Military Review

THE PROFESSIONAL JOURNAL OF THE U.S. ARMY

MAY-JUNE 2023

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Cover photo: Soldiers with 1st Battalion, 6th Infantry Regiment, 2nd Armored Brigade Combat Team, 1st Armored Division, download military vehicles from a C-17 near northeastern Syria 17 September 2020. The unit was preparing for operations in support of Combined Joint Task Force–Operation Inherent Resolve. Combined Joint Task Force–Operation Inherent Resolve supports partner operations in Iraq and Syria in order to defeat Islamic State remnants and promote regional security. (Photo by Staff Sgt. Michael West, U.S. Army)

ARMY UNIVERSITY PRESS

Mavericks, Mavens, and Mentors

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

Leaders must shelter those challenging nonconformists and mavericks who make institutions uncomfortable … that's your job. If you're uncomfortable dealing with intellectual ambushes from your own ranks, it'll be a heck of a lot worse when the enemy does it to you.

—Gen. James Mattis, *Call Sign Chaos*

If anecdotal evidence carries any weight, the U.S. Army may be nearing an inflection point related to how the public views it as well as how it perceives itself. This inflection point may be caused, to an extent, by the institutional loss of the ability to have honest, open, professional dialogue on important issues for fear of negative career and political fallout. However, there are important conversations that are happening behind closed doors, at the proverbial kitchen table, and on alternative platforms about public, politically and emotionally charged challenges related to recruiting as well as the increasing population of leaders opting out of command assignments.

Across the United States, public opinion of the U.S. military is falling in unprecedented decline. Internal to the Army institution, career paths and command positions, once indoctrinated into young leaders as the sine qua non of leadership, are being increasingly rejected. A common thread to these conversations is that there seems to be a growing encroachment on a "safe space" for the Army's mavericks, mavens, and mentors to flourish.

I use the term "safe space" as a nod to what I believe is a growing movement of "magical realism" in our Army, and more generally, in our society. Magical realism is a literary term describing the use of imaginary elements or qualities woven into a real world. Magical realism blends elements of fantasy, "alternative facts," and imagination with real life in an attempt to reveal, critique, and challenge our beliefs, much like a critical theory.

A consequence of this dynamic is a decay of objective truth, as described by a 2018 RAND Corporation study, *Understanding the Threat of Truth Decay*.

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

According to the study, "truth decay" is caused by four overlapping trends. First, the study suggests that there are increasing differences in how individuals interpret objective facts. Second, there is an increasing conflation of fact and opinion in public discourse, particularly in partisan media outlets, wherein opinion and experiential knowledge masquerade as fact. Third, there is an exponential increase in the quantity of purported authorities of opinion versus fact, many with accessible and popular online platforms. Finally, there is diminishing faith in traditional authorities and sources of reliable, accurate information.

For the Army to fight truth decay, we must pay attention to objective facts, separate from our opinions, and we need to revisit what it means to be a maverick, maven, or mentor, and we must shelter and nurture their development and critical thinking within our profession.

Mavericks

Ask yourself these questions. Having come out of two decades of war, who are our mavericks today? Who are our independent thinkers? What is the status of our professional ethos? Who among our senior leaders are truly mavericks of the sort that drive real innovation and positive, meaningful change? Are there so few because our organizational culture expects or demands *too much* conformity?

Merriam-Webster's Dictionary defines mavericks as unbranded range animals, like motherless calves. In the military, however, they are individuals that march to the beat of their own drum. They are the ones that do not always go along with the crowd. They stand out as critical thinkers. They possess a bit of genius and uncommon cognitive complexity. They can add a dose of truth, fact, or reality to a conversation that can sometimes cause friction, hurt feelings, or awkward discomfort; they "ruffle feathers." They are a bit unorthodox. They are sometimes a lone voice of dissent. They are willing to "buck the system" for a cause in which they believe. They are willing to "fall on their sword" on principle.

I argue that there are few mavericks in the senior leader ranks. The system is structured to weed them out. Senior leaders rose to rank on merit for the first twenty years of their career, but merit plays much less of a role in career progression and promotion post-battalion leadership. Thus, mavericks tend to be identified at the midcareer, field-grade level, and hints of nonconformity can quickly trigger labels of "too outspoken" or "not a team player." There is little to no room for those that "rock the boat" within flag-level ranks.

An argument could be made that today's mavericks are weeding themselves out voluntarily. They are "voting with their feet," as we sometimes say. Their individual message is invisibly embedded in the growing numbers of junior and midcareer leaders opting out of key developmental leadership positions required for career progression. On a much wider scale, there is a correlation between trends in how the public views the military and the Army's inability to reach recruitment goals. The Army's recruitment and retention numbers are now a very public institutional concern. Observers may differ as to the reasons, but the outcome is the same, and the Army has a problem.

Mavens

Mavens are tactical experts on a particular subject or domain of subjects like doctrinal terms and references, supply management, or the military decision-making process. Some may consider them to be wonks, nerds, or freakish savants on a particular subject like weapons in the U.S. arsenal, or airborne operations, or how to perform preventive maintenance checks and services on every motorized vehicle in the motor pool. I do not think it includes the ability to quote every line of the movies *The Princess Bride* or *Dr. Strangelove*, or to understand the "airspeed velocity of an unladen swallow."

Regardless, these maven-leaders are subject-matter experts. They can endlessly debate the definition of language in a mission statement based on current and legacy doctrine. They know and can recite the military capabilities of adversaries around the globe. They possess this knowledge and take pride in their "maven-ness" because they are passionate about what they do.

Like mavericks, mavens are a critical part of any large organization. They are sought-after members of a team because they are specialists, not generalists. They are interested in the language and details of a mission because language and details in military planning matter. They are often found in the bowels of a command headquarters, in the staff cubicles crunching numbers, taking care of administrative requirements for the command, deconflicting unit training calendars and resource requests, or writing the enemy estimate for an upcoming training event or mission. They are often taken for granted by leadership, overworked and underappreciated, always in pursuit of someone else's priorities.

Yet, mavens are a vanishing breed of tactical military leader because they are a vanishing character in American society. In an era of social media and "swipe left" mentality, scholars are finding that Americans, including those of us serving in uniform, no longer possess the ability to focus on details. We have shorter attention spans. We are vulnerable to distortions of truth. We are intolerant of complexity and diversity of thought. We no longer hold coherent beliefs. Everyone's opinion, no matter how ill-informed, matters. Idiocy can no longer be confronted, no matter how detrimental or damaging. For the

military, it can mean a greater focus on the operational art versus military science.

Mentors

How many mentorship programs across the Army have started, with great intention and fanfare, only to fail and wither away? Although the Army has sponsored multiple institutional-wide mentorship programs over the years, and has a regulation governing mentors and the mentorship process in Army Regulation 600-100, *Army Profession and Leadership Policy*, the dynamic of mentorship must be organic. It cannot be directed or mandated, or it would be doomed to fail. Rather, a mentor relationship is a grassroots, individual-to-individual relationship that starts by establishing trust, honest communication, accountability, and a demonstration of loyalty and respect.

Mentors often become and act as sponsors and advocates for junior leaders. They help younger, less-experienced leaders with career decisions, understanding assignment options, and how to navigate a bureaucracy and institution that can be intimidating and impersonal. Mentors invest in younger leaders, help them up the proverbial ladder, developing and coaching them over the course of an assignment, a career, or a lifetime.

Healthy mentorship relationships between senior and junior officers, however, is endangered in my opinion. Rather than individual relationships built on trust and meaningful communication, we increasingly try to communicate with the masses over social media with humor and cleverness. We carefully monitor our "views," "likes," "retweets," and "reposts." And, although social media and online platforms offer important, even critical, outlets for conversation and dialogue, they are missing an imperative component of interpersonal relationships—accountability. We snipe at and troll each other, sometimes deservedly, but we do it anonymously, behind a shroud of technology, a keyboard, and a catchy screen name.

Senior leaders that interact over social media do so with real personal and professional risk. Sometimes they may be on target with how they communicate over a tweet or online post. One wrong tweet or post, however, can negatively impact a career. In contrast, junior leaders may think interacting with senior leaders over online platforms is meaningful. A reply by a senior leader can excitingly signal that "I am being heard." Both parties may think that real communication is occurring. But I would argue, it is an empty exchange, a flash of interaction, devoid of a real relationship.

So Why Do We Have So Few Mavericks, Mavens, and Mentors?

Out of necessity, the Army is an institution made up mostly of conformist followers. While we may be hypercompetitive, ambitious, and value leadership, we mostly tend toward conformity and followership. In general, scholarship finds that our military community possesses shared beliefs and principles. We continually validate our culture by who we advance and promote—those that look and act like us. We share a common ethos within our military profession. We demonstrate internal cohesion and trust. We often see the world and our environment in a similar way. We follow orders. We follow our superior officers. We rarely deviate. We teach and train doctrine. Our professional military education teaches us what to think, not how to think. And, in our profession, particularly at the tactical level, these qualities can save lives.

Mavericks can stereotypically seem dangerous and brash. They challenge the status quo. They do not always conform. They do not necessarily want to be like the crowd. While some military officers talk about leading change, it is often only for change's sake. This dynamic is often caused by short assignments wherein we are driven to show progress and improvement on a limited time horizon. In contrast, mavericks take action that may appear to "go against the grain" and may not be in alignment with a commander's vision.

Mavens can seem weird and possess their own stereotype. They are often exceptionally smart, focused, intelligent, and maybe goofy and socially awkward. They are not the cool kids. They do not lead an Instagram life. They may not be active on social media with a cool screen name, capable of pithy comment, sarcasm, or cynical retort. They are not always the fastest runner or most athletic. They may not cut the perfect picture in a uniform. But they are often the intellectual workhorse. They are purpose-driven. They have focus. They are the ones to whom everyone comes to copy their homework.

True mentors are few and far between because our military culture does not do a good job of rewarding developmental leadership. We reward the good leaders

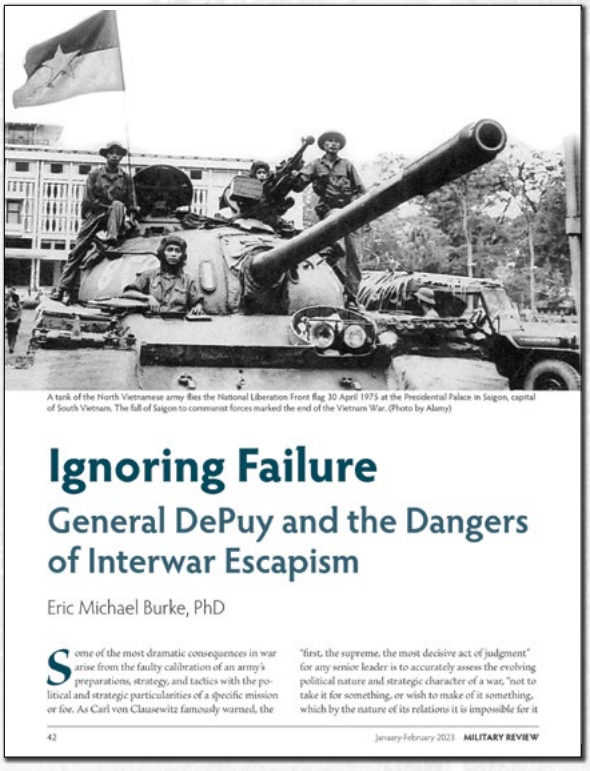
that get things done in the short-term, drive change, meet the commander's intent, and accomplish the mission. This means spending less time meaningfully developing leaders and making long-term improvements to an organization. As an institution, we can sometimes tend to reward the risk-averse leaders that are comfortable with maintaining status-quo—the caretakers. We do not necessarily reward great leaders that know how to build an organization from the ground up, establish long-term goals and objectives, create buy-in to an organizational vision and mission, and accept prudent risk for long-term reward.

So, when we see junior leaders express frustration as they confront the dueling contradictions of magical realism insinuating itself in society or the Army, and the realities of the military and our organizational culture, we need to stop and talk to them. But we must be authentic. Be honest. Show emotion. Admit mistakes. Tell embarrassing stories about your own failures and insecurities. Share—in fact, *overshare*—your own personal experiences navigating an Army career.

Share anecdotes of when you were confused, insecure, frustrated, and discouraged by the Army and the challenges of a military career. Share the pain of a divorce. Share the regret of missing milestones and events in your children's lives. Then, take time to share the reasons that you persevered. Nurture relationships that have mutual accountability. Do not be surprised by or chastise a young leader that may not think, act, look, or want to be like you.

Are you a follower and conformist? Are you a maverick? Are you a maven? Do you possess the insight, empathy, and characteristics that would be valuable as a mentor to young leaders? If you answered "yes" to any of these questions, how can you use that trait to strengthen your unit? Your army? And, how do we get back to honest dialogue and conversation? ■

Military Review invites your attention to "Ignoring Failure: General DePuy and the Dangers of Interwar Escapism"


A tank of the North Vietnamese army flies the National Liberation Front flag 30 April 1975 at the Presidential Palace in Saigon, capital of South Vietnam. The fall of Saigon to communist forces marked the end of the Vietnam War. (Photo by Alamy)

Ignoring Failure

General DePuy and the Dangers of Interwar Escapism

Eric Michael Burke, PhD

Some of the most dramatic consequences in war arise from the faulty calibration of an army's preparations, strategy, and tactics with the political and strategic particularities of a specific mission or foe. As Carl von Clausewitz famously warned, the "first, the supreme, the most decisive act of judgment" for any senior leader is to accurately assess the evolving political nature and strategic character of a war, "not to take it for something, or wish to make of it something, which by the nature of its relations it is impossible for it

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In this January-February 2023 *Military Review* article, Dr. Eric Burke offers a contrarian view asserting that many senior Army leaders of the 1970s and 1980s misinterpreted and promulgated the wrong lessons derived from the Vietnam War and the 1973 Yom Kippur War between Israel and Egypt. The lessons learned during the war in Vietnam provided the Army with an opportunity to seek mitigating solutions to its obvious shortfalls in anticipation of future conflicts involving modern ideological and insurgent warfare. Instead, however, the Army embraced an ossified and stovepiped approach to the nature of modern warfare that left it inflexible and unprepared for the great challenges of the twenty-first century that it would later face.

To read this article online, visit https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/January-February-2023/Burke/.

Write for *Military Review*

Suggested Writing Themes and Topics—2023

- From the U.S. military perspective, what are the greatest external threats to the United States? Why? And, how?
- Do any external threats realistically threaten the survival of the United States or its allies? If so, how?
- Are there nations that consider themselves to be at war with the United States? If so, how are they conducting war and what would increase the probability of their success?
- Is there a new "Cold War"? If so, which nations make up the new confederated blocs (e.g., new "Axis" powers) 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?
- Who does synchronization of DIME (diplomacy, information, military, economic) elements of power to achieve strategic goals best on the global stage? Contrast and compare employment of DIME by China, Russia, Iran, and the United States. How should the United States defend itself against foreign DIME?
- Does China have an "Achilles' heel"? What is its center of gravity? If it has one, how can it best be attacked/exploited?
- What does China view as the United States' "Achilles' heel" or "center of gravity"? (e.g., trade relations? Resource shortages? Diminishing technological manufacturing base? Societal instability and factionalism?) How specifically is it exploiting these? Specific examples?
- What is the impact of irregular immigration on the security of the United States? What role does the U.S. military currently have by law to protect U.S. borders from irregular immigration and criminal activity linked to it? What relationships does the military currently have with other security institutions to protect the border? What relationships should it legitimately have? How should the National Guard be used?
- Update on status of security force assistance brigades. What is the role now of the U.S. Armed Forces in Africa? Far East? Middle East?
- What logistical challenge does the U.S. military foresee due to changes in infrastructure and forward operating locations?
- What is "just over the horizon" in terms of weapons systems about to be deployed? Nanoweapons? Electromagnetic? Artificial intelligence? Other? How is the Army planning to mitigate effects?

2023 General William E. DePuy

Special Topics Writing Competition

This year's theme is "Implementing FM 3-0, *Operations*"

The updated Field Manual (FM) 3-0, *Operations*, was introduced and disseminated throughout the Army in October 2022. The intent of this year's DePuy competition is to encourage close examination of the impact implementing FM 3-0 will have on the Army. A list of suggested topics for examination is provided below. However, the list is not exclusive and treatment of other relevant topics is encouraged. Manuscripts identifying and analyzing other salient topics that offer insight and productive critique of issues related to implementation of FM 3-0 are encouraged.

Competition opens 1 January 2023 and closes 20 July 2023

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*

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

Articles will be comparatively judged by a panel of senior Army leaders on how well authors have clearly identified issues surrounding implementation of FM 3-0 within the Army in general and/or to a significant portion of the Army; how effectively detailed and feasible solutions to the issues identified are presented; and the level of expository skill the author demonstrates in developing a well-organized article using professional standards of grammar, usage, critical thinking, original insights, and evidence of thorough research in the sources provided.

Some Suggested Writing Topics Salient to FM 3-0

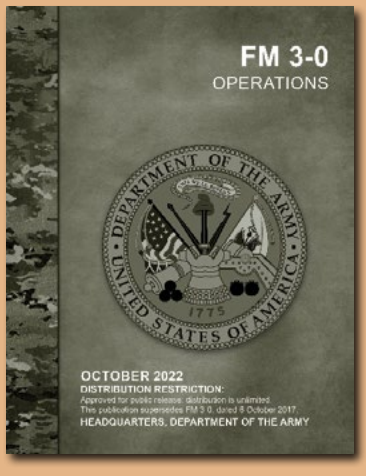
- What are the chief obstacles to the implementation of the new doctrinal concepts in FM 3-0?
- What did the new FM 3-0 get right? What did it overlook or get wrong? How does it need to be revised?
- Surviving on the future battlefield. How does a modernized army equipped with the latest technology, to include cyberspace and space capabilities, remain concealed and protected on the battlefield when our adversaries can "see" and track its units from social media and other media posts from home stations (CONUS or other) to the forward line of own troops?
- Given the concepts introduced in FM 3-0, the antiaccess/area denial capabilities possessed by our potential enemies, and what we are observing in Ukraine with regard to the technical sophistication available for defeating air assets, is it time for the U.S. Army to divest itself of its large-scale airborne forcible entry capabilities?
- Has the tank gone the way of the battleship? With the concepts introduced in FM 3-0, the exponential increase of long-range precision fires and unmanned aircraft systems capabilities, and the U.S. Marine Corps'

recent divesture of heavy armor capabilities (tanks and self-propelled howitzers), should the Army divest of its armor formations?

