. Nonexertional heat illness is more common during the first two weeks of deployment in hot environments before a soldier has

acclimatized to new conditions. For units deployed or training in hot environments, operational effectiveness is degraded when heat casualties occur. The ability of tactical units to maneuver and fight is reduced during high temperatures for both mounted and dismounted soldiers. Commanders and staff may need to balance the risk of heat casualties against operational risk, especially during an initial response to hot environments when there is no time for structured acclimatization. Recent global operations highlight the risk of heat illness are not trivial, and adaptations are occurring in some training environments, but adaptations to mitigate heat risk during deployment are less developed and should be aggressively pursued. ■

The opinions or assertions contained herein are the views of the authors and are not to be construed as official or as reflecting the views of the U.S. Army, the Department of Defense, or the U.S. government.

Notes

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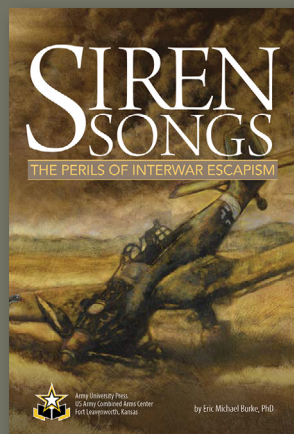
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To read this book online, visit <https://www.armyupress.army.mil/Portals/7/Research%20and%20Books/2024/Dec/Siren-Songs-Burke.pdf>.

Flowers On His Grave

Nathan Goeser

Every year my mom and I
Visit where our honored dead stay
Because my father lives there
It's where he chose to lay
We're not sad, we say aloud
"We love you, we're so proud."
I am so glad for every year we came
Because I got to hear my dad say my name.
First, he said, "Brady, I'm sorry I'm not
Going to be there to teach you a lot.
But every year if you come listen here
I'll tell you what you should learn
Until one day you begin to yearn
To share with your son or daughter
What it means to live like their father."
The next year and every year after he said,

"Make sure you say your prayers before bed."
"Before you can be the hero,
You've got to be able to count up from zero."
"Son, do your chores.
Always be nice and open doors."
"Listen up my little tyke
And I'll tell you how to ride a bike."
"Tell the truth, never lie.
You'd only make your mom cry."
"Find you a best friend.
Someone you can trust til the end."
"Be slow to act. Use your mind.
Be strong and never not kind."
"Let me tell you what's what.
As the saying goes, listen to your gut."
"Be wary of what is done at night,
So always do your business in the light."
"Sometimes you will feel fear.
Hold it... But don't let it near."
"Wow! You got a car.
What! You're now a football star!"
"If you think you're ready, Brady,
I'll tell you how to talk to a lady."

I don't know what he'll say this year
But as we reach his plot, I lean near
And say, "I'm joining the army dad.
Please don't worry about me. Be glad."
As I place the flowers on his grave,
He simply says, "Be brave my son.
Be brave."



(Photo by worm_flag via Adobe Stock)



The U.S. Military Risks Mineral Shortages in a U.S.-China War

**Lessons from World War I, World
War II, and the Korean War**

Gregory D. Wischer

Minerals are foundational in warfighting.¹ They are used in defense platforms like attack submarines, heavy bombers, and mobile missile launchers, and in munitions like submarine-launched torpedoes, air-launched standoff missiles, and ground-launched rockets and missiles. In its last three great power wars—World War I, World War II, and the Korean War—the United States lacked sizable mineral stockpiles yet was the world’s dominant mineral producer.² The U.S. military experienced mineral shortages during these wars due to increased defense production, expanded export controls, and contested shipping routes. Today, the U.S. military is at a greater risk of severe mineral shortages if a U.S.-China war were to unfold: the United States has limited mineral stockpiles; low domestic mineral production; and heavy mineral import reliance, including from its great power rival, China.

A mineral shortage can severely undermine war efforts and impact the war’s outcome. Importantly, mineral shortages can prove decisive. C. K. Leith partly attributes the loss of the Central Powers in World War I to mineral shortages, saying, “The acute shortage of essential minerals which they experienced was a very considerable factor in their ultimate defeat.”³ Similarly, John D. Morgan argues that mineral shortages undermined U.S. industrial mobilization during World War II and prolonged the war.⁴ The Allies also experienced mineral shortages in the early part of 1942, hindering defense production and bringing the Allies “dangerously close to losing the war,” according to Donald Nelson, director of the War Production Board during World War II.⁵ Critically, mineral shortages in a potential U.S.-China war may not only prolong the conflict but, if severe enough, also contribute to U.S. defeat.

U.S. Mineral Supply: Past and Present

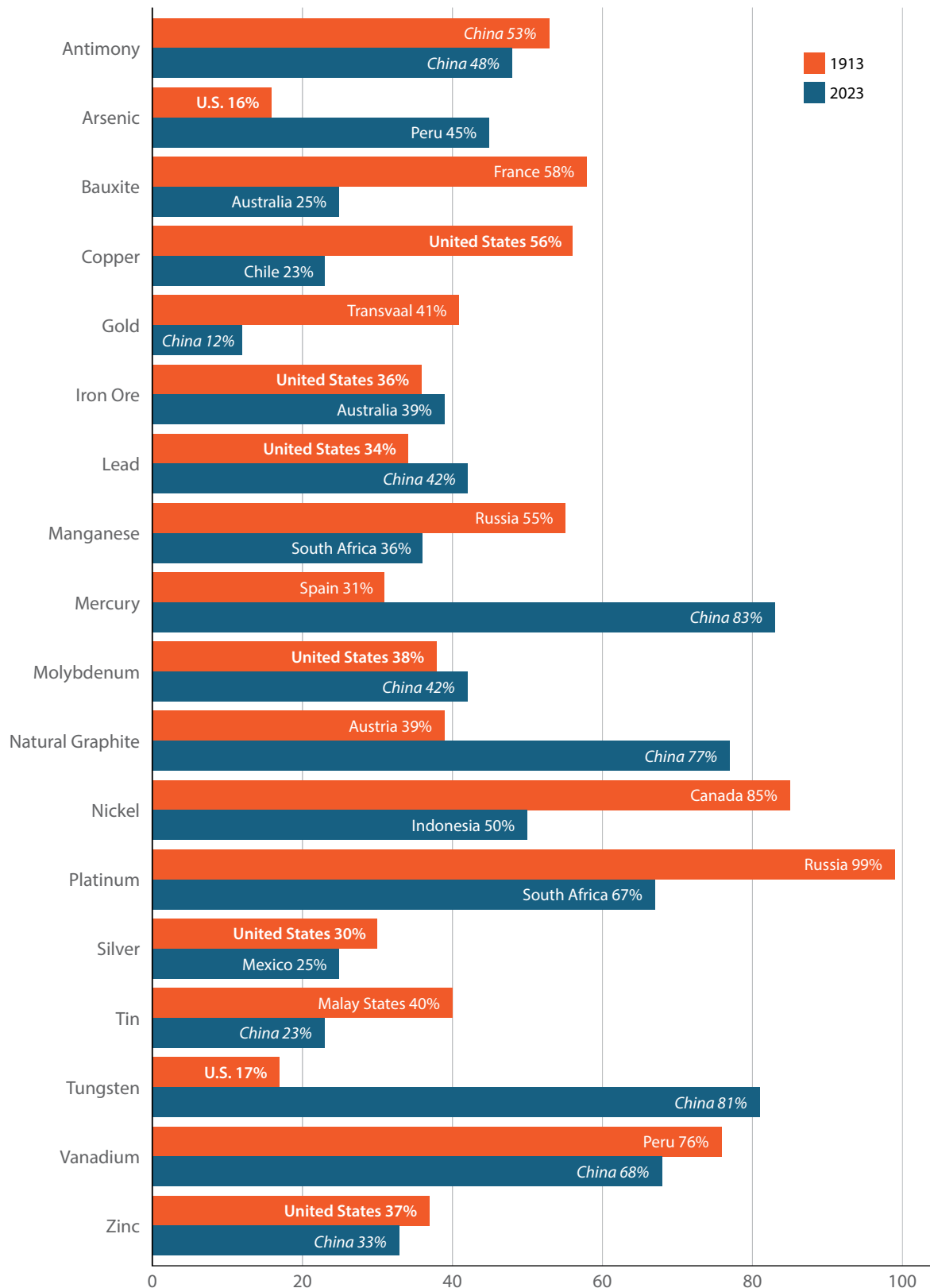
The United States was a dominant mineral producer before the two world wars and the Korean War. At the dawn of World War I in 1913, the United States was the world’s leading producer of several important minerals (see the figure).⁶ Prior to World

War II in 1938, the United States was the world’s dominant mineral producer, controlling major mineral resources across Canada, Central America, and South America.⁷ The United States was self-sufficient in many minerals before the Korean War in 1949, too. U.S. Bureau of Mines Director James Boyd declared, “During the last fifty years the United States has achieved preeminence among the nations of the world in producing, processing, and fabricating mineral raw materials.”⁸ However, before these wars, the U.S. government (USG) largely lacked mineral stockpiles because it lacked a comprehensive mineral strategy.⁹ Still, the United States was the world’s dominant mineral producer before these wars.

The United States today has limited mineral production compared to these prior periods. Moreover, the United States increasingly depends on mineral imports to satisfy its domestic mineral consumption, which indicates a decline in mineral production relative to consumption.¹⁰ From 1954 to 2019, the number of minerals for which the United States was at least 25 percent net import-reliant increased from twenty-one minerals to fifty-eight minerals.¹¹ It no longer mines many minerals that it previously did, such as gallium, manganese, niobium, or tantalum.¹² More importantly, the United States is heavily import-reliant on China for many of its minerals. For its consumption of twenty-four mineral commodities in 2023, the United States was over 50 percent reliant on minerals imported from

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Previous page: Piles of rare Earth elements both mined and refined. (Photo by Anastasiia via Adobe Stock)



(Figure by author; adapted from Joseph B. Umpleby, "The Position of the United States among the Nations," in *The Strategy of Minerals: A Study of the Mineral Factor in the World Position of America in War and in Peace*, ed. George Otis Smith [D. Appleton, 1919]; and U.S. Geological Survey, *Mineral Commodity Summaries 2024* [U.S. Geological Survey, 2024])

Figure. Leading Mineral Producers, 1913 and 2023

China.¹³ Like the prior periods preceding conflict, the United States has limited mineral volumes in the National Defense Stockpile.¹⁴ In 2023, the Department of Defense (DOD) estimated that, in a hypothetical war with China, the U.S. military would have shortages in sixty-nine materials.¹⁵ Therefore, the United States today has limited mineral production and mineral stockpiles—a more precarious U.S. mineral position versus prior periods before great power wars.