- The concept of convergence is one of the key concepts undergirding multidomain operations. Explain this concept and how it will be achieved. What are the implications of enemy electronic warfare on the ability for Army forces to achieve convergence?
- Does the new FM 3-0 adequately address the introduction of new adversarial technologies such as hypersonic weapons? Exotic weapons such as biological warfare agents?
- Army forces have been multidomain forces in many ways for years, so what are the implications of what is new about the multidomain operations concept as described in the new FM 3-0?
- What are the implications of multidomain operations for echelons above brigade?
- What are the implications of multidomain operations for echelons below brigade?
- Are multidomain operations described in FM 3-0 a continuation of (or departure from) the evolution of operational art? If so, how are they different? In any contrast and compare analysis, consider the works of Soviet military theorist G. S. Isserson, former commanding general of U.S. Army Training and Doctrine Command, Gen. Donn A. Starry, and other military theoreticians who have been involved in the evolution of the concept.
- How well does FM 3-0's operational concept address how Army forces need to operate given what we have observed in Nagorno-Karabakh and Ukraine?
- Does FM 3-0 reveal anything about the readiness of our Army to fight a Russia or China?
- Compare and contrast the development of AirLand Battle with the development of multi-domain operations. Consider the influence of the Vietnam and 1973 Yom Kippur War and that of the Global War on Terrorism and the conflicts in Ukraine and Nagorno-Karabakh. What lessons can be drawn from this analysis?
- Using FM 3-0's maritime chapter (chapter 7) as a point of departure, provide insight into the unique challenges of operating in maritime environments.
- What command and control challenges can we anticipate when employing multidomain operations?
- An assessment of the feasibility of doctrine implementation given the projected logistical/material or other constraints?

New from Army Doctrine

Among other important changes, the most recently updated Field Manual (FM) 3-0, *Operations*, published in October 2022, focuses on upgrading Army capabilities to employ speed, range, and convergence of cutting-edge technologies to achieve land dominance against future enemies. It stresses the role the Army plays in holding critical terrain, providing assurances to allies and partners, defeating all enemies in close combat, and consolidating gains to achieve enduring strategic outcomes. FM 3-0 is rooted in the principles of war and reinforces an offensive mindset but also provides a simple definition of multidomain operations intended to help leaders at all echelons visualize and understand the interrelationship among the physical, information, and human dimensions. It also provides an operational framework that helps echelons better organize forces in terms of time, space, and purpose. Notably, it addresses the unique challenges of applying landpower in maritime environments and the unique requirements for combat leadership in complex modern warfare.



The new FM 3-0 can be downloaded from the Army Publishing Directorate at https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN36290-FM_3-0-000-WEB-2.pdf.

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Satellite imagery shows a large fire and a number of destroyed aerial assets on 15 March 2022 in Russian-occupied Kherson International Airport, Chornobaivka, Ukraine, following a Ukrainian attack. (Photo courtesy of Planet via Twitter)

The Graveyard of Command Posts

What Chornobaivka Should Teach Us about Command and Control in Large-Scale Combat Operations

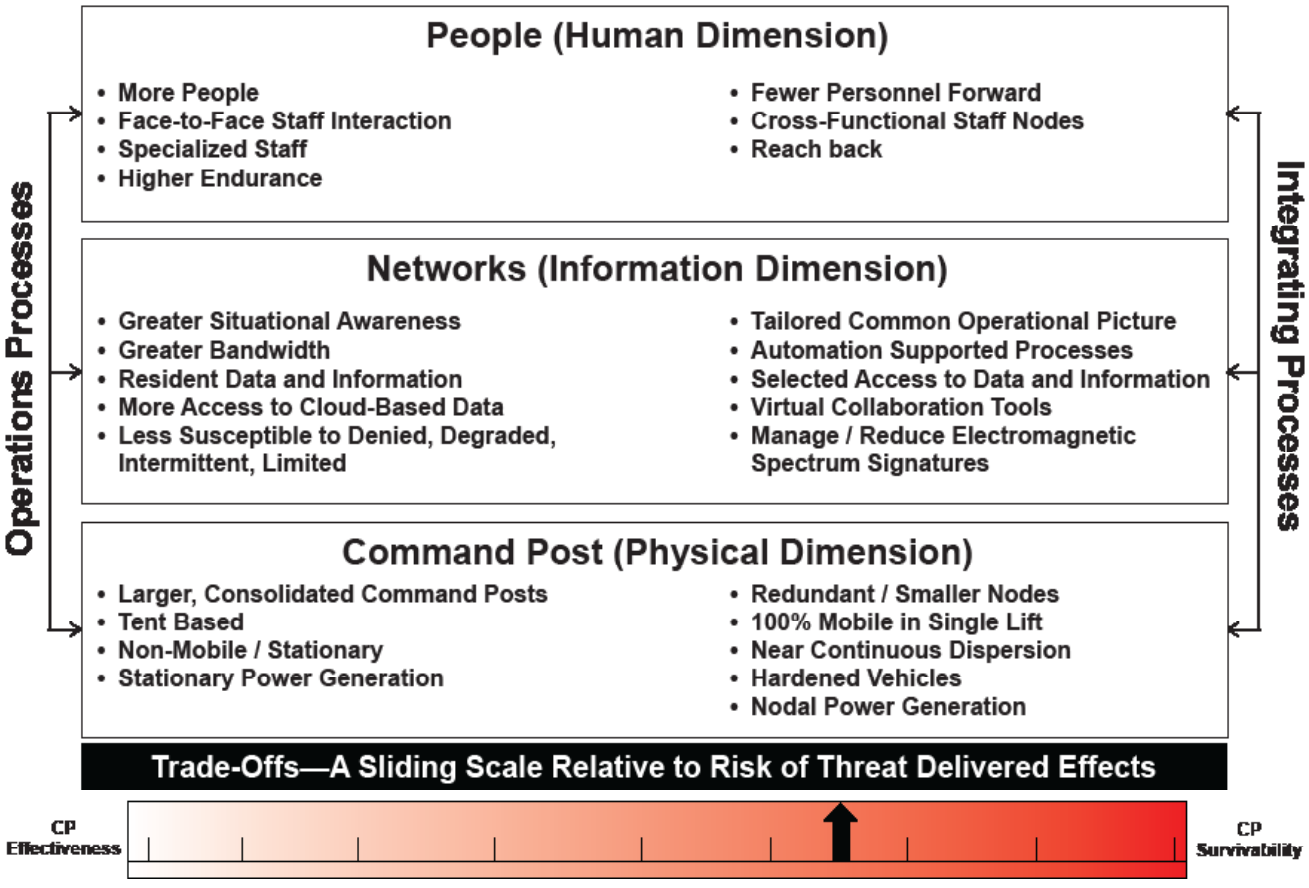
Lt. Gen. Milford "Beags" Beagle, U.S. Army
Brig. Gen. Jason C. Slider, U.S. Army
Lt. Col. Matthew R. Arrol, U.S. Army

Kherson International Airport, Chornobaivka, Ukraine, is heavily damaged 7 December 2022 after Ukrainian forces destroyed diverse Russian targets there including a Russian command post. (Photo courtesy of the Ministry of Defense of Ukraine)

In Ukraine, the village of Chornobaivka is legendary.[1] Songs are written about it.[2] Throughout 2022, the small town and its airfield on the outskirts of Kherson were a meatgrinder for Russian forces. From its original occupation in February to its liberation in November, Ukrainian strikes rained down with a precision and lethality rarely seen in war and allowed a scrappy defender to take down a regional leviathan.[3] Patriotic enthusiasm aside, closer inspection of this hard-won victory reveals that lurking beneath the wreckage of Russian ambitions in the Kherson Oblast is a warning about the vulnerability of legacy command posts that the United States and its allies would do well to heed. The story of Chornobaivka is one of relentless assault on command and control characterized by a systematic attack on Russian command posts at scale and across all tactical echelons.[4] Over the span of eight months, the Ukrainian fires strike complex successfully attacked the headquarters of Russia's 8th Combined Arms Army, the 49th Combined Arms Army, the 22nd Army Corps, the 76th Guards Air Assault Division, the 247th Guards Air Assault Regiment, and their subordinate elements over twenty-two separate times.[5] These attacks significantly degraded the Russians' ability to plan and conduct coordinated operations on the western side of the Dnieper River. The loss of effective command and control sapped Russian momentum and prevented Russians from consolidating gains, which ultimately led to their expulsion. In the process, Ukraine struck down high-level Russian leadership, killing Lt. Gen. Yakov Resantsev, commander of the 49th Combined Arms Army, and nearly killing Lt. Gen. Andrey Mordichev, commander of the 8th Combined Arms Army.[6] Beyond Kherson, this pattern has been similar if less concentrated. Ukrainian attacks on command posts across the country have led to stunning attrition among senior Russian military leaders.[7] This reflects a programmatic approach to striking at the capability and will of the Russian forces by removing their source of purpose, motivation, and direction. By any measure, the Ukrainians' success is impressive. More than 1,500 officers have been killed in Russia's war on Ukraine, including ten general officers and 152 colonels and lieutenant colonels.[8]

Some suggest the Russian experience at Chornobaivka and elsewhere can be explained by the Russians' inability to overcome challenges in professionalism, training, and communications, and a

Lt. Gen. Yakov Rezantsev, commander of the Russian 49th Army of the Southern Military District, is the highest-ranking Russian officer the Ukrainian military claims to have killed. Ukrainian officials assert he was killed 25 March 2022 as a result of a Ukrainian strike on his command post at the Chornobaivka airfield northwest of the city of Kherson. (Photo courtesy of pobeda26.ru/east2west news)



Current Command Post Paradigm

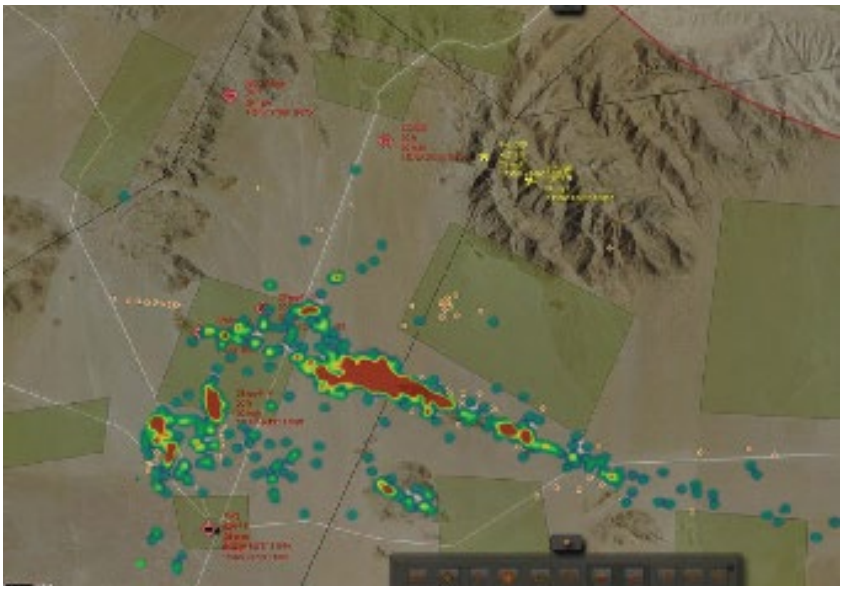
This graphic represents the current necessary trade-off between CP effectiveness and CP survivability, dependent on the threat level. Our current paradigm and the associated command-and-control systems and infrastructure necessitate a trade-off in a "fight tonight" scenario. However, implementation of the recommendations in this article will decrease the trade-off, resulting in redundant command post capability that retains both effectiveness and the agility and protection to ensure survivability. (Figure by the Mission Command Center of Excellence)

fundamentally different philosophical approach to command and control.[9] Pinning Russian woes solely on ineptitude, while true to some extent, downplays the effect Ukrainians are having in systematically dismantling their enemy's command-and-control system through multidomain targeting. Furthermore, the Ukrainians are achieving these effects without the benefit of a substantial air force or extensive long-range fires.[10] Limiting this problem to failures in Russian military leadership ignores the fact that technologies and capabilities exist today that can enable and deliver devasting effects on command and control. U.S. adversaries, including the Chinese, have made attacking our command-and-control systems a stated objective.[11] Specifically, command posts are targeted because they have become easily targetable. Contemporary tented command posts—with their radio frequency emitting antennas, dozens of generators and vehicles, and extensive support requirements—are easily targetable to even the untrained eye. During large-scale combat operations, these command posts can be easily seen by an ever-expanding array of sensors and just as easily struck by complementary effects throughout the depth and breadth of the battlefield. For anything as ostentatious as a modern command post, no true sanctuary exists.[12] While we may be quick to point fingers at the Russians, Western command posts have significant challenges with survivability. Even where efforts have been made to improve the mobility of command posts, our inability to hide the multispectral signatures of these massive structures coupled with persistent battlefield surveillance and precision weapons negates any

benefit achieved and likely renders a second strike unnecessary.[13] At higher echelons, this survivability problem is exacerbated.[14]

The battle for Chornobaivka brings into focus a theory of warfare, introduced during the Nagorno-Karabakh War of 2020, that lays bare the lethality and transparency of the modern battlefield through the concerted employment of multidomain effects on the command-and-control warfighting function.[15] It reveals an imperative to rethink command posts for this new era of warfare. In the face of this immediate threat, the U.S. Army must transform command and control to incorporate the tenets of multidomain operations (MDO) as it transitions to this new operating concept across all warfighting functions. To fight and win on the modern battlefield in large-scale combat operations, Army command posts can and must become more flexible, agile, and resilient while not sacrificing effectiveness. Otherwise, our command posts will be a place our leaders go to die.

An understanding of how our command posts need to evolve must begin with an appreciation for the role command posts play in our Army. Having defined their function and current form, it will then be possible to illustrate how that form is unfit for its purpose and at odds with the tenets of MDO. This will enable a discussion on a better approach to facilitating multidomain command and control, with near-term goals and an objective end state optimized for large-scale combat operations.



A satellite image shows the electronic emissions signature of a brigade combat team (BCT) training at the National Training Center (NTC), Fort Irwin, California. The BCT is attacking southeast to northwest to seize several mountain passes (key terrain), while the opposing force (OPFOR) is conducting a reverse slope defense. The dispersed colored areas at the leading edge of the BCT and the greater intensity area to the lower left are the BCT reconnaissance units and lead maneuver battalions. The bright magenta-colored areas edged with yellow are various command posts and sustainment locations emitting highly conspicuous electromagnetic signatures. This image highlights the challenge of concealing modern-day command posts from detection and attack. The OPFOR at the NTC uses its electronic warfare systems to both generate images like this as training tools to show visiting units what their digital signatures look like from overhead sensors and also to target those units during the exercise using such imagery to simulate the actual threat posed by enemy detection and observation technologies on the modern-day battlefield. (Photo courtesy of Col. Scott Woodward, U.S. Army)

Army Techniques Publication 6-0.5, *Command Post Organization and Operations,* broadly defines a command post as "a unit headquarters where the commander and staff perform their activities" and states that "the commander alone exercises command within a CP [command post] or elsewhere."[16] This statement reinforces the purpose of a command post: to "assist commanders in the exercise of mission command."[17] For those unfamiliar

The current configuration of the Army tactical command posts poses a major battlefield vulnerability due to size and electronic signature. (Photo courtesy of the U.S. Army)

with the term, "mission command" is a philosophical concept in the U.S. Army that represents an approach to command and control that "empowers subordinate decision making and decentralized execution appropriate to the situation."[18] While not every nation or service views command and control the same, most view the purpose of the command post similarly, as a tool for enabling the commander's process for understanding, visualizing, describing, directing, leading, and assessing operations. Any suitable and acceptable form of command post must achieve these criteria.

Top photo: A close examination of this screen shot of the destroyed Russian army position 13 March 2022 reveals that the Russian command post configuration of vehicles and structures in the early stages of the invasion closely resemble most current U.S. command post configurations. (Photo courtesy of the Ukrainian Armed Forces)

Bottom photo: A recent overhead image of a command post taken by a UAV at the National Training Center, Fort Irwin, California, during a training exercise. Vehicles and tentage concentrated in a single location to maintain command and control over maneuvering units is a predictable pattern among many militaries today that is increasingly becoming a battlefield vulnerability due to modern detection and observation technologies that enable rapid targeting of such concentrations. (Photo courtesy of Col. Scott Woodward, U.S. Army)

Wrong Tool for the Job of Commanders Today

At its core, the current command-and-control dilemma reflects an imbalance in the functional requirements for command posts to be both effective and survivable. Throughout history, as the complexity and scale of war has expanded, so too has the organization, composition, and proliferation of command posts. Commanders and their staffs have tailored these structures to provide the best means to control formations in the chaos of war, deliver good decisions faster than the enemy, and increase effectiveness by leveraging the experience and leadership of the commander. In the nineteenth century, industrial-level warfare bred industrial models for command posts as well as the accompanying bureaucracy to manage them.[19] In many ways, this approach persists even two hundred years later, as represented by the Napoleonic Staff Model, which remains the predominant organizational design.[20] In the early twentieth century, the rise of airpower greatly improved the effectiveness of armies but complicated control and created a need to synchronize a third domain that would be subsequently joined by two others in the twenty-first century. A commander's need for control and knowledge across all these areas created a demand for human and technical decision-support

Members of the 1st Battalion, 12th Infantry Regiment, 2nd Infantry Brigade Combat Team, 4th Infantry Division, work inside their mobile tactical operations center at the Joint Readiness Training Center, Fort Polk, Louisiana. (Photo courtesy of the U.S. Army)

tools. While this initially manifested in the form of an ever-expanding functionally dedicated staff, today it also appears in the form of computer servers and the digital applications required for processing and discerning meaning from the sea of data in which our operations are now awash.[21] This insatiable demand for decision-quality information to enable understanding and commander visualization has only increased over time. In the current form, these tools and staff weigh on the agility of the command-and-control system and increase its vulnerability by orders of magnitude.