Mineral Shortage Risks in War

The U.S. military would face the following risks that could contribute to mineral shortages in a war with China: increased defense production, expanded export controls, and contested shipping routes.

First, the United States would likely increase defense production to expand U.S. warfighting capabilities and to replenish attrited war materiel. During the two world wars and the Korean War, the United States consumed significant minerals for increased defense production, which contributed to some mineral shortages. For instance, the United States was self-sufficient in many minerals before World War II, but wartime demand contributed to shortages of nickel, tin, zinc, and aluminum.¹⁶ Near the end of the war, E. W. Pehrson of the U.S. Bureau of Mines noted that despite substantial domestic mineral production, “the demands for this war overtaxed our capacity for production.”¹⁷ Likewise, during the Korean War in 1951, titanium demand greatly exceeded production capacity.¹⁸

In a U.S.-China war, the United States would likely face mineral shortage risks from increased defense production for the war effort. A 2016 RAND publication on a possible U.S.-China war over Taiwan said, “War between the two countries could be intense, last a year or more, have no winner, and inflict huge losses and costs on both sides.”¹⁹ To illustrate, in U.S.-China war games conducted by the Center for Strategic and International Studies, the U.S. military expended its entire inventory of long-range antiship missiles in the first week of combat.²⁰ Estimating mineral consumption in a U.S.-China war is difficult given limited open-source information on the material composition of such defense platforms and munitions. Yet as previous great power wars indicate, defense production in a U.S.-China war would heavily demand minerals and may cause mineral shortages (see table 1).

Second, the United States would likely confront expanded export controls implemented by China and possibly Russia. Before U.S. entry into the two world wars and the Korean War, it faced export controls that reduced access to foreign minerals and contributed to mineral shortages. During the Berlin Blockade in the late 1940s, for instance, the Soviet Union restricted mineral exports to the United States.²¹ Interestingly, the United States also faced export controls from its geopolitical partners. Before the United States entered World War I, Great Britain imposed export restrictions on tin, prohibiting U.S. manufacturers from exporting such tin or their products to Germany.²²

In a U.S.-China war, the United States would also face export controls from China. In fact, it already does. The United States imports most of its gallium, germanium, and graphite from China, and China placed export restrictions on these minerals in 2023.²³ Then in December 2024, China banned the export of gallium and germanium and tightened export controls on graphite.²⁴ As geopolitical tensions rise globally, other countries may impose export restrictions to secure their own mineral supplies or disrupt the mineral supply chains of other countries. A 2023 report by the Organization for Economic Cooperation and Development noted that export restrictions may already be “affecting availability and prices” of critical raw materials.²⁵ Therefore, if a war unfolds, the United States would likely face mineral export controls, posing mineral shortage risks.

Third, the United States would likely encounter contested shipping routes, including submarine warfare. During the two world wars, U.S. mineral imports faced such disruption. In a 1949 study on the U.S. mineral industry during World War II, John D. Morgan Jr. wrote, “The World War I and World War II records likewise shows [*sic*] that import shipping is a very vulnerable activity.”²⁶ Submarine warfare threatened mineral imports even before the United States entered the wars, and mineral imports experienced significant disruption after U.S. entry into the wars.²⁷ For example, in World War I, Germany’s unrestricted submarine warfare disrupted U.S. imports of Spanish pyrites, causing severe shortages.²⁸

The United States would similarly face mineral supply disruption from contested shipping routes and may experience mineral shortages during a potential

Table 1. U.S. Defense Use of Minerals

Mineral	Defense Use	U.S. Net Import Reliance in 2022
Antimony	Antimony metal is used in most of the military's lead-acid batteries. Indium antimonide semiconductors are used in forward-looking infrared vision systems and infrared homing missiles. Antimony trisulfide is used in fuses, small arms ammunition, mortar rounds, and artillery projectiles.	84%
Beryllium	Beryllium metal is used in intelligence, surveillance, and reconnaissance guidance systems, chassis and support arm/beam components, neutron reflectors, and X-ray mirrors.	6%
Bismuth	Bismuth-based alloys are used in machining.	97%
Chromium	Chromium metal is used as superalloys in turbine engines for jet aircraft, tanks, and marine applications.	84%
Cobalt	Used in superalloys for jet engines, Stellite alloys, nickel-metal hydride (NiMH) and lithium-ion batteries, samarium-cobalt, and Alnico magnets.	73%
Gallium	Used in electronics and missile guidance systems. Gallium arsenide (GaAs) is used for radar, short wave infrared tracking, night vision, and satellite communications. Gallium antimonide is used for night vision and missile guidance.	100%
Germanium	High-purity germanium is used in infrared lenses for most of the Department of Defense's night vision technology, thermal imaging systems, and infrared tracking systems in combat vehicles. These applications are essential for tracking ground targets and heat-seeking missiles and conducting nighttime operations. High-purity germanium substrates are also used in the manufacture of solar cells that power defense and national security space satellites. These satellites are critical for reconnaissance, missile detection, and communication.	> 50%
Graphite (natural)	Used in batteries, lubricants, body armor, engine turbine components, coatings for aircraft manufacture, and missile parts.	100%
Indium	Used in infrared imaging systems and communications systems.	100%
Lead	High-purity lead is used for thin-plate pure lead batteries used in aircraft and some navy vessels.	38%
Lithium	Used for repairs of fighter jet structures, safety-critical batteries, and batteries in electronics.	> 25%
Magnesium	Used in helicopter transmission housings, armor applications, broadcast and wireless communication equipment, radar equipment, torpedoes, antitank ammunition rounds, batteries, flare and ordnance applications, and infrared and missile countermeasures. Also used an alloy for aircraft, vehicle engine casings, and missile construction.	> 50%
Nickel	Used in superalloys for high-temperature sections of jet engines and maraging steel (aerospace and military use).	54%
Niobium	Used in superalloys for turbine engines, rocket sub-assemblies, and memory metal for hydraulic couplings.	100%
Palladium	Used in circuit boards and brazing and soldering in aerospace applications.	31%
Rhenium	Used in high-temperature alloys including superalloys for air transport and land power generation turbine engines.	70%
Strontium	Used for pyrotechnics (e.g., signal flares).	100%
Tantalum	Used in nickel superalloys for high-temperature sections of jet engines and capacitors for Department of Defense military specification and U.S. space applications. Also used in shaped charge and explosively formed penetrator liners, missile systems, ignition systems, night vision goggles, and global positioning systems.	100%
Tellurium	Used in thermal imaging devices such as short and mid-wave infrared sensors, thermoelectric coolers for infrared detectors, integrated circuits, and laser diodes.	> 75%
Tin	Used in alloys for bearings.	77%
Tungsten	Used in high-temperature superalloys for military turbine engines, tungsten filaments for electronics, and lighting and armor-piercing ammunition.	> 50%
Vanadium	Used as an additive in steel, specialty steel, catalysts, titanium-aluminum-vanadium alloys for jet engines, cladding, vanadium-gallium tape for superconducting magnets, and glass coatings.	60%

(Table by author; adapted from Under Secretary of Defense for Acquisition, Technology and Logistics, *Strategic and Critical Materials 2015 Report on Stockpile Requirements* [U.S. Department of Defense, 2015]; and U.S. Geological Survey, *Mineral Commodity Summaries 2024* [U.S. Geological Survey, 2024])

Table 2. Mineral Import Demand

Element	U.S. Self-Sufficiency		Increase / -Decrease
	1938	2023	
Aluminum	97%	56%	-41%
Antimony	16%	18%	2%
Arsenic	43%	0%	-43%
Bauxite	47%	25%	-22%
Manganese	6%	0%	-6%
Nickel	2%	43%	41%
Platinum	81%	17%	-64%
Tin	0%	26%	26%
Tungsten	95%	50%	-45%

(Table by author; adapted from H. Herbert Hughes, ed., *Minerals Yearbook 1939* [U.S. Government Printing Office, 1939]; and National Minerals Information Center, "US Geological Survey Mineral Commodity Summaries 2024 Data Release" [U.S. Geological Survey, 30 January 2024])

U.S.-China war. Such a war would severely disrupt supply chains in Northeast Asia and Southeast Asia, regions from which the United States imports significant volumes of minerals.²⁹ Japan is a major U.S. import source for cobalt, gallium, tellurium, titanium, and rare earth elements including scandium; and South Korea and the Philippines are also major mineral suppliers to the United States: South Korea is a major U.S. import source for bismuth, indium, refined lead, yttrium, and refined zinc, while the Philippines is a major U.S. import source for scandium, selenium, and tellurium.³⁰

Shipping routes from other resource-rich countries would also face disruption. For example, Australia is a major mineral producer, but Australia's sea lanes could face disruption in a war that encompasses the South China Sea.³¹ Currently, "Beijing is seeking to transform the South China Sea from an international SLOC [sea line of communication] into a Chinese-controlled waterway and a strategic chokepoint for other countries," according to Richard A. Bitzinger.³² Consequently, U.S. mineral imports would likely face contested shipping routes and may create mineral shortages for the U.S. military.

Can't the United States Just Produce More Minerals in War?

One counterargument to U.S. mineral shortage risks is that the United States can significantly

increase its mineral production, as it did in previous wars. For instance, from 1913 to 1918, U.S. tungsten production increased by 222 percent, manganese production by 984 percent, and chromite production by 23,327 percent.³³ However, before and during the two world wars and the Korean War, the United States arguably possessed the world's dominant mineral industry, which even made the United States self-sufficient in some minerals.³⁴ Since then, the U.S. mineral industry has declined. As previously noted, the United States relies increasingly on imports to meet domestic demand, and it has even stopped mining and refining some minerals (see table 2).³⁵ For example, the United States has not mined tantalum since 1959 and has not produced cobalt metal since 1983.³⁶ Therefore, the United States has a relatively weakened mineral industry with less expertise.