To increase survivability, commanders sought to protect their command posts by reducing their size, hardening them, splitting them up, camouflaging them, increasing their mobility, and actively defending them against all manner of threats including air, cyber, and electronic attack.[22] Advancing technology has been on both sides of this dilemma. It has provided communications, automation, and information technology to compress the structure of command posts and make them more productive. However, technology also created a gateway into further functionality and capability that added size and structure counterproductive to survivability. Generally, this ebb and flow of effectiveness and survivability has been incremental, with actions and reactions reflected in doctrine, material, and design more evolutionary than revolutionary.

Sometimes, evolution includes mutations that, if left unchecked, can metastasize into a vulnerability that requires a revolution to correct. Such is the case with U.S. command posts over the last twenty years, which have been rendered unfit for their purpose given the speed, complexity, and lethality of large-scale combat operations. Since 2001, the absence of an observable and aggressive threat allowed our command posts to gradually mutate during the Global War on Terrorism. Over the succeeding thirteen years following the invasion of Afghanistan, command posts progressively diverged further and further from a suitable model for large-scale combat operations. At the same time, their organization and systems allowed commanders to have unprecedented levels of control and situational awareness.[23] At times, this threatened the Army's very leadership philosophy

Soldiers demonstrate the Command Post Computing Environment prototype at Aberdeen Proving Ground in May 2017. (Photo by Dan Lafontaine, U.S. Army)

of mission command by enabling micromanagement by command posts that were overpeopled, overprocessed, overnetworked, and understressed.[24] Within the U.S. Army, one of the main reasons this gap expanded is because our entire doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) enterprise was oriented on lower tactical echelons to provide the forces and capabilities required for counterinsurgency operations. As an example, within the U.S. Army Training and Doctrine Command, the combat training centers evaluated the command posts of brigade combat teams for nearly two decades using a rubric that promoted a comprehensive and process-driven approach to targeting that previously existed only at the division level or above. This incentivized commanders to develop ponderous infrastructure to support capabilities for integrating complex operations without adequately punishing them for the resulting loss of flexibility, agility, and survivability.[25] Those combat training center "lessons," appropriate though they were for that time and mission, inculcated an entire generation of leaders with a sense of invulnerability inconsistent with highly dynamic, mobile, and lethal warfare against a capable enemy. The United States was not the only nation to adopt this approach; our NATO allies who dutifully participated in counterterrorism and counterinsurgency operations around the world followed suit.[26] Even our adversaries, hoping to replicate successes in Operation Iraqi Freedom and concerned with their own expeditionary regional entanglements, expanded the sizes of their headquarters at tactical echelons.[27] Ironically, commander's experience, knowledge, and intuition today are backstopped by an unprecedented system of functional experts and technical tools that significantly reduces their decision risk but exponentially increases risk to mission and their personal safety. While there is not space here to fully examine all the implications of this period for command and control, each component of DOTMLPF must be evaluated independently to assess our experience since 2001 and its effect on the command-and-control system and our command posts. Today, our command posts have mutated away from the lean, mean, killing machines we need and are instead fat and ponderous.

Putting the Right Tool in the Hands of Commanders

Change is coming. The release of the U.S. Army's capstone doctrine, Field Manual 3-0, *Operations*, in October 2022 codifies a significant departure for all warfighting functions from legacy foundations and seeks to drive the Army to sustained dominance of the land domain while operating in multiple domains in the twenty-first

century.[28] Recognizing the challenges of the current environment, MDO emphasize that command posts, as an element of the command-and-control system, must adhere to the tenets of *agility*, *convergence*, *endurance*, and *depth*. To optimize our command posts, we must reduce our reliance on the physical dimension (the material), increase our utilization of the information dimension (the data), and maximize our relationship with the human dimension (our leaders). These three mandates provide the framework for a new rubric to assess and evaluate command posts across the Army's training programs. To develop a new foundation for command and control, examining each of the tenets of MDO will help distinguish what truly constitutes an acceptable, suitable, and complete command post design; one that is both effective and survivable in large-scale combat operations against a capable enemy.

> By the Army's definition of *agility*, 'the ability to move forces and adjust their dispositions and activities more rapidly than the enemy,' our current command posts are not providing us with any demonstrable advantage.

Agility. By the Army's definition of *agility*, "the ability to move forces and adjust their dispositions and activities more rapidly than the enemy," our current command posts are not providing us with any demonstrable advantage.[29] Agility denotes speed and the nimbleness to change quickly. At present, our command posts are locked in an endless cycle of the work required to establish, disestablish, displace, and emplace to remain survivable and keep pace with operations. This alone disrupts operational tempo and degrades decision advantage even without enemy interference. Increasing mobility by divesting tentage and transitioning to vehicle mounted systems will help but not eliminate this problem. Increasing mobility will not change the fact that when our command posts arrive at their new location, they will not be more than what they were before. For example, a brigade command post cannot rapidly become a division command post, even though a brigade command post may have to assume those roles and functions with less capability if the division command post is destroyed. If we organize our command posts around what is truly important, the commander's processes, then we can be indifferent about what provides those processes. If we envision our command posts as less of a place or a thing and more as a service, it may be possible to vastly increase our agility. What happens if a corps, division, or brigade commander arrives, takes control of any command post, and receives the capability of the appropriate echelon with a push of a button? What if command posts at higher tactical echelons were truly fungible based on connectivity and accessibility of data? What if, instead of tents and dozens of vehicles and generators, the command post capability could be delivered in a footprint the size of a personal security detachment (three to four vehicles)?[30] This approach to achieving the tenant of agility could be a game changer and enhance the commander's ability to achieve decision advantage in a hyperactive environment. In MDO, decision advantage is leveraged to enable convergence of joint and Army capabilities.

Convergence. Newly introduced in Field Manual 3-0, the tenet of *convergence* is "an outcome created by

Corps C2 Vignette

These capabilities enable a scenario where a corps commander, dislocated from the corps command post but collocated with a subordinate brigade commander on the battlefield, is contacted by his staff on a tactical radio to request an unanticipated high-risk and time-sensitive decision. The corps commander immediately accesses the brigade command post capability, and uses a pull-down menu on a common operational picture application enabled by the cloud and mesh network that gives immediate access to the visualization and decision support tools the commander needs to make the decision.

An M1087 Expandable Van Shelter houses the Command Post Integrated Infrastructure System under operational test by the 2nd Infantry Division's 2nd Stryker Brigade Combat Team at Joint Base Lewis-McChord, Washington. (Photo by Sgt. 1st Class Frederick E. Estep, U.S. Army Operational Test Command)

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."[31] In part, convergence is achieved through combined joint all-domain command and control and therefore must be a driving factor in the composition of future command posts. Convergence reminds us that, far from giving up capability at echelon to simplify our activities, any acceptable command post design must be able to achieve even greater effectiveness through more robust integration and interoperability. Command posts that connect sensors, shooters, and decision-makers enabled by machine learning and artificial intelligence will transform the legacy kill chain into a kill web to create "exploitable opportunities that enable freedom of action and mission accomplishment."[32] This mandate for data integration positions decision-quality data that enables commander's processes (e.g., understanding, visualization) at the heart of the modern command post. To retain agility and enable the constant flow of the right data to the right leaders, command posts can no longer rely on legacy stove-piped systems, on-site servers, and the accompanying support mechanisms as the primary means to support decision-making. Instead, we must migrate to the cloud and leverage data mesh and data fabric concepts to ensure data is secure, organized, and available in a manner that is usable for commanders and their staffs. For those unfamiliar, data mesh and data fabrics are complementary approaches to data management that enable connectivity and accessibility. A data mesh is a decentralized data architecture that federates data production, management, and sharing within and among domains.[33] A data fabric is a domain within the data mesh that automates data integration and enables connectivity and access to find, create, and widely share data products across the breadth and depth of the battlespace, including with joint, allied, and partner forces. These data management concepts within the civil sector enable endurance and agility of our command posts, reducing reliance on single platforms or repositories that have the potential to be trapped and isolated as a result displacing command posts or the effects of enemy actions. Here we begin to see the shift away from the physical dimension and toward the informational, which requires significantly different approaches and skill sets to facilitate operations.

In data-centric command posts, commanders may rely on development, security, and operations professionals who could expedite the secure development and integration of new applications on operational timelines and forward at the point of need.[34] These data professionals will replace the legacy employment of the operations sergeants responsible for configuring and organizing the network-centric command posts we have today. This would essentially provide commanders with the flexibility to fine tune their command-and-control system based on unique mission requirements and leader preferences. To remain survivable, we must also divest command posts of the physical collocation of anything delivered "as a service" (aaS). This includes communications (CaaS), radios (Raas), and especially, knowledge (KaaS). For those unfamiliar with the as-a-service model, aaS is a disruptive business approach that outsources the burden of

ownership-based sustainment that requires the functional expertise and infrastructure to operate and maintain. Those past practices reinforce dependencies on legacy systems and skill sets, which stagnates innovation.[35] The aaS approach enables rapid adoption of emerging technology and mobility, and it opens the door to competition among providers, which ensures our soldiers have the very best capability available. Consider, for example, the unique and creative ways that the Ukrainians are using Starlink's capabilities without owning the satellites and the associated skill sets and support infrastructure. However, decreasing commanders' reliance on the physical dimension in favor of the information dimension will increase survivability by reducing the overall command post signature and the need to aggregate staffs in a single location. To achieve the full potential of convergence, command posts will need to adapt to such an extent that they will be unrecognizable to the generation of leaders that fought in Iraq and Afghanistan.

Endurance. *Endurance*, defined as "the ability to persevere over time throughout the depth of an operational environment," is the next critical tenet of MDO.[36] While more capable and agile command posts provide apparent benefits toward endurance, preserving that command-and-control capability over time will occur in the harshest and most-lethal conditions imaginable. Command posts must demonstrate resilience and persistence in temporary isolation and under austere conditions. This also implies that even highly mobile command posts must be protected in a way that our current expandable vans and tentage are not. They must be armored, and we must develop solutions that deliver scalable capability to units where hardening command posts will be difficult, including our airborne and light expeditionary forces. To this end, we should pursue command post capabilities that are multimodal, with vehicle-mounted capability that can be quickly and easily dismounted to occupy hardened structures and blend into dense urban terrain. Command posts must also be capable of masking their signature to complicate an adversary's targeting by concealing their visual, thermal, electronic, acoustic, and soon, their quantum signatures.[37] Ultimately, if we can reduce the size and structure of command posts at all echelons to a few tactical armored vehicles, the extraordinary signature of our high-tactical and operational command posts will fade into the normalized electromagnetic spectrum and background clutter of a battlefield where armored vehicles are ubiquitous. In this way, we may deny the enemy the ability to discern priority and high-value targets, a valuable skill in an environment that may be characterized at times by a shortage of precision munitions. This approach reinforces the Sun

The 4th Infantry Division completes set up of a new division tactical operations center in December 2021 at a Fort Carson, Colorado, training area during the Command Post Infrastructure Integration (CPI2) test. The design of CPI2 enables a division headquarters to be scalable, modular, and agile while reducing the physical area required of tactical operations. (Photo by Maj. Monty Blamires, U.S. Army)

The Department of Defense has selected a mobile power program from Army Futures Command to increase the speed at which on-the-move power capabilities are delivered to the battlefield. (Photo by Dan Lafontaine, U.S. Army Combat Capabilities Development Command, C5ISR Center Public Affairs)

Tzu dictum that "all warfare is based on deception" and applies it to our command posts, thereby setting the tone we hope is reflected in the operations they direct.[38] We must also not forget that survivability, whether physical, informational, or human, is just one aspect of endurance. Endurance also has a sustainment aspect, which implies that whatever command-and-control system is fielded, it must be capable of operations for an indefinite period. In the past, this may have implied a mountain of logistics and personnel to support work–rest–maintenance cycles. In the future, this problem may be overcome by simply transferring mission command to any one of many distributed command-and-control nodes within a constellation of distributed nodes in much the same way industry manages global workflows.

Depth. Finally, in assessing future command posts against the remaining operational tenet, *depth*, we can measure the ability of command posts to "extend our operations in time, space or (cognitive) purpose."[39] In the expanded multidomain operational framework, this suggests a command-and-control node that optimizes its effectiveness to exploit or create opportunities in a way that offsets the hyperactive nature of large-scale combat operations to give the commander a comparative advantage. This advantage is also achieved through the integration of combined joint all-domain partners, offensively and defensively. It enables the delivery of effects across all three dimensions, human, physical, and informational, and throughout the entirety of the operational framework while simultaneously protecting its own combat power. These complementary efforts allow friendly forces to apply combat power against enemy capabilities to achieve advantages in time and space. The results can also disrupt the cognitive depth of an enemy, by interrupting or extending their decision cycle, further generating advantageous conditions for a friendly commander. The combined effects across the temporal, spatial and cognitive aspects of depth extend the operational reach of friendly forces.

The Human Dimension

War, now and in the future, is and will remain a human endeavor. The fact that command posts exist at all speaks to the limits of the commander's unaided human capacity for understanding and decision-making as well as the need to amplify the effectiveness of their leadership beyond their physical reach. Thus, the importance of the human dimension and psychology in command and control during large-scale combat operations cannot be overstated. In examining the value of any current or future command post model, the proximity of leaders matters—more so when employing the U.S. Army's command-and-control philosophy, mission command, which places such a great emphasis on trust, shared understanding, intent, and subordinates' initiative.[40] During large-scale combat operations, commanders must have the ability to be physically present to provide leadership but also to quickly move to where they are needed to gain understanding. From a morale and motivational standpoint, leaders, especially in the land domain, must be seen to share the hardships and danger of those they lead. The trust and cohesion necessary for mission command is derived from a commander's personal stake and involvement in the conduct of operations. Currently, this occurs in a physical sense through "battlefield circulation" and presence at unit locations, which is both time consuming and potentially high risk. Alternatively, a commander can virtually bridge the proximity challenge through voice

communications, but this approach provides limited context and may not always meet the psychological needs of subordinates under stress. At Chornobaivka, insufficient communications were one of the reasons Russian senior leaders were deployed so far forward, even for the simplest operations. Considering this, a command post should have assured and redundant communications that enable a sense of proximity between commanders and staff and the leaders and the led. Given these challenges and desirable characteristics, imagining a future command post is difficult, but not impossible.

Organizational Design and Employment of an Objective Command Post

To avoid our own Chornobaivka and provide command and control that possesses the characteristics of agility, convergence, endurance, and depth, an effective and survivable command post must exist in a nonphysical construct. We must aggregate and integrate functions, processes, and capabilities but not the people, equipment, and things that have historically been associated with delivering them. While this may seem to violate the feasibility criteria of course of action development, deeper analysis reveals the technology currently exists, and the world of online gaming is showing us the way. To meet the tenets of MDO, we must rely heavily on both augmented and virtual reality. The Army is already experimenting with both technologies but has yet to fully pursue their utility in the command-and-control space.[41] In a virtual world, commanders could replicate, expand, traverse, and interact as needed with their entire physical command post and never have to leave the room or vehicle they are in. They could move between command posts seamlessly and be present wherever and whenever needed. One vision of future Army command posts could be a proliferation of small three-to-four-armored-vehicle command-and-control nodes that represent what was formerly a "functional staff tent" in the legacy structure. These nodes would be broadly distributed and mobile on the battlefield. Supported by software and hardware engineers, commanders and staffs would be able to organize these nodes around a variety of tasks, time horizons, or crossfunctional areas. These distributed command-and-control nodes would be connected and able to conduct operations in the physical environment. Enabled by augmented reality, commanders and staffs could also access an immersive virtual space and whichever command-and-control echelon they needed. This would allow commanders to initialize, configure, and connect to a constellation of command posts and maintain access all data, knowledge, and decision support tools within the data mesh. By flooding the area of operations with a constellation of command-and-control nodes dispersed over wide areas and employing masking techniques to reduce their battlefield signatures, the effectiveness of the most capable enemy's targeting processes would be minimized. If command-and-control nodes operated alongside tactical maneuver elements of similar design, it would further exacerbate the enemy's targeting dilemma. Unfortunately, assured communications would be even more critical in this approach and would require significant bandwidth. However, recent developments in space-based capability and the science of quantum communications indicate that bandwidth may not be a limiting factor in the foreseeable future.[42] Quantum solutions might also allow us to discard our reliance on legacy antennas and the risks associated with electromagnetic signatures on the modern battlefield.

Aside from communications, this approach will require significant work from developers and the synthetic training community to achieve an "Avatar" level of virtual reality where commanders and staff forget that they are interacting in a virtual world.[43] The advantage of a commander who is able to project their presence anywhere on the battlefield without having to be physically present would be revolutionary. The path to the objective end state described here is resource intensive and will take focused and directed guidance from senior Army leadership, partnership with industry, and political buy-in. But it can and must be done.

Think Big, Start Small, Go Fast, and Institutionalize: A Practical Demonstration

The magnitude of the change suggested above will inevitably draw criticism and opposition and require early "wins" to gain support and momentum. A successful effort to introduce this idea into our command-and-control system will need to start small and demonstrate utility through experimentation. A good test case for a multidomain-operations-capable command post relying on virtual and augmented reality would be to experiment with an organization constantly challenged

to maintain physical and functional integration in an operationally dynamic environment, the division joint air-ground integration center (JAGIC). This small, thirty-person command-and-control node is comprised of both Army and Air Force personnel and liaison elements executing a variety of functions. Currently, they must come together to manage the employment of joint effects effectively and efficiently in the close fight. Despite their value, the problem these organizations inherently have is that, in garrison, they do not exist. When needed for training and operations, JAGICs are formed from the division and air support operations squadron staffs. As such, they are very difficult to form, train, and maintain to a high degree of proficiency, much less expertise, given the demands of manning cycles and garrison activities aligned against them. In this case, a virtual JAGIC could serve as a microcosm for a full command post. Thus, the experiment would simultaneously address an existing real-world and persistent readiness challenge and chart a path toward improved command post capabilities for the entire Army.