Consequently, additional U.S. production lines for defense platforms and munitions may be built quickly in a U.S.-China war, but mines and refineries would take far longer to develop given the lack of U.S. expertise. In 1951, then-U.S. Bureau of Mines Director James Boyd said that "new domestic raw material supplies cannot be made available in less than two to five years."³⁷ Currently, a mine in the United States takes an average of thirteen years from discovery to production.³⁸ Compared to other prewar periods, the U.S. mineral industry lacks the production base and expertise to increase mineral production quickly.

Today, the United States is analogous to Russia during World War I—mineral rich but unprepared for wartime demands and foreign supply restrictions.³⁹ Despite Russia's efforts to support its mineral industry during World War I—from mapping resources across the country to improving infrastructure in mining regions—Russia could not sufficiently supply its military.⁴⁰ Writing in *The Scientific Weekly* in 1917, Joseph Pogue compared the British Empire's well-developed mineral industry with Russia's largely undeveloped mineral industry, saying, "Industrial organization for war is one problem and can be quickly arranged for—behold England; the development of a country's resources is a different matter and can not [sic] be accomplished in a brief period of years—that Russia has learned to her loss."⁴¹ Like Russia in World War I, the United States in a U.S.-China war cannot quickly increase mineral production.

U.S. Policy Options

The USG can, however, adopt policies now to mitigate risks of mineral shortages in case a U.S.-China war occurs. First, the USG should stockpile more minerals—both larger volumes and a larger variety.⁴² It is already doing so, like seeking to acquire 18,500 metric tons of high-purity aluminum and aluminum alloys.⁴³ However, the National Defense Stockpile lacks some of the most-used minerals by the U.S. military, such as copper, lead, and fluorspar.⁴⁴ An expanded stockpile has precedent. The USG stockpiled minerals at 213 locations around the country during the Cold War in 1961; presently, the USG only stores minerals at six locations.⁴⁵

The DOD should stockpile more minerals in the National Defense Stockpile. Under 50 U.S.C. § 98h-5(b)–(c), the DOD sets target stockpile inventories based on the Pentagon’s “base case” conflict scenario, in this instance, a one-year, large-scale conventional U.S.-China war followed by three years of industrial recovery.⁴⁶ The DOD can intensify this conflict scenario, increasing the military’s mineral demand. For example, the National Security Council in 1950 produced policy paper NSC 68, *A Report to the National Security Council by the Executive Secretary (Lay) on United States Objectives and Programs for National Security*, which updated the U.S. threat planning scenario and corresponding mobilization period, and consequently increased stockpiling appropriations in 1950 and throughout the Korean War.⁴⁷ Congress could also increase the one-year combat duration currently in law, just as it did in 1988 when it explicitly required that the stockpile “be sufficient to sustain the United States for a period of not less than three years during a national emergency situation that would necessitate total mobilization of the economy of the United States for a sustained conventional global war of indefinite duration.”⁴⁸

Second, the USG should incentivize domestic mineral production. These policies should include supply-side and demand-side policies. The USG already implements supply-side policies through programs like the Department of Energy’s Advanced Technology Vehicle Manufacturing program and Office of Manufacturing and Energy Supply Chains, and the DOD’s Defense Production Act Title III program and Industrial Base and Sustainment program.⁴⁹ The USG also offers demand-side policies, namely tax credits to taxpayers who purchase new electric vehicles with batteries containing a certain percentage of critical

minerals extracted or processed in the United States, free-trade agreement countries (e.g., Australia), or critical mineral agreement countries (e.g., Japan).⁵⁰

The USG should increase the available capital for domestic mineral projects and increase the domestic content requirements for mineral-related government incentives. Supply-side policies would include more grants and loans for mineral projects—both mining and refining—while demand-side policies would include stricter domestic mineral content requirements for government procurement (e.g., DOD procurement of nontactical electric vehicles) and domestic mineral feedstock requirements for grants and loans to downstream U.S. projects (e.g., battery gigafactories). The USG should also modify the content requirements for the electric vehicle critical minerals tax credit to establish a higher tax credit for batteries containing U.S.-produced minerals versus foreign-produced minerals.

Third, the USG should restrict mineral imports from China. China is presently an indispensable supplier of several minerals. It produces mineral volumes that other countries cannot easily replace. For example, China is the world’s largest producer of yttrium, and it supplied 94 percent of all yttrium compounds consumed in the United States from 2019 to 2022.⁵¹ If the USG were to ban yttrium imports from China, U.S. companies would struggle to find alternative suppliers to satisfy their demand. Rather than outright banning U.S. imports of minerals from China, the United States should apply tariffs on these minerals, making them the highest-cost mineral source. Such tariffs would incentivize U.S. companies to find alternative, non-Chinese mineral sources and incentivize non-Chinese producers to develop other mineral resources.

The USG should also condition any grants, loans, and tax credits related to critical minerals on excluding Chinese minerals. For instance, the critical minerals tax credit for electric vehicles requires no minerals from foreign entities of concern, but the ownership threshold for an entity to be deemed a foreign entity of concern is currently 25 percent ownership by a foreign entity of concern, including Chinese companies.⁵² The USG should tighten this restriction: electric vehicles with batteries containing *any* content in their supply chains produced by companies with *any* Chinese ownership should disqualify those vehicles from the critical minerals tax credit. Similarly, government procurement



An aerial view of Santa Rita strip copper mine near Silver City, New Mexico. (Photo by Cavan via Adobe Stock)

should also exclude goods containing any China-produced minerals, and federal grants and loans for U.S. projects should include conditions that prohibit recipients from sourcing any China-produced minerals.

Lastly, for minerals lacking reserves in the United States, the USG should seek to secure overseas mineral production in countries aligned geopolitically with the United States. This supply chain alignment is known as “friendshoring.”⁵³ The United States simply does not have enough reserves of some minerals to fulfill U.S. mineral demand in a large-scale military conflict. For example, during World War II from 1942 to 1945, Canada supplied many minerals to the United States, including 85 percent of the U.S. nickel supply, 49 percent of its platinum group metals, and 15 percent of its aluminum.⁵⁴ The United States is currently pursuing various friendshoring initiatives, such as the Mineral Security Partnership, Partnership for Global Infrastructure and Investment, and various bilateral agreements.⁵⁵ The success of these friendshoring initiatives remains to be seen.⁵⁶

However, U.S. friendshoring policies should include investing capital in U.S. companies for acquiring ownership stakes in overseas mineral projects. The

policy would be similar to how the U.S. International Development Finance Corporation has invested in TechMet, a Dublin-based private investment vehicle, to invest in a nickel-cobalt mine in Brazil and a rare earths project in South Africa.⁵⁷ The USG should also offer low-cost loans to U.S. companies for securing long-term mineral offtake agreements with overseas mineral producers. Both investments and offtake agreements provide capital to projects in partner countries for expanding their mineral operations.

Yet, friendshoring with overseas partners bears risks during wars as sea lanes are vulnerable.⁵⁸ Moreover, international cooperation is particularly challenging amid great power competition. For instance, after World War I, some U.S. mineral experts proposed an internationalist approach, including free trade for mineral supply chains, but countries sought to increase domestic mineral production and reduce their reliance on imports.⁵⁹ Today, many countries are doing the same for economic and geopolitical reasons.⁶⁰ Therefore, the

USG should prioritize onshoring mineral production over friendshoring.

The Outlook for U.S. Mineral Security—and U.S. Military Power

Minerals influence war. In 1949, U.S. Bureau of Mines Director James Boyd said,

The strength or weakness of our raw materials position, in respect to certain essential minerals, may well determine the status of our country as a world power in the years to come. Our national potential in both peace and war is intrinsically bound to the availability of minerals because many of them are the foundation of our industrial and technology structure.⁶¹

Minerals undergird industrial and technological power, which undergirds military power, ultimately affecting great power wars.⁶² Previously, the United States was the world's leading mineral power; today, China is.⁶³

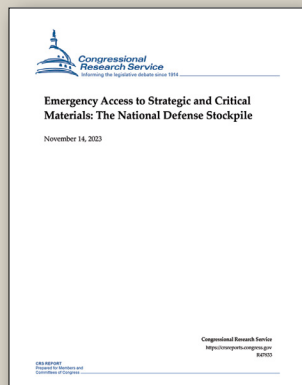
If a U.S.-China war occurs, the U.S. military will likely face mineral shortages. The United States already has limited mineral stockpiles, low domestic mineral production, and heavy mineral import reliance from China, its geopolitical rival. The United States would consume significant mineral volumes for increased defense production in a war, and it would face disrupted mineral imports from expanded export controls and contested shipping routes, posing mineral shortage risks. The USG should stockpile more minerals, incentivize domestic mineral production, and restrict mineral imports from China to mitigate such shortage risks.

Mineral shortages could prove disastrous for the United States, given the serious—sometimes decisive—role of minerals in war.⁶⁴ In its last three great power wars—World War I, World War II, and the Korean War—the United States lacked sizable mineral stockpiles but was the world's dominant mineral producer. Still, it experienced mineral shortages. Following these wars, U.S. officials highlighted the importance of minerals in wartime, urging the country to pursue mineral independence and self-sufficiency.⁶⁵ Yet, the United States now has a relatively weak mineral base and faces the possibility of a major war against a minerally superior adversary. Past wars indicate that the United States risks defeat if such a war occurs.

In this case, the words of U.S. Bureau of Mines Director R. R. Sayers in 1941 may be particularly prescient.

Events in 1940 have demonstrated again that in this age of mechanization minerals are indeed the sinews of war. The British have shown that valor can offset, to a remarkable extent, the advantages of superior armament and munitions; but the experience of Finland, Belgium, Greece, and others has revealed the ineffectiveness of heroic men against an avalanche of iron, manganese, aluminum, and petroleum utilized in tanks and airplanes, bullets and bombs.⁶⁶

But instead of Finland, Belgium, and Greece succumbing to Germany's mineral superiority in World War I, Taiwan, Japan, and the United States may succumb to China's mineral superiority in a U.S.-China war. ■



Military Review Recommends

The Department of Defense manages the National Defense Stockpile (NDS) and has delegated authority as the NDS manager to release stockpiled materials to eligible domestic manufacturers in the defense industrial base and other critical infrastructure sectors under certain conditions. This report, *Emergency Access to Strategic and Critical Materials: The National Defense Stockpile*, provides background on this NDS and analyzes selected issues that Congress may face related to its management.