Conclusion: Whistling Past Chornobaivka?

Oft in the lone church-yard at night I've seen,
By glimpse of moonshine chequering through the trees,
The school-boy, with his satchel in his hand,
Whistling aloud to bear his courage up …

—Scottish Poet Robert Blair, 1745[44]

Any casual visitor to the Army's National Training Center these days, with a watchful eye on the Ukrainian war through their Twitter feed, can attest that U.S. Army command posts are going to struggle in that environment. While the Army may not be able implement a revolutionary new command post structure optimized for large-scale combat operations overnight, neither is it helpless if faced with the imminent prospect of war, even against an adversary as capable as the Chinese. Every day, commanders can start preparing for that environment, assessing their command posts from the standpoint of conducting MDO during large-scale combat operations and with a realistic appreciation for the threat. Leaders at division level and above can help by doing more of the heavy lifting of joint integration, targeting, and other enabling processes for those at the tactical edge. At the same time, the Army must stay focused on the future. The technology is either here, or on the near horizon, to make everything discussed in this article possible. Given the state of the security situation in the world, it is unlikely that we have time to address the challenges of our command posts through incremental changes. The U.S. Army and the West must respond to the lessons of Chornobaivka with a sense of urgency, leadership, and unity of purpose on the modernization of our command post systems. ■

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Notes

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Smoke rises over the Ukrainian capital Kyiv after Russia unleashed a barrage of deadly missile attacks on cities across Ukraine as part of a wave of strikes against civilians and infrastructure in October 2022. This photo reveals the massive concentration of population together with industry, manufacturing, road networks, bridges, and electricity-generating facilities that make urban centers essential terrain for adversaries attempting to assert geographical, political, and economic control during periods of conflict. (Photo by Ukrinform, Alamy Live News)

Decided among the Cities

The Past, Present, and Future of War in Urban Environments

Maj. Michael G. Anderson, U.S. Army

Cities not only possess cultural and psychological value for combatants, but they are also sociologically and geographically anchored to multiple aspects of military key terrain. Cities sit astride, near, or encompass major ground routes (road and rail), major water crossings such as large bridges, and logistical and power projection hubs for sea and air. The ongoing conflict in Ukraine provides an immediate example of the importance of cities themselves and what cities contain. Moreover, the importance of cities is apparent with a study of history. However, even with history and current events, there is faint acknowledgement of the importance of the urban fight in military theory, and it has limited coverage in U.S. Army doctrine. When acknowledged, urban operations are largely discussed in commentary on their inherent difficulty, the natural aversion to costly fighting characteristic of urban combat, and with the recommendation to bypass or avoid city fights altogether. However, as history and recent examples in Ukraine demonstrate, conflicts often are decided among the cities. The physical and infrastructure characteristics of cities naturally and geographically can make control of them critical for victorious military campaigns. The one who can seize and hold the city controls, or just denies, crucial capabilities to military operations.

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Early observations indicate Russia's war in Ukraine hangs in the balance and appears it will be won or lost in the cities. Ukraine's defiance in the northeast, holding Kyiv and denying Russian advances in Chernihiv and Kharkiv, altered Russia's operational calculus.[1] The prolonged resistance in Mariupol consumed multiple Russian tactical battle groups that could have been better employed to support other offensives; the stoutest resistance for weeks was in the four square miles of the Azvostol Steel Plant with its complex, dense collection of buildings and intricate woven underground passageways.[2] Even the seemingly casualty-accepting Russian President Vladimir Putin called off further offensive advances into the plant to preserve Russian lives.[3] While the overall performance of the Russian military has surprised many, its poor performance in urban fighting has not. Russian forces were unprepared for much of this war, but most distinctly for urban operations.[4] While they had attempted to modernize in platforms and weapon systems, their military training and organization from the short-term conscript system to the lack of a definitive noncommissioned officer corps set them up for failure beyond combined arms to also include in urban terrain.[5]

The Symbolically Driven Fights over Cities

The battle for Kyiv mattered as a symbolic Russian attempt to delegitimize Ukrainian sovereignty and swiftly conduct regime change. History is replete with examples of the importance of cities, both successful and failed attempts from Carthage and Rome in the Carthaginian Wars to Richmond in the American Civil War, and to a more modern example of Baghdad in Operation Iraqi Freedom.[6] The symbolism of cities as a wartime measure of psychological importance and their influence on morale even expands beyond that of a simplistic capital city sociopolitical center-of-gravity concept. Other cities draw decisive battles beyond capitals. For Ukraine and Russia, Mariupol became a symbol of resistance with a distinct past as it had been a city that changed hands in 2014.[7] These so-called "hero cities" in the current war have evolved beyond the importance of their physical terrain and into cities with psychological and morale importance all their own. This status further draws forces into city fighting not only to secure the physical terrain that may or may not be operationally or strategically important but also because the mere resistance to capture from the city has grown to be seen as symbolically important. In history, a city of similar psychological importance stands out

from the Second World War: Stalingrad.[8] And in an Asia-Pacific example, the fierce urban fight over Manila during Gen. Douglas A. MacArthur's Philippines liberation campaign shows a city's importance in drawing armies into an unwanted urban fight.[9]

A military's tactical inability to successfully wage urban warfare, whether it wants to or not, can have decidedly psychological and morale impacts on the larger operational and strategic, even political, aspects of the conflict. But cities have an unavoidable effect over wartime success beyond the symbolic or political. The symbolic can be managed by deftly skilled information operations, and politically potent targets can always be moved. Capital cities have fallen in the past, but combatants stubbornly kept fighting, such as the evacuation of Moscow in 1812 and again in 1941, and the burning of Washington, D.C., in the War of 1812. However, the loss of these capitals did not end their respective wars.[10]

The Logistics-Driven Fights over Cities

Over time, cities naturally grow up around major ground lines of communication. Lines of communication can be militarily key terrain, and their possession can decide operational success or failure. Russian logistics are driven by rail.[11] Ukrainian cities of Sumy, Chernihiv, Kharkiv, and Izyum across the northeast and east of the country matter because they contain or are near railheads. Seizing these rail hubs is a must for Russia, and these railheads naturally exist within urban environments. Russia had to seize the crucial rail areas associated with Sumy, Chernihiv, and Kharkiv in its opening northeastern operation to take Kyiv. Russia's failure or delays in securing these cities with their surrounding infrastructure interrupted and contributed to its logistical failures, resulting in its inability to advance and successfully envelop Kyiv. Russia's tactical failures resulted in an aborted northeastern operation at Kyiv and a shifted strategic focus because of the inability to take certain cities.

Cities naturally form around railheads. During the American Civil War, and building up to then Maj. Gen. Ulysses S. Grant's Vicksburg campaign, the critical seizure of the railroad hub city of Corinth cut off rebel supply and reinforcements from Vicksburg and opened those same lines to the U.S. Army's continued encirclement of the river bastion city.[12] During World War II, the Allies' strategic bombing campaign revolved in part around targeting logistical hubs, specifically found in large cities, in accordance with air power theorists such as Giulio Douhet and Billy Mitchell.[13] While admittedly not winning the war solely from the air by bombing these railways, it disrupted Axis efforts and supported the Allies' ground forces' seizure of those cities.

Road network hubs, much like rail hubs, also commonly have urban development in their immediate vicinity, which is a natural sociological and economic condition. As Russia withdrew from its initial Kyiv access and refocused on the eastern Donbas region, extensive road network intersections such as those around the small city of Izyum became important, leading to multiple operations and counteroffensives to fight over these road intersection cities. Much like the importance of Bastogne during the Second World War, the resistance and contest over Izyum played into Russia's encirclement attempts.[14] Contemporary motorized and armored armies require hard surface roads to provide the high-demand sustainment for large-scale combat and flexibility in operational maneuver. Without securing multiple road networks and hubs, forces are even more anchored to railways, airfields, and ports.

Additionally, large inland waterways spanned by extensively reinforced heavy-tonnage bridges commonly are in or near developed cities. Historical examples of the importance of major bridges crossing large bodies of water include the World War II failures at Arnhem during Operation Market Garden and the successful seizure of the bridge over the Rhine in Remagen.[15] In the opening push of Operation Iraqi Freedom, the First Marine Division's plan revolved around the seizure of An Nasiriyah and holding the large bridge over the Euphrates.[16] And bridges and their surrounding urban development have become a common scene of major fighting in the Donbas theater of the Ukraine conflict around the devastated city of Sievierodonetsk.[17] Fights for cities span more than just railroad hubs, road networks, seaports, and airfields to support sustainment; they increase in importance in their broader, even more critical role as power projection sites, inherently dominated by the urban sprawl that inevitably grows around major ports and airfields. Moreover, the seizure and security of the cities either through direct action or encircling efforts reduced resistance.

Infantrymen of the 3rd Armored Division advance under artillery fire in Pont-Le-Ban, Belgium, 15 January 1945. (Photo courtesy of the National Archives)

The Power Projection and Resistance Fights over the Cities

The Russian efforts in Mariupol and Odesa along Ukraine's southern coast center on their importance as port cities to the Sea of Azov and the Black Sea, respectively.[18] These ports and their outgrowth urban environments influence the security of the Russian Black Sea fleet based out of Crimea, control shipborne export/import trade, and are directly tied to military operations over-the-water logistics and power projection of forces. Russia expended significant effort in taking Mariupol by creating its land bridge from Crimea to Russia and sealing off the Sea of Azov. It also served as a symbolic victory over Ukrainian resistance but at a heavy cost. Even as Russia is suffering limitations in operational reach, it still threatens Odesa as another major Black Sea port it desires to further cut Ukraine off territorially from the sea. Control of these ports would allow Russia to project power from the Black Sea fleet with troop and logistics movements from what is still contested key terrain.

The American Civil War's coastal actions demonstrate the importance of securing an opponent's coastline and cutting them off, which involved efforts against cities. In these cases, it was not about Charleston, Wilmington, or New Orleans specifically, though the fall of each had significant additional benefits beyond port access. It was about cutting off the rebel southern states from trade and transport.

Similarly, in the Second World War, the Allied efforts to besiege Brest also exemplifies the urban actions involved in seizing critical, large ports. It was more about having port access to supply the ground forces in Western Europe than to control the cities of Brest, Le Havre, Antwerp, or Cherbourg. Ports dominated the logistical calculus for strategic advances and drove operational planning.[19] The siege of Brest and the efforts to take Cherbourg after the successful Normandy landings regulated the advances across Western Europe. Even Adolf Hitler's final major offensive across the Ardennes, however improbable, had prioritized the targeting of the large city port of Antwerp as the focal point to cripple the Allies' advance.[20]

Manila serves as another example. Commodore George Dewey seized the harbor at the opening of the Spanish-American War but had to wait for the arrival of a ground force to then envelop and take the port by land.[21] As exemplified by Manila, any power projection operations in the Asia-Pacific will necessarily be designed around ports across the various archipelagos and littoral regions, which inherently are encompassed by built-up urban areas required to be taken to hold and operate the seaports.

Airports fall into the same category as seaports in that they are a means to rapidly envelop and project combat power quickly, forward operate air support, and again serve as logistics centers. Large-capacity airports are commonly located around cities. An example of the critical importance of such airfields is the ferocious, back-and-forth fighting over the Hostomel airfield in the outer suburbs of Kyiv during the opening days of the war.[22] It was the scene of some of the bloodiest fighting early in the war, and some of Russia's best troops were sacrificed during their efforts to take

A marine with Regimental Combat Team 6 patrols the streets of Fallujah, Iraq, while fellow marines, Iraqi soldiers, and Iraqi police distribute food to the people during Operation Alljah on 8 August 2007. (Photo by Cpl. Samuel Corum, U.S. Army)

it to flow in more troops quickly for a rapid thrust on Kyiv. In Operation Just Cause, the rapid seizure of the Panamanian airport to flow in additional U.S. forces was crucial to the operation and involved incursions into the city.[23] For Operation Iraqi Freedom, there were early planning efforts for airborne and air assaults to take then Saddam International Airport prior to the unexpectedly rapid mechanized operations into Baghdad that took the airport and opened it to coalition use.[24] Operations utilizing these airports involved control of the surrounding cities through urban operations. The larger the city, the larger the airport, and the more sizable platforms and higher numbers of aircraft it can take. If large, paved airports are needed, urban operations will be included in their control.

Lastly, resistance fighters are becoming more urban. No longer is effective guerrilla activity springing up in the woods; it is originating in the urban sprawl of cities. Kherson is but one example of this in the current Ukrainian conflict, where Russia is experiencing significant resistance activities against its imposed occupational government.[25] This is largely because the nature of urban terrain strongly benefits the resistance in anonymity, access to media, presence of civilian congestion ripe for information operations and messaging for exploitation of occupiers' overreaction, manipulated disinformation of occupier actions, or even fictitious actions. Whereas in open, uncongested, and less dense terrain, reconnaissance and surveillance technologies strongly benefit the counterguerrilla for locating, tracking, and targeting resistance forces, the ability for guerillas to hide in urban sprawl neutralizes much of those technologies.[26]

A Cautionary Conclusion

Even with the importance of the city fight demonstrated in warfare throughout history, the U.S. military swings back and forth in placing emphasis on understanding urban warfare and how to effectively conduct it. Intellectually, the U.S. Army's former Asymmetric Warfare Group (AWG) filled a learning and training gap for the U.S. Army regarding combat in dense urban terrain with subterranean elements. The AWG, formerly headquartered at Fort Meade, Maryland, had

training sites at Fort A. P. Hill, Virginia, and a robust mobile training team that travelled to hosting units, training multiple brigade combat teams in urban warfare. However, AWG was closed along with the Army's Red Team Academy out of Fort Leavenworth, Kansas. To address the fears of the group's shuttering, the Army released a statement: "The functions of AWG, including the solutions to current and emerging threats, will transition to other Army organizations. Also, to ensure the utility of the organization's work over the past fourteen years is not lost, all lessons learned will be maintained by the U.S. Army Combined Arms Center (CAC), via the Center for Army Lessons Learned (CALL), Centers of Excellence (COEs), and other TRADOC enterprise stakeholders."[27] The Army also maintains an urban warfare study with the Modern Warfare Institute's Urban Warfare Project, and Fort Leavenworth's Army University Press hosts a Primer on Urban Operations section; each one continues the intellectual support to the Army's understanding of urban warfare, if one specifically seeks it out.[28]

Even with this intellectual support, the Army has shifted away from a deliberate urban training focus as it pivots more concertedly toward large-scale conventional combined arms fights. This shift has only been passionately heightened and embraced with the focus on Russia's full-scale invasion of Ukraine in February 2022, though there are now some positive undercurrents of acknowledging the realities and a "relearning" of urban fighting.[29] The Army is not alone in shifting away from this. The U.S. Marine Corps had embraced the deliberate study and training for urban fighting before a reprioritization shifted focus. Out of its innovative Marine Corps Warfighting Laboratory in Quantico, Virginia, in 2019, the Marines had a planned program called Project Metropolis II with a four-year life cycle as part of the Warfighting Lab's own urban focus.[30] However, as the Marine Corps shifted toward a littoral focus, it canceled the urban study project after only one year.[31] The first Project Metropolis was instituted during a three-year life cycle in the late 1990s under then Marine Corps commandant Gen. Charles Krulak to embrace urban operations. It had resulted in experimental equipment to include initial drone use, robotics, and communications, as well as changes in doctrine and tactics for urban operations and training for marksmanship and sustainment. Many people ascribe these benefits from Project Metropolis I to the success of Marine urban operations in Iraq during Operation Iraqi Freedom in places such as Ramadi and Fallujah.[32]

To bridge the gap from intellectual understanding and theory to practice, there have been calls in and out of the military profession for a more pointed embracing of the primacy of urban combat. These calls have included the creation of an urban warfare school and specialized professional military education.[33] It has also included some calls for specialized urban-focused units.[34] Even Congress became involved when the House of Representatives placed instructions for studies and reports by the Department of Defense on lessons learned from the urban operations against the Islamic State in Iraq and Syria. Additionally, in the same National Defense Authorization Act of 2020, Congress proposed a specific urban training center.[35] In the last few years, Gen. Mark A. Milley, first as the Army chief of staff and most recently as chairman of the Joint Chiefs of Staff, has made multiple public statements before and after the onset of the latest hostilities in Ukraine discussing the criticality of urban operations now and in the future of war.[36] Limited though important progress has been made, including the standing up of the Army's Urban Operations Planner Course.[37]

Even as there is give-and-take in the prioritization of understanding urban warfare through resilient intellectual commitment to its study, there is a wider gap in its practice. Current U.S. Army doctrine that does exist for urban fighting is largely rooted in the tactical fight: tactics, techniques, and procedures; battle drills; and small-unit skills.[38] While the urban fight is truly a decentralized small-level fight in execution, these squad-level block-by-block fights will not be conducted in a vacuum but in the growing expanse of dense urban terrain and rapid mass global urbanization. The joint Army/Marine Corps manual, *Urban Operations*, provides a foundation to build from but needs expansion and continued updating to current realities.[39] Ongoing revisions to the current doctrine are critically important and must make use of contemporary observations, informed by the study of the past and merged with developing theory for applied practice before the U.S. military finds itself in a sustained, high-intensity conflict inevitably involving dense urban

terrain. This calls for the expansion of operational level doctrine for large-scale urban operations. Fighting in a city has never been wished away by commanders and statesmen historically, and even now it is not the case. Sustained fighting in dense urban environments must be embraced doctrinally. Modern doctrine needs to be formulated, created, or updated, accounting for siege-like activities and large-scale sustained engagement across megacities and sprawling urbanization, and with incumbent cross interagency and partner coordination requirements and civil disturbance occurrences. There are studies and various lessons learned formats from the Center for Army Lessons Learned and the now shuttered Asymmetric Warfare Group that provide a foundation for this development; however, these documents, though providing framework, do not provide the authoritative guiding nature that official doctrine holds over the force and in professional military education and training.[40]

While battles are fought across varied terrain, the emphasis of this argument is that it is the fights in the cities over either the city itself, what the city contains, or what is in its immediate vicinity that it dominates that often determines the success of military operations. It is difficult to find a significant port, airfield, or rail hub in the middle of open, rural plains or an isolated coastline. These key infrastructures are often naturally surrounded, collocated, and have their access dominated by the inevitable urban environment they spawn over time. The future wars, as those often of the past, will be won in the cities, not always because of the cities themselves but because of what the cities possess. For this reason, the study, focus, resources, and training for urban planning and operations must be prioritized based on lessons from contemporary conflicts and history, with emphasis placed in developing military theory and expanding current doctrine to address the urban fight. ■

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Mechanics of the Ukrainian Army's 14th Mechanized Brigade pass by a damaged main battle tank 20 February 2023 at the brigade's workshop in the Kharkiv region of Ukraine. (Photo by Yasuyoshi Chiba, Agence France-Presse)

Analysis of Land Army Maintenance Techniques in the War in Ukraine

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As seen in the first images from the battlefield, the war in Ukraine has a predominantly technical dimension. Both the Russians and Ukrainians employ a huge number of tanks, armored vehicles, and artillery systems in combat operations. However, according to unconfirmed information from various sources, by the beginning of July, both sides had suffered huge losses of combat equipment.[1] Numerous photographs illustrate these losses, but numerical data will not be presented here. History shows us that estimates of combat losses are often far from reliable as they are subject to all kinds of distortions caused by the "fog" of war, wishful thinking, outright lies, and other factors.[2] Instead, this article analyzes the maintenance of combat technical systems in support of ground operations on both sides in the initial period of the war.