To read this report online, visit <https://crsreports.congress.gov/product/pdf/R/R47833>.

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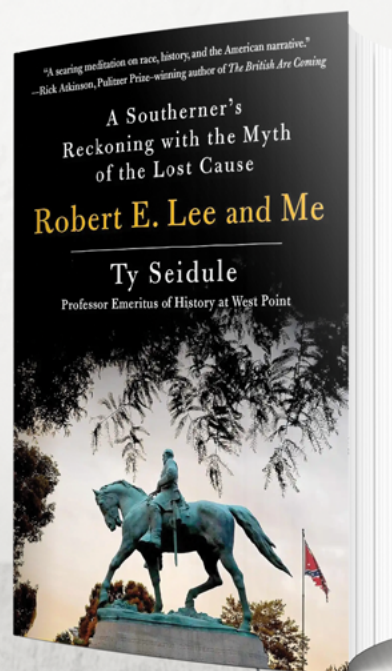
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Robert E. Lee and Me

A Southerner's Reckoning with the Myth of the Lost Cause

Ty Seidule, St. Martin's Press, New York, 2021, 304 pages



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Robert E. Lee and Me: *A Southerner's Reckoning with the Myth of the Lost Cause* by Ty Seidule, a retired U.S. Army brigadier general and former head of the Department of History at West Point, is an intimate look at Robert E. Lee's formative youth and career within the military alongside a collage of stories about the Civil War that Seidule increasingly felt at odds with. In its pages, Seidule pulls no punches in confronting a slew of ingrained narratives connected to the American Civil War, particularly those affiliated with Lee. Seidule persuasively argues that these myths, as he sees them, continue to influence both military traditions and American culture writ large.

In 1914, a huge monument was erected at Arlington National Cemetery honoring the Confederacy. This was proof how thoroughly the "Lost Cause" narrative had been absorbed by the collective consciousness of the Nation.¹ Billing it a monument to national reconciliation, President Woodrow Wilson called it an "emblem to a reunited people."² "The statue represents all the terrible lies of the Lost Cause."³

An African American woman, portrayed as an overweight, crying, but loyal "mammy," takes a white baby from her "master," a Confederate soldier heading off to war. Clinging to her billowing skirt, another child seeks the "mammy's" protection. In reality, young enslaved girls, not adult women, looked after white children. Another enslaved figure follows his "master" to war, serving as a body servant. The figures provide one racist trope after another.⁴

"The statue serves as an act of defiance. The sculptor knew exactly what he was doing. [The sculptor] wanted to portray an 'accurate' history of the loyal, happy slave, not the 'lies' told through books like *Uncle Tom's Cabin*, which showed the brutality of slavery. Instead, the artist said the monument represents the South, which fought 'for a constitutional right, and not to uphold slavery.'"⁵ Inscribed on the monument was a Latin phrase that translates as "the victorious cause pleased the gods, but the conquered cause pleased Cato."⁶ For

one noted historian, “the inscription is a ‘f*** you’ to the Union.”⁷

It’s worth remembering that Seidule is a genuine historian himself and engages in serious historical analysis while pondering his own legacy with these myths that he wholeheartedly embraced growing up in Alexandria, Virginia, and Georgia. The book’s relevance, in terms of a military audience, revolves around the impact these myths continue to have on military culture, heritage, and, most importantly, values.

But the book is more than just historical analysis. It is also a memoir, chronicling his evolution from a childhood rich in Confederate mythology that slowly, and with resistance, gives way to a more nuanced understanding of the war’s true causes and consequences as he incorporates a lived existence. Seidule readily admits he grew up with a profound reverence for Lee as a classical hero, a feeling echoed by so many across the South and reflected in a profusion of monuments, schools, textbooks, and even street names. But as Seidule matured, his professionalism developed, and he honed his academic chops, he began to see a chasm between uncomfortable facts he knew to be true about both Lee and the Confederacy and the widely propagated Lost Cause narrative. That Lost Cause story depicts the Confederacy as a gallant effort on behalf of states’ rights instead of a preservation of slavery.

Seidule does an exemplary job of deep diving into the life of Lee, his role as a leading Confederate figure, and the accompanying mythology that emerged over time. He critically examines how the military, its academies, and society at large have embraced these myths and insists that society must reevaluate how history is both taught and memorialized.

Lee left [the Union] for the same reason the southern states seceded. The southern states went to war to protect and expand chattel slavery because they felt threatened by Lincoln’s election. ... Lee chose the Confederacy because of his abiding belief in slavery. A senior Army colonel as intelligent as Robert E. Lee knew full well why the states seceded; they told the world why they seceded—to protect and expand slavery. Lee chose to fight for a new nation whose explicit, constitutional guarantee was human bondage—forever.⁸

First and foremost, Seidule’s book is a frontal assault on the Lost Cause tale, which clearly romanticizes the shaky Confederate foundation. And this is a herculean task given the degree to which the myth is ingrained. As previously noted, the myth celebrates a proud, albeit doomed, resistance toward so-called Northern aggression, underscoring Lee as a beacon of light, somehow possessing a moral superiority. Using both precision and persistence, he demolishes the myth with unassailable evidence—Confederate leaders’ own words and documents—definitively showing the Confederacy’s primary objective was to maintain, if not expand, the tradition of slavery. The author contends the myth was constructed in the war’s wake as a means by which to reconcile the victors and the vanquished at the expense of Black America. What the myth really did was, plain and simple, sanitize motives and blur the horrific brutality of slavery.

Seidule implores the military community to consider how these myths have warped traditions and institutions. He dissects Lee’s actions and decisions, probing the morality attributed to him. In so doing, however, he does not discount his military genius. But he contends that Lee’s choice to fight for the Confederacy and, by default, support slavery, cannot be divorced from any assessment of his legacy. And Lee’s postwar behavior, which included staying quiet regarding violent acts of white supremacy and a refusal to advocate for racial equality, further muddies his legacy.

For military members reading this book, consider the fact Lee is not only a historical figure but also a symbol interlaced with military values like duty and self-sacrifice. Confronting this directly, Seidule openly asks the reader if it is appropriate to revere a man who abandoned his country and worked to preserve slavery. In short, is the Confederate general worthy of respect and admiration? Here is but one example to consider regarding Lee’s character:

Lee joined Mary at Arlington in November 1857 after George Curtis, Lee’s father-in-law, died. Until January 1860,

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Lee served as the executor of the will with no army duties. Winfield Scott, the commanding general of the army, gave Lee more than two years of administrative leave at full pay to sort out his father-in-law's estate. Lee's paid leave was more than twice as long as that of any other officer during the entire antebellum period.

... He certainly spent more time managing enslaved workers than he did leading soldiers.

As the executor of Curtis's will, Lee had several competing tasks. The first remit was to pay all debts, which proved to be substantial. ... the final task was to free all Curtis's enslaved people within five years. ... he could have chosen to sell land to pay the debts immediately. If he had done this, he could have freed the enslaved workers within months. Instead, Lee chose another path, keeping the enslaved workers as long as he could to pay off Curtis's debts and build money for the family. To do this, he broke families apart using the hiring system. ... Whenever Lee made a decision regarding enslaved people, he chose profit over human decency. ... Lee finally emancipated his [father-in-law's] enslaved workers [per the law at the time], but only after losing a court case in which he tried to keep them longer.

In addition to his keen financial interest and belief in human bondage, Lee loathed those who fought for emancipation. He deplored the "evil passions" of abolitionists who stirred "disloyalty" among slaves.⁹

From Seidule's point of view, as a soldier and scholar, commemoration of various Southern Civil War

"heroes" are not just impartial acknowledgements of history but vigorous endorsements of the myth. And upon closer examination, many of these commemorations arose during periods of racial tension and were pointedly intended to buttress a social order anchored to white supremacy.

The author confronts the military, as an institution, to own its guilt in perpetuating certain myths and consider what values it aspires to project going forward. He says renaming bases (already done) and removing Confederate statues (largely done) would be steps in the right direction toward aligning military culture with suitable values. He argues military professionals are obliged to seek the truth and to educate themselves and their subordinates about the complexities of history rather than accept sterilized or partial versions of the past.

One thing the book excels at is stressing the importance of historical education within the military profession. Seidule's own trek from ardent supporter of the Lost Cause myth to historian devoted to unearthing the unvarnished reality reveals the transformative power of education. His thoughtful exposition serves to remind us of the need for continuous learning and critical thinking, particularly as it pertains to history and that history's impact on both society and the military. In a way, the author's full throttle analysis serves as a framework for grasping the significance of institutional change and cultural reform within the military.

Robert E. Lee and Me is a courageous and illuminating work that challenges deeply held myths about the Civil War and what it was really all about. The book is at once both a commendable exfoliation of history and a call to action. And it comes with my highest recommendation. ■

Notes

1. The Lost Cause is a skewed historical interpretation of the American Civil War that attempts to portray the Confederate cause as just and heroic, and downplays the role of slavery in the war.

2. Ty Seidule, *Robert E. Lee and Me: A Southerner's Reckoning with the Myth of the Lost Cause* (New York: St. Martin's Press, 2020), 160–61.

3. *Ibid.*, 161.

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8. *Ibid.*, 226.

9. *Ibid.*, 228–30.



Farewell to Col. Todd Schmidt

The staff of *Military Review* bids farewell to Col. Todd Schmidt, the director of the Army University Press and the editor in chief of *Military Review*, as he retires from military service after twenty-nine years. For nearly two and a half years, Col. Schmidt's vision and his unwavering focus on restoring professional writing in the U.S. Army ensured *Military Review's* continued relevance as the premier professional journal in the Army. Although he effectively managed multiple teams in Army University Press and their corresponding initiatives, he still found time to spearhead multiple special themed *Military Review* issues, coordinate for numerous high-level writers, elevate the DePuy writing contest to national prominence, and write several articles for our publication.

Col. Schmidt will be missed by everyone in the organization, and his influence will be felt long after his departure. We wish him good luck and continued success in the next chapter of his life as a civilian and Army veteran.