Tanks, armored vehicles, trucks, and weapon systems, in addition to suffering damage in combat, often fail under conditions of intensive use and increased stress. This equipment cannot be constantly replaced so maintenance and overhaul are very important as elements of the logistics of mechanized operations and should be analyzed. For example, armor battalions with relatively old M1A1 tanks averaged only 74 percent operational readiness during rotational training at the U.S. Army National Training Center from 1999 to 2001; four out of twenty-two battalions achieved less than 70 percent, which is often considered the breaking point for combat readiness.[3] The importance of maintenance in combat conditions is shown by the claim of French maintenance experts that up to a third of all tanks of a unit are constantly defective and are undergoing needed repairs.[4]

The system of maintenance of armed systems requires the use of technical resources that are significantly different from those normally used outside of the military.[5] When possible, national military-industrial overhaul capabilities are put into operation, and at the corps level, the technical potential of the maintenance system is based on four main elements: recovery vehicles, mobile workshops with universal equipment, special tool sets, and sets of spare parts.[6]

Ukrainian and Russian Military-Industrial Repair Capabilities

The heavy losses of both sides could be mitigated by the rapid repair of malfunctioning armored vehicles and massive refurbishment of old Soviet-era stocks, but how, and who can do it?[7] Major damage requires work at the level of a general overhaul, which can only be done in a stationary factory. For major repairs, facilities are needed with cranes and specialized workshops for complex systems and provisions for surface protection.[8]

A general overhaul can be cost-prohibitive in peacetime.[9] However, in wartime conditions when there might be no new production, the ability to overhaul broken equipment is one of the keys for any army to continue the fight. For Russia and Ukraine, it is vitally important to bring back to life the tanks and combat vehicles that have otherwise been rusting in vehicle graveyards for years.[10]

Ukrainian capabilities. The former Ukrainian Soviet Socialist Republic had a well-developed military-industrial complex and numerous industries capable of mobilization for mass repairs of military equipment. Most of the Ukrainian repair facilities were inherited from the USSR, and many military factories and overhaul facilities have been preserved.[11] Also, after 2014, several new companies appeared in the country, mainly related to the production and repair of armored vehicles.[12]

Before the Russian attack, there were about twenty large enterprises in Ukraine for the production, modernization, and repair of vehicles and armored vehicles (e.g., Kharkiv Mechanical Design Bureau Morozov, VA Malyshev Factory, Kyiv Armored Factory). They are located all over the country. Particularly large concentrations (clusters) of military factories have been in Kyiv and Kharkiv since Soviet times; the Kharkiv cluster is known for its legendary Soviet school of tank construction.[13] Their production programs contain many new models and modifications of some well-known models.[14] They are important for supplying the armed forces of Ukraine, and their maintenance systems are complex.[15]

During May 2022, the Russians destroyed the military-industrial complex and large repair facilities in Kiev and Kharkiv as well as in the interior of Ukraine.[16] At the beginning of the operations in the north, the Kyiv and Kharkiv clusters, due to the partial encirclement of these cities, were not able to accept damaged vehicles, nor could they send new or repaired weapon systems to the front.

According to available information, of the twenty largest enterprises of the armored vehicle industry of Ukraine, up to 20 percent continued or tried to

continue their normal operations by moving to a safe area or using suitable civilian facilities for repair in an urban area.[17] Ukrainian sources point out that those facilities are meeting their daily production schedules 100 percent every day.[18] They also point out that in addition to the repair and maintenance of the Ukrainian equipment, they also mastered the repair of the Russian captured equipment.[19]

A very important factor in equipment repair is the availability and management of overhaul and production documentation. Since the beginning of the invasion, Ukraine has worked to strengthen the resilience of the Internet in the country, which is important for maintaining and protecting documentation. Thanks to Microsoft, the management of digitized documents is carried out and maintained in a "cloud" warehouse outside of Ukraine.[20] Ukraine has also received some SpaceX Starlink transceivers to ensure secure satellite communications.[21]

It can be assumed that with the ongoing hostilities, the Ukrainian military-industrial complex will continue to decline due to the daily bombardment, but only if the Russians have enough long-range cruise missiles.[22] A report by the U.S. Congressional Research Service confirms that Ukraine's capacity to repair and maintain its military equipment has been severely undermined by Russian missile attacks on production sites.[23]

Russian capabilities. During the Cold War era, Russia maintained a large capacity for producing tanks and armored vehicles.[24] According to the information available in the Russian Federation, the largest producer of tanks at the moment is the UralVagonZavod; another large producer is the Chelyabinsk Tractor Factory.[25] UralVagonZavod is not currently producing the desired number of tanks, but instead it has focused on repairing damaged combat equipment.[26] Another factory reportedly lost its ability to manufacture tanks due to sanctions that hindered its ability to procure parts.[27]

A report by the Main Intelligence Directorate of the Ministry of Defense of Ukraine says that directors of Russian overhaul factories are refusing to repair severely burnt equipment brought back by rail from the war in Ukraine. This applies mainly to tanks and armored infantry vehicles. The reason is that much of the equipment is returned with burnt bodies, and repair requires demoralizing and expensive sanitation.[28] The report also contends there is a lack of components and money for this type of repair. Now,

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The UralVagonZavod factory in Nizhny Tagil, Russia, shown here in 31 July 2005, is the largest producer of tanks in Russia. The factory cannot produce enough tanks to meet the needs of the Russian Army and has switched its focus to repairing damaged equipment. (Photo courtesy of Wikimedia Commons)

however, there is no officially confirmed information from the Russian side.[29]

According to the Ukrainian intelligence services, Russia recently initiated the complete mobilization of companies in Russia to support its war efforts, potentially because of the problems with the repair of the returned military equipment.[30] Russian legislation now obligates companies to enter into contracts for government orders under military conditions. This means "working night shifts, working on holidays and weekends, and changing vacations."[31] In Russia, however, contracts concluded under military conditions do not provide compensation for overtime work. This law, says Ukraine, will support material resourcing from state reserves, mobilization capacities, and locations.

Recovery of Damaged and Defective Combat Equipment

For damaged or defective combat equipment to be repaired, it must first be evacuated to safety. This can be very difficult; a very striking example from the beginning of the war is when a convoy of Russian tanks, armored vehicles, and self-propelled artillery stopped in the vicinity of Kyiv. According to the British Ministry of Defense, the convoy was stopped in part by determined Ukrainian resistance but also because of mechanical failures and Russia's inability to recover and repair its broken vehicles.[32]

Recovering damaged assets and systems from the battlefield is a very important task. It is necessary to tow a damaged vehicle a safe distance to where there are facilities for maintenance and repair. Russian battalion tactical groups, combined battle formations of up to a thousand soldiers, have on average only one heavy BREM-1 and one light BREM-2 recovery vehicle, though there are more at the regimental or brigade levels.[33] Ukrainian forces use the same or modernized type of recovery vehicle.[34] During short-range operations, this is not a problem. Combat formations have organic capabilities to create effective security in the area where they are located on the battlefield. Recovery vehicles can quickly pick up broken equipment with a minimal escort, as friendly units are always nearby. Short towing distances allow recovery vehicles to make multiple turns in a short time,

A disabled Pacir-S air defense vehicle sits mired in the mud in Ukraine. Disintegrated tires on Russian combat vehicles and trucks in Ukraine are a sign of poor basic maintenance. (Screenshot courtesy of Crux via Youtube)

allowing Russian forces to settle for a minimum number of battalion-level recovery vehicles.[35]

None of this applies during deep operations. Damaged vehicles must be towed up to a hundred kilometers, and due to the lack of recovery vehicles, combat vehicles are often diverted to towing. Only a heavy recovery vehicle or a tank can tow another tank.[36]

Long road marches lead to a large number of broken-down vehicles, which significantly exceeds the means for recovery in the Russian battalion and regimental formations.[37] This is not only a Russian problem—it is common to all armies around the world.[38] In the north, the Russian army carried out deep penetration attacks, penetrating up to 120 km deep into Ukrainian territory. At first, not a single unit was left to secure the line of communication. This meant that the faulty vehicles were either abandoned or combat vehicles had to be diverted to tow them. Based on multiple images that appeared online, after a certain time, the Russian commanders decided to abandon their vehicles. The crews were initially left with them, but as partisan resistance from the Ukrainian side emerged, the Russian army stopped leaving the crews, fearing that they would be captured or killed.[39]

An Example of Poor Basic Maintenance

Experiences from the 1990s war in the Balkans have shown that basic maintenance is often poor or insufficient due to the high intensity of the fighting. Due to frequent battles with dangerous exposure to enemy fire, crews do not have time to devote to maintenance.[40] Moreover, poor maintenance can be attributed to the lack of crew training, especially for those replacing other crews lost in combat who did not have time for such training. According to Russian tank experts, basic maintenance is even more important than repair, because it is proper and timely maintenance that can maximally delay the a combat vehicle's departure for repair.[41]

Based on the available photos, we can talk about the poor basic maintenance of some Russian trucks. Trucks are the backbone of any modern motorized military force. The photo we refer to shows potential tire damage on a multimillion-dollar Pancir-S mobile missile system. With such an expensive combat system, it is expected that its maintenance would be first class. However, this vehicle was left stuck in the Ukrainian mud just a few weeks after the war began.[42]

If trucks are not moved often, the rubber on their wheels becomes brittle and the tire walls are susceptible to cracks and tears. The problem is common when tires are used with low pressure to cope with the muddy conditions that Russian forces have faced in the Ukrainian plains. When military truck tires are left in one place for months on end, the sidewalls become brittle in the sun and fail. No one has used that Pancir-S for probably a year.[43]

For Western experts who specialize in U.S. Army truck maintenance issues, the condition of Pancir-S is a revealing mistake. "If you don't do preventive maintenance for something that important, then it's very clear that the entire fleet was treated similarly," they say.[44] Photos provide evidence of other trucks with similar problems.[45]

Maintenance in Field Conditions

As mentioned, mobile workshops with universal equipment, special tool sets, and spare parts kits are very important for field maintenance.[46] In the Ukrainian army, the assumption is that big repairs are mostly carried out in hidden sites in rear urban areas to conceal the maintenance and repair process since the Ukrainians are exposed to bombardment by Russian long-range and cruise missiles.[47]

There is more information available regarding the Russians. According to the International Institute for Strategic Studies, the Russian army has "10 material-technical support brigades, supporting 11 combined armies, one tank army, and four army corps"; the Russian "Western and Southern Commands each have three armies and three material-technical support brigades to support them."[48]

The Russian army has formed mobile repair teams from these support brigades that are sent to the battlefield to repair less damaged and unburned equipment on the spot, installing new parts and assemblies. However, the establishment of forward repair and maintenance points, which are close to the battle lines, is very dangerous. Once the repair begins, the vehicles become immobile and cannot be moved in the event of indirect fire or attack by enemy forces in the rear.[49] For this reason, most maintenance is done in the rear in so-called repair bases. An example is the Tenth Special Regiment for Repair and Evacuation, which deployed a repair base in Crimea for the repair and overhaul of weapons and military equipment of the Russian army. This regiment is mobile, ready to deploy anywhere, and ready to carry out any type of overhaul of any complexity and at any temperature.[50]

Repair bases are equipped with all the necessary tools and accessories for carrying out any type of repairs, regardless of complexity and weather conditions. In these bases, craftsmen and engineers deal not only with defective equipment but also with its planned maintenance. Maintenance and repairs are conducted in a rather comfortable environment in tents with heating and light. Civilians work alongside military foremen. Samples of the equipment under warranty are provided by industry representatives from the companies where they are produced.[51]

In such conditions, aggregate replacement is the fastest and most common method of repair.[52] For example, if a car with a damaged chassis arrives at the repair site, then the wheels will not be repaired, but new ones will simply be put on. If a tank arrives with a damaged engine, it will not be repaired either, but a new one will be installed.[53]

Provision of spare parts is always a problem. Therefore, in combat conditions, cannibalism is imposed as a way of providing spare parts for damaged systems in repair bases. The Russian overhaul battalion cites an example with four damaged cars. If there are spare parts, the cars can come out the very next day. If there are none, then the principle is four cars entered, two will surely exit.[54] In peacetime conditions, cannibalism is considered an unfavorable way of securing spare parts, and its use is a clear indication that there is a lack of spare parts on the Russian side.[55] The Ukrainians also use cannibalism, but in a different way. In their territory, there is a large number of damaged and disabled Russian tanks and combat vehicles of the same type that they use.[56] Each brigade has a technical reconnaissance unit dedicated to searching fields for abandoned vehicles and equipment, then transporting them to repair sites. When a part is removed from a battle tank, it is disabled, but "the number of confiscated working tanks could be counted on one hand. Those that needed repair but will eventually pass is probably another 30 percent. And the last 50 percent was garbage that requires a lot of work."[57] Thus, cannibalism

is imposed on them as a natural way of providing spare parts.

System Modernization Weaknesses

The use of a specific item of equipment in war quickly proves if that equipment works as intended or is flawed in some way, and the repair process provides an opportunity for improvements or work arounds to be made on that equipment to correct any deficiencies.[58] In this war, tanks of Soviet and Russian origin, which are normally used by both sides, showed two very important weaknesses that needed to be addressed.

The first weakness is in the design of Russian tanks and armored personnel carriers. Early development of Russian combat vehicles focused on replacing humans with machinery such as the automatic tank loader. This change specifically meant that ammunition was stored in a rotating "transporter" under the feet of the crew.[59] Tanks of Western origin are similarly automated to reduce the number of crew members, because the technological solution is cheaper than training, housing, and paying soldiers. For the Russians, it allowed the Russian army to invest more in firepower as well as reduce the silhouette of the tank.[60] However, the weakness of the Russian design is that when a tank is hit by an antitank missile, it activates ammunition under the crew compartment that explodes, ejecting the turret from the tank. Terrible pictures show that the crew in such cases has no chance of survival. In the Balkan area, for example, many Yugoslav M84 tanks (made under the T-72 license) suffered the same fate in 1991 during the battles of Vukovar, Croatia. The tanks fought without infantry support, and many were destroyed in the battle on Trpinja Road.[61]

Pictures from the war in Ukraine show these catastrophic kills to be common. This is why the new Russian Armata tank is designed with ammunition storage in the rear part of the turret, like tanks of Western origin. All crew members are seated in a well-protected armored cell separated from automatic loader and ammunition.[62]

Another weakness relates to protection against the tandem warhead on antitank missiles. To protect tanks from this threat, they are covered over the basic armor with explosive-reactive armor.[63] Reactive armor reacts to the impact of a projectile with a counterexplosion to reduce the damage to the vehicle from the round. It is most effective in protecting against cumulative rockets and especially solid kinetic energy penetrators.[64]

However, the problem is with the upper side of the turret. Modern rockets such as the Javelin strike their targets on the top where the armor is thinner and not protected by explosive-reactive armor plates. Russian tank crews have recently begun fitting slatted armor over the turret to their main battle tanks, specifically designed to protect against a top-down impact from a Javelin antitank missile or a drone bomb.[65] This type of improvised cage armor, which is increasingly appearing on Russian T-80 and T-72 tanks in this war, has been seen before in Syria.[66]

The extra cage armor on top might reduce the effectiveness of certain top attack-guided missiles to some degree. However, while the metal structures on top of the tank's turret could potentially interfere with an RPG's detonation sequence and reduce the likelihood of penetrating the base armor, the cage armor alone is unlikely to provide significant protection against an advanced antitank guided missile like the Javelin. Tests just before the war showed the ineffectiveness of this protection, and there is no evidence from the battlefield that this protection was effective.[67]

Technology Theft

Another characteristic of this conflict is the theft of technology from both sides. Both sides captured many weapons systems and armored vehicles.[68] As soon as such interesting systems are captured, they are sent to military factories or institutes for detailed examination and analysis. Western donor countries are assessing the risk of revealing sensitive technology to the Russian military if their donated equipment is captured. Technological trophies routinely change hands in modern warfare, and there have been reports of Ukrainian forces turning the tables and gaining insight into Russian equipment seized on the battlefield. What is new is that risk assessments of equipment falling into Russian hands are becoming more deeply embedded in new donation decisions, as a generational change in the quality of weapons entering Ukraine is underway.[69]

The Ukrainians presented the analysis of advanced electronic chips taken from the guidance system of a

Russian Kh-101 cruise missile that did not explode.[70] This analysis showed the Russian military industry relies on its own but also on Western sources of supply. Some media claimed the large presence of advanced electronics of Western origin are proof that Western sanctions are extremely effective in stopping Russian military production. Michael Kaufman, director of Russian studies at the Institute in Arlington, expressed skepticism about claims that sanctions have forced some Russian tank factories and other defense companies in Russia to shut down their facilities: "It's still too early in the war to expect significant supply chain problems in the Russian defense industry."[71]

As an example of the loss of sophisticated Western weapons, the British Brimstone missile stands out. The first undamaged British Brimstone missile, which has built-in target recognition technology, ended up in the hands of the Russian army in July 2022.[72] Ukrainian forces used it in the Zaporizhzhia region, but the missile fell undamaged into the hands of the Russian side during the fighting. It was immediately sent to Russia for analysis of its construction and technology.[73] Another example is how Russian troops captured two French Caesar self-propelled guns in Ukraine. According to available information, the howitzers have already been sent to Russia, where they will be analyzed by Russian designers from the UralVagonZavod concern.[74]

Variety and Complexity of Combat Systems as a Maintenance Problem

Both warring parties use many diverse systems. The Foundation for Defense of Democracies from Washington identified in its report more than 6,300 relevant weapons systems used by Ukraine.[75] The Russian side noticeably used very old systems, which some Western analysts interpreted as the fact that they did not have sufficient technical means to replace the destroyed ones.[76] However, it may be that using older, known systems makes training to employ them easier. Additionally, using known systems facilitates the acquisition of spare parts and maintenance. If there are known systems, then there is a developed maintenance system for them.[77]

The production and maintenance of tanks and other armored vehicles is a very complex and demanding process that requires a strong industrial base in the country. To have a complete maintenance process, one must have the ability to perform a general overhaul, which is considered the most complex type of maintenance. Repairing heavy battle damage is categorized as a general overhaul operation.[78] However, the general overhaul process is very complicated, requiring educated and experienced engineers and craftsmen. In addition, facilities, technical overhaul documentation, special tools, instruments, spare parts, and equipment are needed.[79]

"The lack of unified documentation is one of the most serious obstacles to technological improvements and the organization of military overhaul of complex models of armored vehicles."

The current models of armored weapons and equipment that the Russian and Ukrainian forces are equipped with represent myriad systems belonging to different services or specialties of the ground forces (e.g., missile and artillery weapons, armored weapons, engineering, chemicals, communications). This wide variety is where the problems arise when this equipment needs to be repaired.

The lack of unified documentation is one of the most serious obstacles to technological improvements and the organization of military overhaul of complex models of armored vehicles. According to Russian sources, experts must use fifteen to twenty books on vehicle operation and as many books of documentation for repairs.[80]

Leo Peria-Peigne, a weapons expert at the French think tank IFRI, confirms that the battle tank is the most complex military vehicle of the army in terms of maintenance.[81] To illustrate the complexity of the maintenance tasks related to armored combat systems, in the table (on page 41), we provide an overview of the assemblies of the fire control system and the gun of

Table. Illustration of the Complexity of the M-84 Tank Fire Control System

Function	Description
Optoelectronics optics	Aiming devices, laser receiver-transmitter channel, and night channel with a passive light amplifier, periscope TNPO-168V and two periscopes in the cover for side observation, passive-active periscope PPV3 with a light amplifier, IR beacon FG-125S
Hydraulics	Hydraulic booster with hydraulic pump and electric motor, horizontal cylinder, hydraulic motor, installation
Electrics	Power junction box, starter, ignition circuit, installation, electric motors, electric motor of hydro booster, block relay KP-1
Power electronics	Power circuits, acorn power circuits, static converter
Electronics	Electronic ballistic computer, gyro block, interface, amplifier box, meteorological sensor, control panel computer, 2 Motorola MC6802 microprocessors, day-night aiming device DNNS-2
Precise electro mechanics	Gyroscopes, Box K-1, Box K-2
Electro mechanics	Cannon loading machine – rotating "transporter," programmer
Artillery mechanics	Automatic machine, cradle, shutter, tube with linings for cooling, powder gas extractor

(Table by authors)

the Yugoslav tank M-84. The fire control system of this tank is an electro-hydraulic modular type, automatic with stabilization in both planes, integrated with a ballistic computer and a laser range finder, a day-night sight device, and an automatic loader.[82]

Related to this example, an interesting question is how and who will maintain the Slovenian M-84 tanks that were sent to Ukraine. Out of fifty-four M-84 type tanks in Slovenia, only thirteen were overhauled and modernized; the other tanks have been in reserve since 2013 and with outdated equipment.[83]

The Ukrainians have begun to receive complex Western systems, but there is not much time for training on how to use them, let alone maintain them. It was reported that Bulgaria will not deliver weapons but will instead provide "military-technical assistance"; in other words, it will repair damaged Ukrainian weapons and maintain military equipment.[84] Slovakia also offered the Ukrainians the use of overhaul capacities in state-owned enterprises owned by the Ministry of Defense, but on a commercial basis.[85]

The assumption is that combat use will quickly lead to the required level of training for use, but maintenance is a far greater challenge that cannot be solved during combat operations. An example is the seven Panzerhaubitze 2000 self-propelled howitzers Ukraine received from Germany. After a short training and intensive action in combat, there were no problems with use. However, the loading mechanisms began to fail and the barrels wore out as the Ukrainians fired a large number of shells in a short time. Repair and overhaul will have to be carried out by the Germans, which requires the howitzers be transported to Poland.[86]

If the variety of incoming weapons presents them with a logistical headache, military analysts agree that Ukrainian technical support has shown an exceptional ability to adapt to it. Peria-Peigne said that Ukraine has a significant number of specialists who can accept a variety of Western equipment.[87] However, maintenance training efforts for the Ukrainian side will only pay off if the West sends sufficient tanks and armored vehicles. If, for example, Great Britain sent only ten Challenger2 tanks, it would be a "poisoned chalice."[88]

Russian military journals point out that the experience of combat operations in Ukraine is very important

for their army. Here, the crystallized need for the standardization, or "unification," of combat systems will be singled out, so much so that the importance of unification is placed first concerning innovations and the development of new systems![89] They use the slogan "Унификация важнее инноваций" (unification is more important than innovation). Unification of military equipment was insisted on even in the Soviet Union, reaching its peak by the end of the Second World War. In the Red Army, until the end of the war, there were only two main models of tanks on the production line: T-34 and IS (KV), with one V-2 tank engine, in two versions for medium and heavy tanks. Self-propelled guns were also built based on these platforms.[90]

This approach in the Soviet Union contrasted to the German approach at the time. The technical innovations that the Germans introduced on the fronts of the Second World War were impressive, but they seriously complicated logistics, maintenance, and repairs. The famous German general of armored units Guderian recalled this in his memoirs: "Hitler's orders that required constructive changes in the production process of combat vehicles, and therefore the creation of countless different types with many spare parts, were a big mistake. All this led to the overhaul of tanks in the field becoming an intractable problem."[91]

The situation regarding the unification of Russian main battle tanks is interesting. The Russian army uses three lines of armored vehicles with modifications: T-72, T-80, and T-64. These are the three crowns of the Kharkiv, Leningrad, and Nizhny Tagil schools of design. However, the interchangeability of parts or subsystems of these tanks ends at the ammunition; the engines, transmissions, and chassis are completely different.[92]

When considering that the Ukrainian military production program contains a lot of new and modified models of tanks and combat armored vehicles, and with various types of equipment arriving from the West, it is clear that there are problems with maintenance and supply of spare parts for both warring parties. At the same time, of course, Russia has an advantage, because it still has undamaged storage capacities from which spare parts can be obtained.

Conclusion

So far, no new features have been observed in the maintenance systems that were not seen in earlier wars, including the war in the Balkans. It can be concluded that the main characteristics of this war include a large number of irretrievably destroyed equipment and a large number and variety of technical systems for which it is necessary to plan and carry out maintenance. Such a model indicates that one of the most important lessons from this war is the need for unification in all elements of technical systems, similar to what Soviet forces successfully achieved against Wehrmacht forces in World War II. According to NATO standards, this is called interoperability among allies, which strives for the highest level of compatibility—that is, the level of interchangeability when it comes to ammunition, fuel, and supply and service systems. ■

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Egyptian military trucks cross a bridge over the Suez Canal during the Yom Kippur War 7 October 1973. (Photo courtesy of Wikimedia Commons)

Fighting with Agility

The 162nd Armored Division in the 1973 Arab-Israeli War

Lt. Col. Nathan A. Jennings, PhD, U.S. Army

The tenets of operations (agility, convergence, endurance, and depth) reflect factors that can explain, in part, why armies succeed or fail in challenging campaigns. Agility, specifically, has emerged as critical to attaining success on the increasingly lethal, expensive, and transparent battlefields of the twenty-first century. As seen in recent events such as the siege of Mosul, the Nagorno-Karabakh War, and Russia-Ukraine War, the ability for attacking combined arms formations to, as argued in the U.S. Army's revised

capstone doctrine, Field Manual (FM) 3-0, *Operations*, "move forces and adjust their dispositions and activities more rapidly than the enemy" remains essential to protect cohesion and extend operational reach.[1] This requirement, especially in the context of proliferating antiair, antiarmor, surveillance, and electronic warfare systems, makes the mastery of operational agility a fundamental imperative for expeditionary armies that seek to achieve decisive outcomes in landscapes increasingly becoming defined by positional and attritional dynamics.

History is replete with examples of militaries that succeeded, and failed, to operate with agility in the face of formidable defenses in order to achieve strategic objectives. The 162nd Armored Division of the Israel Defense Forces (IDF) provides a useful example of a formation that negotiated a rapid series of tasks and transitions to enable a high-risk counteroffensive in the final stages of the 1973 Arab-Israeli War. While the command's performance included a costly learning curve following early mistakes, its subsequent recovery and execution of a critical sequence of actions before, during, and after the crossing of the Suez Canal tells a story of adaptation and initiative. The resulting record, which included enabling the crossing, repelling counterattacks, reconstituting combat power, crossing the canal, and immediately leading the breakout in Africa—across just two days of intense combat—offers a compelling case study to understand how superior agility can mitigate setbacks and create opportunity.[2]

This episode, which deeply informed the U.S. Army's AirLand Battle reforms in 1980s, holds new value as the institution adopts the multidomain operations concept and negotiates challenges in the twenty-first century. As proven in recent conflicts, the development of sophisticated adversary defenses—bristling with standoff weaponry entrenched in complex terrain—is again threatening to raise the cost of maneuver. While all wars remain distinct to their time and place, the IDF counteroffensive in 1973, and more specifically the 162nd Division's demonstration of operational agility at the Suez Canal, offers relevant insights to inform how contemporary armies can win across battlefields that feature arrayed fires and ubiquitous surveillance. As argued by Gen. Mark Milley, the twentieth chairman of the Joint Chiefs of Staff, this will ultimately require American forces to "disrupt, penetrate, disintegrate, and exploit the enemy's anti-access systems" to catalyze "operational paralysis" or risk failure in the crucible of expeditionary combat.[3]

The Fourth Arab-Israeli War began on 6 October 1973 when Egypt and Syria conducted surprise offensives into the Sinai Peninsula and Golan Heights respectively to reclaim lost territories (see figure 1, page 48). While the Egyptian army attacked with two corps-size armies to overwhelm the Israeli forts and garrisons, called the Bar Lev Line, along the east bank of the Suez Canal, the Syrian army simultaneously launched an aggressive assault with thirty-two thousand men and 1,200 tanks to capture the strategically valuable plateau north of the Sea of Galilee. Employing cutting-edge, Soviet-provided antiair and antiarmor missile systems, the Arab forces then repelled the expected, and uncoordinated, counterattacks by the Israeli Air Force (IAF) and Israeli armored brigades that sought to converge multidomain efforts. The resulting IDF losses, which shocked the national command, saw the IDF lose more than 40 percent of its tanks in the Sinai theater in just two days of fighting along with more than thirty attack aircraft during a similar period.[4]

These opening moves shattered previously held assumptions about the supposed overmatch of the Israeli military and the very character of modern warfare. During the Six-Day War in 1967, the IDF had employed rapid and deep maneuver by tanks and attack aircraft to decisively defeat a coalition of Arab adversaries on divergent fronts, resulting in massive territorial expansion for the Jewish state. Egypt and Syria, smarting from their losses, then acquired an array of surface-to-air missile (SAM) systems that included SAM-2s, SAM-3s, SAM-6s, and SAM-7s along with ZSU-23-4 self-propelled antiaircraft weapon systems designed to contest, or even neutralize, the IAF's dominance over the air domain. On the ground, the Arab armies had likewise armed their infantry with man-portable AT-3 Sagger guided antitank missiles and RPG-7 rockets to counter the

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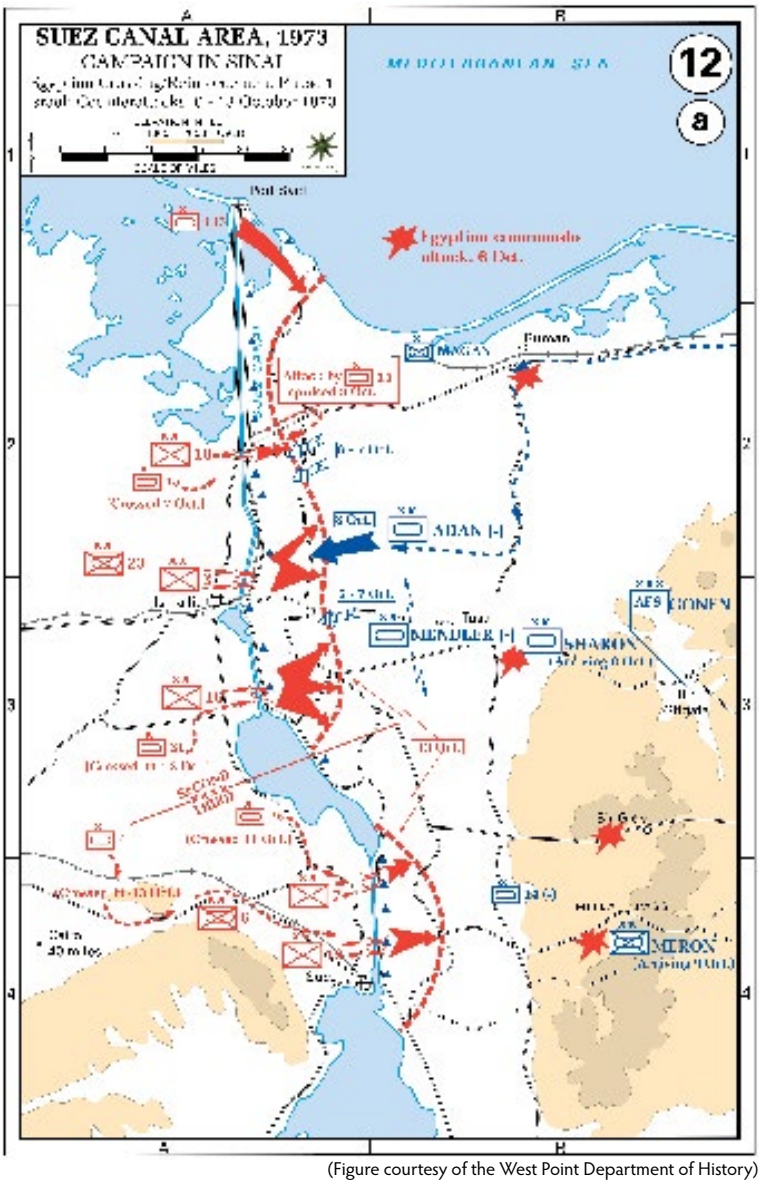


(Figure courtesy of the West Point Department of History)

Figure 1. Suez Canal, 6–13 October 1973

vaunted Israeli Armored Corps. While the IDF would quickly, albeit painfully, adapt in the north to repel Syrian forces out of the Golan Heights, Egypt's shocking gains in the south would prove a far more difficult and costly challenge.

The problem of retaking the Suez Canal—which crystalized when the 252nd Armored Division lost approximately two hundred of three hundred tanks in the first IDF counterattack on the morning of 7 October—would fall squarely on the Southern Command's 162nd Reserve Armored Division.[5] Commanded by an experienced general named Avraham "Bren" Adan, the division, which began mobilization immediately after the Arab attack, included the 217th, 460th, and 500th Armored Brigades equipped mostly with American-provided M48 and M60 series tanks.[6] While it possessed limited mechanized infantry, scouts, and a divisional artillery battery, it lacked the robust combined arms profile required to defeat the now entrenched Egyptian defenders. However, combat experiences in 1948, 1956, and 1967 had provided the command, also called the "Steel Formation," with veteran leaders at battalion, brigade, and division levels who understood maneuver warfare. This tactical experience would prove crucial in coming days as the division would have to learn from mistakes and adapt to new threats.

The 162nd Division, with a combined total of 183 tanks, led the Southern Command's renewed counterattack early on 8 October with a headlong assault by two armored brigades and another following in reserve. Ordered to dislodge the Egyptian 2nd Army's strongpoints at Hizayon and Purkan north of the Bitter Lake, the attacking Israeli armor, which lacked adequate reconnaissance, mechanized infantry, and artillery support, encountered a flurry of enemy missiles and rockets from entrenched infantry as the division's forward elements struggled to coordinate offensive actions. Worse, the Steel Formation attacked without planned close air support, which was supposed to compensate for the dearth of artillery fires, due to IAF commitments to the exploding crisis on the Golan Front. As argued by Adan after the war, his division, and the entire IDF, had become "prisoners of our own doctrine," which demanded that they "attack as fast as possible and transfer the fighting into enemy territory."[7]

Even as the 162nd Division failed to achieve its objectives in the Sinai at a shocking cost of eighty-three tanks, with similar failure by the 143rd Armored Division and its famed commander Ariel Sharon, the feared IAF encountered its

A destroyed Israeli M60 tank lies among the debris of other armored vehicles after an Israeli counterattack in the Sinai during the 1973 Yom Kippur War. (Photo courtesy of Wikimedia Commons)

own problems in the skies above. Prevented from eliminating enemy air capability preemptively or methodically as in the Six-Day War, the IAF suffered severe losses in the first week of fighting as they struggled to penetrate the Egyptian and Syrian integrated air defenses. While Israeli pilots would successfully protect the Israeli interior throughout the war, they would do so at the previously unthinkable cost of more than one hundred destroyed aircraft while leaving IDF ground forces bereft of critical support.[8] However, in stark contrast, the IDF's sophisticated missile boat fleet would achieve decisive success in the maritime domain by destroying the small Syrian, and then Egyptian, fleets off of the Mediterranean coast and accruing the benefits of localized sea control.[9]

With prewar plans in disarray and both their tank and aircraft fleets suffering massive losses, the IDF high command faced a central problem: how to restore offensive maneuver to the inordinately lethal battlefield without succumbing to an attritional contest that their adversaries could better afford. With the Syrian front stabilizing, the answer in the Sinai would arrive in the form of an ambitious attack across the Suez Canal that aimed to encircle Egypt's 2nd and 3rd Armies and compel a favorable cease-fire. This would require the IDF to not only cross the canal under fire and repel expected counterattacks at points of vulnerability, but also to devise a solution to the SAM and air defense artillery (ADA) conundrum that prevented critical multidomain cooperation between IDF ground and air forces. The battered 162nd Division under Adan would play a central role in the planned operation as the primary breakout force and demonstrate the value of employing operational agility to counter enemy action and seize battlefield initiative.

Israeli tanks arrive on the West Bank of the Suez Canal in October 1973. The 143rd Armored Division successfully crossed the Suez Canal on the night of 15–16 October 1973 under the command of Ariel Sharon, a move that changed the face of the campaign. (Photo courtesy of Wikimedia Commons)

Recovery and Defense

Despite plans for an ambitious counteroffensive across the canal (see figure 2, page 52), the IDF could not attempt the operation until they attained the necessary theater conditions. This occurred, in part, on 12 October when, over the strenuous objections of his generals, President Anwar Sadat acceded to demands from his Syrian ally to relieve pressure on the Golan front by ordering a general offensive into the central Sinai to seize key crossroads and command nodes. This proved decisive from an Israeli perspective because it required the Egyptians to transfer their operational reserve of two armored divisions across the canal to lead the attack—in effect transitioning the enemy posture from a defense in depth to more of a forward posture that could more easily be penetrated and reduced. More importantly, the Egyptian offensive would compel their armor and mechanized infantry to move beyond the antiair and antiarmor shield that had stymied Israeli efforts to that point and, even worse, attack into prepared engagement areas.[10]

This turn of events would provide an opportunity for the 162nd Division, still recovering from its devastating losses, to regain confidence on favorable terms. Over the past few days, the Steel Formation had reconstituted its combat strength and received reinforcements as it balanced a complicated mix of requirements to integrate replacement soldiers and units, repair battle-damaged and broken tanks, plan for the hoped-for offensive, and above all, maintain readiness to deflect attacks in their sector opposite the Egyptian 2nd Army in the Northern Sinai. Adan ordered one battalion from each brigade to defend forward while the other battalions stood down for recuperation and repair. By 13 October, the division had increased in size to 272 tanks across the three brigades. The depth of combat experience across the division leadership, specifically with armored warfare, proved invaluable as commanders revised their tactics to avoid another catastrophic setback.[11]

The Egyptian offensive on the morning of 14 October catalyzed the largest clash of tanks since

the Battle of the Kursk in 1943. Seeking to draw IDF attention away from the collapsing Golan front, the 21st Armored Division of the 2nd Army and the 4th Armored Division of the 3rd Army led a general assault to advance into the Sinai interior and seize the Mitla and Gidi Passes as well as the IDF command center at Refidim. Unfortunately, and despite the robust artillery fires that preceded the attack, the vector of the Egyptian forces took them away from the antiarmor entrenchments along the canal and into engagement areas overwatched by Israeli tanks and newly acquired TOW antitank missiles. Worse, the attack also left behind the vital SAM and ADA protection and soon allowed a vengeful IAF to compliment the IDF armor's gunnery with close air support. By afternoon, the remains of stunned Egyptian units were in full retreat to their canal positions while leaving behind an astounding 250 burning tanks.[12]

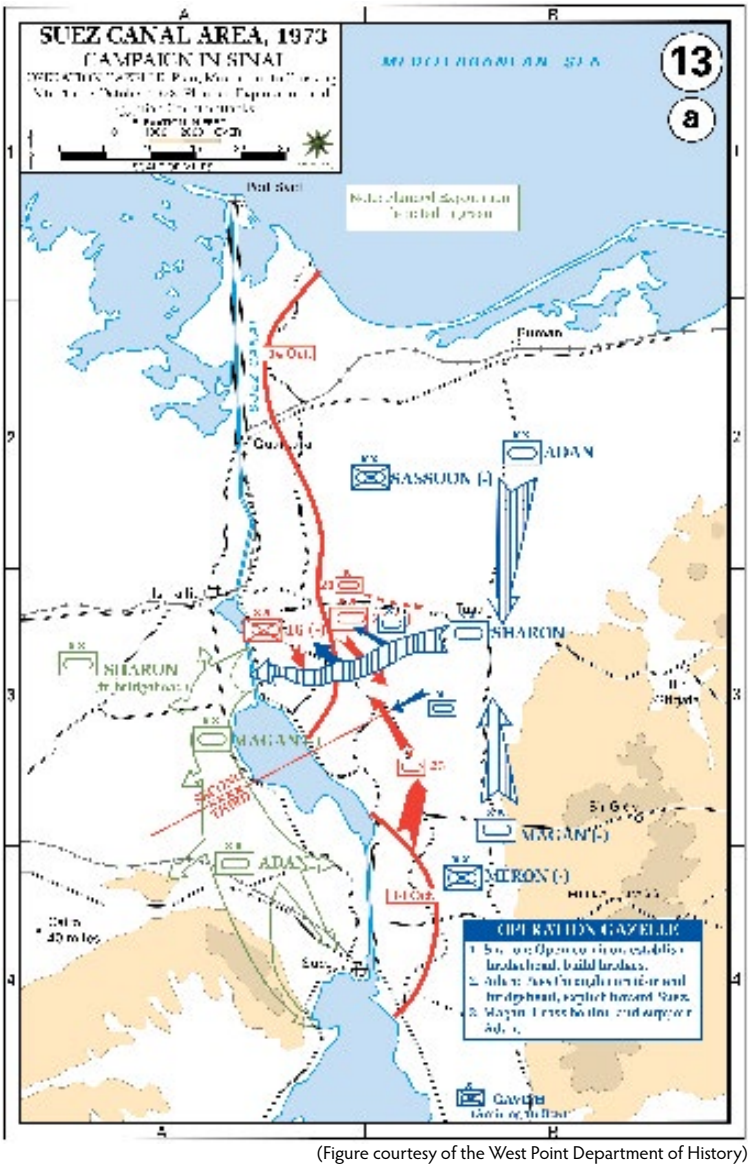
The 162nd Division, as the Southern Command's northern element, played a central role in repelling elements of the 2nd Army in the north. Realizing the need to preserve combat power for the imminent crossing, Adan tasked a temporarily attached armored brigade, with the 500th Brigade in support, to turn back the Egyptian assault while preserving the rest of the division for a future offensive. Now in their element, tank commanders directed textbook gunnery tactics from carefully selected fighting positions with limited counterattacks to prevent penetration of the Israeli line. The division completed the action by clearing out Egyptian infantry that had managed to infiltrate the town of Havraga. By 1600 hrs. that day, with the defense of the Sinai interior assured and the offensive power of the 2nd and 3rd Armies broken, the Steel Formation began turning over its defensive positions to an ad hoc division under veteran commander Sasson Yitzchaki and positioning to cross the canal.[13]

Enabling the Crossing

With conditions set for the next stage of the war, Southern Command initiated a complicated, multidivision plan designed to penetrate the Egyptian line at a fortuitous gap between the two defending armies, cross over the canal using redundant bridging systems, and break out with deep maneuver to the north and south to sever the Egyptian lines of communication back to Cairo. Critically, the penetration would require IDF ground forces to attack SAM clusters to create, as required by modern Army doctrine, "windows of opportunity" for the IAF to begin disintegration of the Egyptian air defense network. After Sharon's 143rd Division secured and established the bridgehead over the canal, the 162nd Division would serve as the main effort for the breakout in Africa.[14] Unfortunately for Adan and his men, they would not be allowed to wait for their turn to execute; immediate setbacks in establishing the crossing would require agile positioning and retasking to prevent culmination of the IDF scheme.

The first unanticipated action occurred on 15 October when Sharon's forces proved unable to clear key intersections along the single route leading to the crossing point due to unexpectedly fierce enemy resistance. These difficulties included what would become known as the Battle at the Chinese Farm, which left Sharon's 14th Armored Brigade severely damaged after chaotic night fighting. The 162nd Division, as it followed along the Akavash Road to posture for crossing, soon received orders to both clear entrenched Egyptian infantry and armor from the vital Lexicon and Tirtur intersections and assume escort responsibility for the struggling pontoon convoy attempting to reach the crossing site. Even as Sharon launched his elite 247th Parachute Brigade across the canal in rubber boats, soon to be followed by an advance guard of twenty tanks on motorized rafts, enemy presence along the passageway to the canal threatened to prevent establishment of more secure bridgeheads with reliable pontoon and roller bridges.[15]

Over the next hours, the 162nd Division balanced the task of enabling the precarious crossing operation and preserving strength for the anticipated breakout. When the 217th Armored Brigade encountered difficulties in dislodging the entrenched Egyptian forces, Adan received the 35th Paratrooper Brigade to clear a series of trenches and positions extending south from the Chinese Farm. The infantry, under pressure from Southern Command to secure the route for the approaching bridge convoys, rushed into battle the night of 16 October and fought throughout the next day while taking significant losses due to faulty intelligence and miscoordination. Eventually, when the 890th Battalion became pinned down by Egyptian fire and numerous casualties, Adan dispatched the 460th Armored Brigade



(Figure courtesy of the West Point Department of History)

Figure 2. Suez Canal, 15–17 October 1973

to rescue the beleaguered infantry. While it would take days to reduce the Egyptian positions along the route, the division's perseverance enabled the vulnerable bridge convoys to pass through to the crossing point.[16]

Ambushing the Counterattack

Events in the Sinai theater began to move quickly as the IDF forced the crossing and the Egyptian command realized the seriousness of the situation. Even as the 35th Brigade battled for control of the crossroads and the Chinese Farm, the 143rd Division's advance tanks had begun destroying SAM and ADA systems proximate to the expanding bridgehead. In Cairo, where Sadat had attended a premature victory parade, the Egyptian national leadership reacted frantically by ordering immediate counterattacks by the 2nd and 3rd Armies to meet in the center and sever the IDF penetration. With the 143rd Division preoccupied with executing the initial crossing, escorting two of the three bridging systems, and recovering from terrible fights the previous night and day, the Steel Formation, who yet needed to retain readiness to conduct the imminent breakout across the canal, would receive the task of countering both the Egyptian assaults and thus preserve the viability of the IDF counteroffensive.

The Egyptian 21st Armored Division attacked from the north first on the morning of 17 October, aiming to smash the Israeli bridgehead and strand Sharon's forces on the far bank (see figure 3, page 53). Adan, also realizing that an elite Egyptian armored force was approaching from the south, directed his 460th Armored Brigade to block the northern sector while he positioned the 217th Armored Brigade to set an ambush in the south. This move, and the Israeli forces' defensive dispositions informed by accurate intelligence, allowed them to maximize superior gunnery skills and take advantage of the hasty nature of the Egyptian tank assaults that left the attackers bereft of combined arms support. In short order, before noon, the 162nd Division's northern element had destroyed much of the remaining offensive capability of the 21st Armored Division and compelled a scattered Egyptian retreat into their Sagger-protected positions. Amazingly, the Israeli gunners had destroyed forty-eight enemy tanks without losing a single armored vehicle.[17]

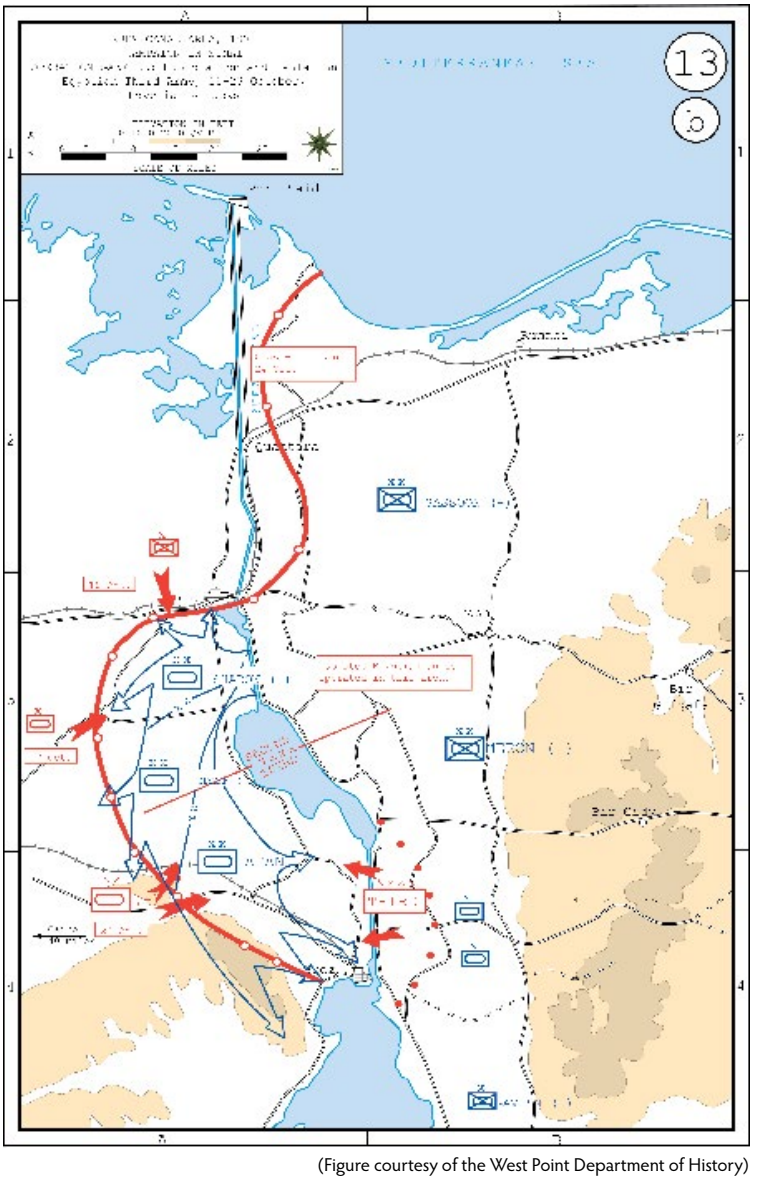
With his northern flank secured, Adan's attention shifted south to the next threat: the elite 25th Independent Armored Brigade and its cutting-edge T-62 tanks. Again obeying Sadat's express orders over the protest of senior Egyptians commanders, the brigade moved north on the Lexicon Road without adequate reconnaissance or fire support. This

movement, with the canal on their left, led the Egyptians directly into a prepared "kill zone" where Adan's 217th Armored Brigade opened fire against the 25th Brigade's flank from higher ground while the 500th Armored Brigade, then serving as the Southern Command reserve, closed the trap with an assault from the south. The result was devastating for the Egyptians: in just a few hours, eighty-six of their ninety-six main battle tanks were destroyed along with numerous armored carriers and support vehicles.[18] From the Israeli perspective, this final action reduced the threat of interference on the east bank and allowed full focus on crossing into Africa.

Maneuver and Breakout

Even as the Steel Formation completed the destruction of the 25th Armored Brigade, the IDF, after massive logistical hurdles, had finally installed the pontoon bridge over the canal. Low on fuel and ammunition following days of fighting, Adan, under pressure from both Sharon and Southern Command to immediately cross and exploit Egyptian paralysis, nevertheless had to pause on the evening of 17 October to partially replenish his worn brigades. At 2200, as Egyptian artillery now shelled the entire crossing site, the veteran general crossed with his division headquarters followed by the 460th Armored Brigade at midnight and the 217th Armored Brigade before dawn. Such was the urgency to seize initiative on the far bank that many of the 162nd Division vehicles launched without full fuel tanks. While the 500th Armored Brigade remained in the Sinai as the theater reserve, the division brought over two self-propelled artillery battalions and additional infantry to support its assault forces.[19]

By 0515 on 18 October, the division main body had crossed, assembled, and received passage-of-line briefs from the 143rd Division elements that had secured the lodgment. At 0545, in a remarkable display of operational agility, the command immediately pivoted southwest and attacked the first series of Egyptian positions. After Adan's forces used a combination of shock armor assault, infantry clearing, and artillery suppression fires to defeat Egyptian tanks and Sagger-equipped infantry at the fortified Tsach crossroads—reflecting significant combined arms improvement since the start of the war—they then scattered an array of SAM clusters to allow IAF participation. Throughout this process, the brigades and battalions negotiated a delicate process of maintaining pressure on the Egyptian defenders and pausing to complete the delayed resupply. While the 143rd Division's breakout to the north



(Figure courtesy of the West Point Department of History)

Figure 3. Suez Canal, 18–21 October 1973

had stalled short of its objectives at Ismailia, the Steel Formation was making better progress toward cutting off the Egyptian 3rd Army on the east bank.[20]

Early the next morning, on 19 October, Sharon's engineers finally emplaced a giant roller bridge, and Israeli forces began pouring across the canal. While the 500th Brigade rejoined the 162nd Division, the 252nd Armored Division arrived to protect its right flank. Overhead, in an act of desperation, the Egyptian high command had initiated a massive air battle that saw its air forces decimated by Israeli fighters even as they pulled critical SA-6 systems back to protect the capital area. Now boasting three armored brigades, Adan continued his attack to the south with an intermediate aim of clearing a cluster of SAMs from the Geneifa Hills to open the way to the main objective of Suez City. With Egyptian defenses in disarray, Israeli armor overran an entire artillery brigade that had been shelling the crossing site and, while coordinating with the IAF, cleared the SAMs from the high ground the next day. To the division's right, the 252nd Division captured the valuable Fayid Airfield to repurpose as a forward air base.[21]

By 20 October, the Steel Formation had fought through the Geneifa Hills to sever the vital Asor Road and Cairo-Suez railway that connected the 3rd Army to its strategic support areas. With the 143rd Division having failed to fully isolate the Egyptian 2nd Army in the north, Southern Command placed renewed emphasis on completing the isolation of the 3rd Army to the south, despite intermittent cease-fire agreements, to attain diplomatic leverage for postconflict negotiations. With the 252nd Division on his right, Adan continued to prioritize the reduction of SAM and ADA sites as his forces encountered elements of the 4th Armored Division and 6th Mechanized Infantry Division that had recrossed to the west bank in a desperate move to prevent the strategic disaster. However, despite dogged Egyptian resistance, the ever-increasing Israeli air dominance allowed the attacking IDF ground forces to employ joint approaches to avoid culmination and continue the methodical advance.[22]

With a cessation of hostilities imminent, Adan pushed his forces hard in the final stage of the war to secure maximum positional advantage. While the 252nd Division maneuvered west of the hills of Mount Ataka and past the Steel Formation to reach the Adabiah Port on the Gulf Coast and complete the isolation of the 3rd Army, Adan, in a departure from the agile tactics that had marked his division's performance over the previous week, ordered the 500th Armored Brigade with attached paratroopers to execute a hasty attack to occupy Suez City on 24 October. Unfortunately for the Israelis, the movement by disjointed columns into the complex urban terrain would result in disaster when a determined militia resistance inflicted heavy casualties and forced disparate groups of IDF soldiers to fight their way back to friendly lines. The dramatic loss of eighty men dead and one-hundred-twenty wounded over the next day and night would leave a black mark on Adan's reputation and the 162nd Division's record after the war.[23]

Yet regardless of the failure in Suez City, the IDF, and the 162nd Division in particular, had salvaged a disastrous start to the war and ended it with a convincing, though not fully decisive, tactical victory. While the Egyptian 2nd Army remained viable with intact lines, the 3rd Army to the south was beaten and likely only days away from surrender when the armistice took hold. By emphasizing operational agility, the Steel Formation had executed a complicated sequence of actions that required exceptional flexibility, responsiveness, and sequencing as it enabled the canal crossing, won major tank battles, reconstituted combat power, and exploited the crossing with deep maneuver. Called a "dazzling victory" by Adan, they "stormed the enemy and broke through his defenses" to advance one hundred kilometers in five days, eliminate thirty SAM sites, repel the Egyptian 4th and 6th Divisions, and capture thousands of prisoners.[24] More importantly, the division's tactical adroitness, even as it learned costly lessons, placed Jerusalem in a far better position to negotiate a future peace.

Insights for the Twenty-First Century

The Fourth Arab-Israeli War, though distinct to a different time and place, continues to hold insights for the U.S. Army as it focuses on winning wars of expanded scale and intensity. As seen in the Siege of Mosul, the Nagorno-Karabakh conflict, and Russia-Ukraine War where positional and attritional dynamics have strongly influenced outcomes, the mastery of operational agility remains a fundamental requirement to attain battlefield success. This has become especially apparent given the

multidomain character of the current environment and the demonstrated capacity for standoff weaponry to challenge the offensive actions. The combat performance of the 162nd Armored Division in 1973 consequently provides a valuable example for ground forces that seek to, as required in the 2022 version of FM 3-0, *Operations*, "maneuver to seize or retain key terrain and exert control over resources and people for as long as is necessary to achieve tactical, operational, and strategic objectives" in the twenty-first century.[25]

> One of the primary and most obvious parallels between the Yom Kippur War and the contemporary environment is the continued lethality to both defending and attacking forces.

One of the primary and most obvious parallels between the Yom Kippur War and the contemporary environment is the continued lethality to both defending and attacking forces. As assessed in the U.S. Army's postconflict report, "Anything seen on the battlefield can be hit, and anything that can be hit can be killed."[26] This trend toward attrition, which forced Adan to reconstitute entire brigades and innovate new tactics, has likewise characterized recent combat. While the Azerbaijani army reportedly integrated drones, indirect fires, and standoff missiles to destroy more than seven hundred armored vehicles and paralyze their Armenian opponent in 2020, the Russian army has suffered similarly high losses to sophisticated antiair and antiarmor weaponry in its invasion of Ukraine.[27] Echoing how the IDF grappled with Egyptian lethality in the Sinai, armies in the present will be required to employ similarly agile approaches that preserve combat power and enable survivable maneuver across contested spaces.

A second continuity between 1973 and the current environment centers on the increasing transparency of the battlefield. With the onset of ubiquitous surveillance tied to long-range and precision fires, contemporary armies will require dexterity, redundancy, surprise, and deception to implement offensive maneuver and defend critical terrain. This is especially relevant during contested gap crossing operations, with the IDF's successful traversing of the Suez Canal—despite major mistakes and Egyptian interference—contrasting with failed attempts by the Russian army to cross rivers in Ukraine in 2022. While the 162nd Division's support to the IDF effort demonstrated how rapid maneuver, redundant systems, and crossdomain cooperation can overcome sophisticated defenses, the Russians proved unable to achieve the same against Ukrainian defenders who observed, targeted, and destroyed clumsy attempts.[28] This indicates that transparency will remain a feature of modern warfare and countering it will require an enhanced scope of maneuver and logistical agility to survive and win in nonpermissive spaces.

A third insight from the 1973 Arab-Israeli War stems from the complicated requirement for armies to reconstitute during major campaigns. Following the disastrous initial counterattack where it lost 45 percent of its armor, the 162nd Division conducted a remarkable recovery that required rapid repair and replacement of tanks, integration of new leaders and soldiers, and psychological recovery of battered teams—all while yet committed to an active front. As argued by Adan after his shocking defeat, though his command was "dead tired, hurting for our friends … and downcast over the blows taken," the division nevertheless "girded themselves for the task" and "threw themselves into the work."[29] Fast forward to the present, the debilitating losses by the Iraqi army in 2017, the Armenian army in 2020, and both the Russian and Ukrainian armies in 2022 suggest that dynamic reconstitution will remain fundamental to sustaining operational endurance and campaign tempo.[30] Conversely, inability to rapidly rebuild broken formations will not only risk culmination, but also potentially outright defeat, in austere and expeditionary settings.

A fourth insight from the experience of the Steel Formation in 1973 pertains to the ability to operate with enough agility to ensure multidomain convergence. While the division's early setbacks stemmed from the Arab militaries' newfound ability to disintegrate the

IDF's historical air-ground approach, its subsequent success in responding to armored counterattacks in Sinai and then maneuvering into Africa resulted from adaptive efforts to restore crossdomain cooperation and isolate components of the Egyptian area defense.[31] For contemporary armies, as illustrated by flawed combined arms and joint offensives in Iraq, Nagorno-Karabakh, and Ukraine, the imperative to prevent friendly disintegration while inflicting the opposite upon the enemy order of battle remains just as challenging and important in the wars of today. Regardless of time and place, the lesson is clear: possessing the agility to ensure multidomain convergence continues to define success in campaigns that aim to maneuver decisively against sophisticated antiaccess and area denial defenses.[32]

In the final analysis, the record of the 162nd Armored Division in 1973 represents a useful demonstration of how ground forces can employ operational agility to overcome intractable challenges. For contemporary armies, the Steel Formation's ability to rapidly reconstitute, enable difficult gap crossings, repel enemy counterattacks, and transition to offensive maneuver remains an emulative example. For the U.S. Army of today, like how it studied the conflict for the AirLand Battle reforms in the 1980s, the episode can inform its adoption of the emergent multidomain operations doctrine. While no two conflicts are exactly alike, the requirement to employ superior agility to converge efforts, disintegrate networks, and endure in lethal settings will remain fundamental to both deterring adversaries and defeating enemies. Adan, in his memoir, perhaps summarized it best: "In spite of unfortunate conditions at the start, we managed to hold our own; we were able to recover quickly and launch a counterattack" that, against all the odds, allowed his nation to "overcome the most problematic of situations."[33] ■

"The record of the 162nd Armored Division in 1973 represents a useful demonstration of how ground forces can employ operational agility to overcome intractable challenges."

The views expressed are those of the author and do not reflect the official position of the Department of the Army or Department of Defense.

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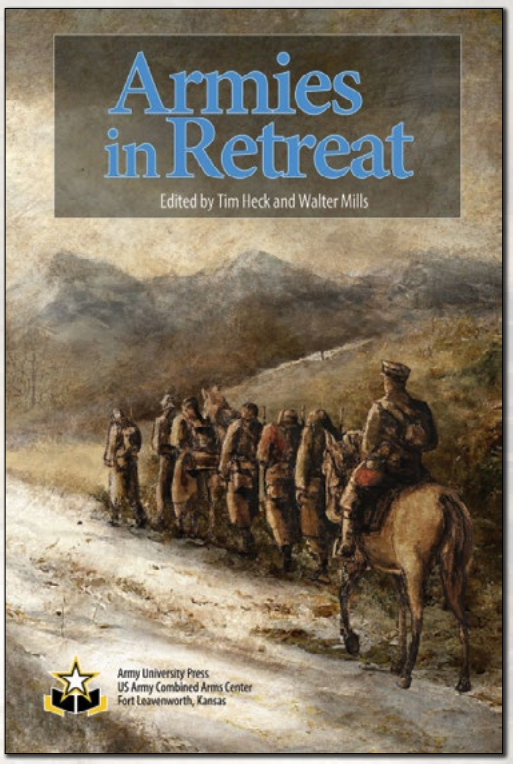


Armies in Retreat: Chaos, Cohesion, and Consequences

Edited by Lt. Col. Tim Heck (U.S. Marine Corps) and Capt. Walker Mills (U.S. Marine Corps)

In *Armies in Retreat: Chaos, Cohesion, and Consequences,* editors Timothy Heck and Walker Mills have culled together a collection of essays that fills a critical gap in publications and literature covering large-scale combat operations. Every battle has two sides: the victors and the vanquished. This book explores retreating armies—those that maintained cohesion and later succeeded and others that devolved into chaos. Ultimately, this book is about surviving defeat and designed to inform leaders about what to expect when the unexpected happens, to prevent the shock and mitigate some of the terror on every side so they can respond with resilience and cohesion. Retreat, while unpalatable, can ultimately lead to military or national survival, even victory.

To read this book online, visit https://www.armyupress.army.mil/Portals/7/Research%20and%20Books/2023/ArmiesRetrt-HeckMills-2023.pdf.

After landing on East Falkland Island, Argentine soldiers move through the city of Stanley during Operation Rosario, 2 April 1982. (Photo courtesy of Wikimedia Commons)

A Sad and Bloody Business

Land Force Lessons from the Falklands, Forty Years On

Lt. Col. Robert S. Krenzel Jr., U.S. Army, Retired

In April 1982, the Falkland Islands became a household name. On 2 April, Argentine forces landed on East Falkland and seized Port Stanley, claiming the "Malvinas" for Argentina. The following day, British Prime Minister Margaret Thatcher stood up in the House of Commons to condemn this aggression, and at the end of her speech, announced, "A large task force will sail as soon as preparations are complete."[1] It seemed preposterous that two American allies could fight over a bunch of remote rocks in the South Atlantic, yet as the weeks passed, diplomacy failed, British warships churned south, and the prospect for a peaceful resolution dimmed. On 2 May, the nuclear attack submarine HMS *Conqueror* torpedoed the cruiser ARA *General Belgrano*, taking 368 lives.[2] Within forty-eight hours, an AM39 Exocet air-launched antiship cruise missile slammed into the British destroyer HMS *Sheffield*, killing twenty-one crew members and the Royal Navy's confidence in its ability to defend itself.[3] The war had begun in earnest. Against the background of these losses, an amphibious force, Task Group 317.0, steamed toward Falkland Sound. Its passengers included the Landing Force, Task Group 317.1, composed of the Royal Marines' 3rd Commando Brigade, reinforced with the 2nd and 3rd Battalions of the British Army's Parachute Regiment, plus supporting arms. The mission of these two task groups was "to land a force in the Falkland Islands with a view to repossessing the Islands."[4] Prior to sailing, Cdre. Michael Clapp and Brig. Julian Thompson, the commanders of these two groups, had been warned by task force commander Adm. Sir John Fieldhouse, "This is going to be a sad and bloody business—I only wish I could offer you more ships."[5]

Smoke billows from HMS *Sheffield* after it was hit by an Argentine Exocet missile in 1982 during the Falklands War. (Photo courtesy of the Press Association via Wikimedia Commons)

The Argentine cruiser ARA *General Belgrano* lists heavily to port in the Atlantic Ocean after being attacked by a British submarine 2 May 1982 during the Falklands War. It later sank. (Photo courtesy of the Press Association via Wikimedia Commons)

The amphibious operation at San Carlos on 21 May did, in fact, land a force in the Falkland Islands. Three weeks later, after an initial build up ashore and subsequent bitter fighting, the Argentine garrison would surrender to the numerically inferior British land force. It was a remarkable victory, but Fieldhouse's warning had proved prophetic. On the British side alone, the war resulted in the loss of two destroyers, two frigates, one landing ship, a roll on/roll off container ship, ten fighter aircraft (Harriers), twenty-four helicopters, 255 killed, and 777 injured or wounded.[6]

The Falklands War marked the first significant naval campaign of the missile age, and the largest amphibious operation since the Korean War. As such, naval and marine planners have studied it extensively. Forty years on, with the Russian invasion of Ukraine underway and tensions high in the Pacific's First Island Chain, it is worth looking at the joint campaign in the Falklands from a land force perspective. We will find much to learn about force projection, forcible entry, expeditionary warfare, and the limitations and the challenges facing our joint partners.

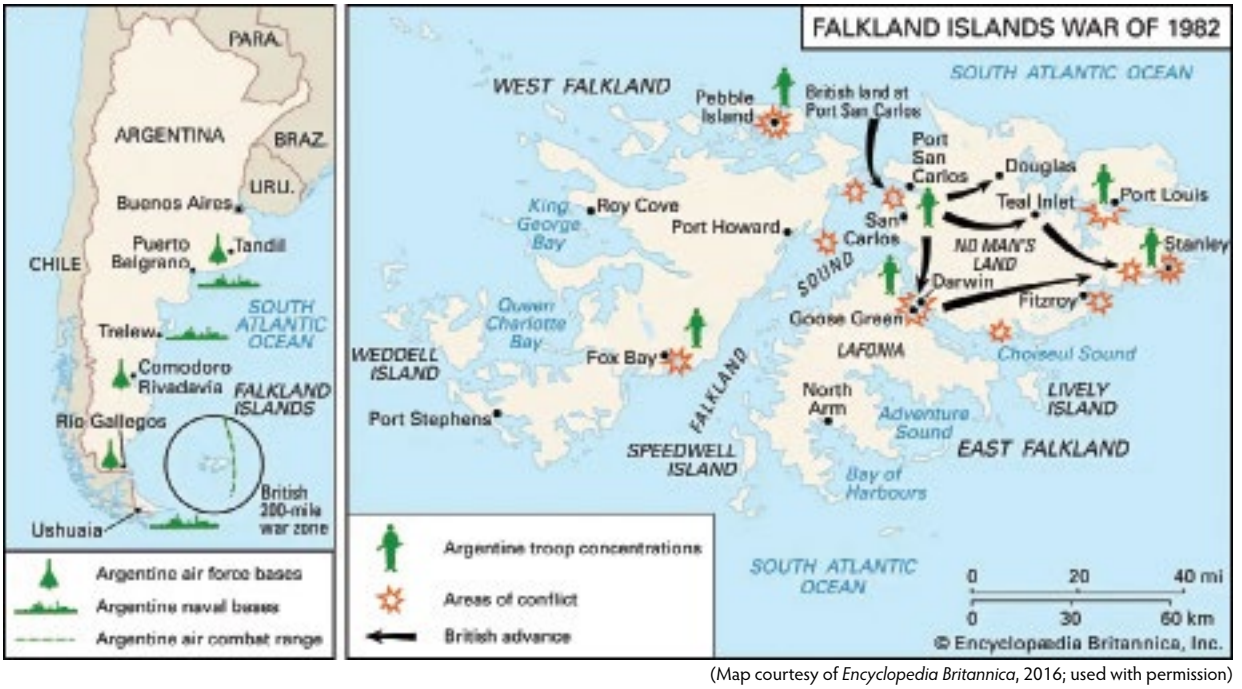
Action Stations! Surface Ships in the Missile Age

The Falklands campaign made very clear two things about surface warships in the missile age: they are essential for power projection, and they are vulnerable.[7] The Royal Navy Carrier Force, Task Group 317.8, entered the total maritime exclusion zone on 23 April 1982 with thirteen ships; there were two

small carriers plus their escorts (assorted destroyers and frigates). Many of the escorts filled specialized roles, such as air defense, antisubmarine, or surface warfare, but all had at least some capacity in each role. The crown jewels of the escorts were three "Type 42" destroyers (*Coventry*, *Glasgow*, and *Sheffield*) and two "Type 22" frigates (*Brilliant* and *Broadsword*).[8] The Type 42s were air defense specialists; their twin Sea Dart long-range surface to air missile (SAM) launchers suited them to protect NATO fleets against massed attacks by high-flying Soviet bombers delivering high-altitude antiship cruise missiles (ASCMs). The Type 22s were antisubmarine warfare vessels, but were equipped with short-range Sea Wolf SAM launchers, capable of destroying sea-skimming cruise missiles. (They, like many Argentine ships, also mounted Exocet ASCMs.) Aside from the twenty untested Sea Harriers on the two carriers, these five ships represented the task group's best hope of defending itself against air attack.[9] By war's end, air attacks had crippled *Glasgow*, *Brilliant*, and *Broadsword*, and sent *Sheffield* and *Coventry* to the bottom of the South Atlantic.

> While the Argentine navy's surface and submarine fleets failed to contest control of the sea, the Argentine air force and naval aviation proved an existential threat to the British task force.

While the Argentine navy's surface and submarine fleets failed to contest control of the sea, the Argentine air force and naval aviation proved an existential threat to the British task force. Having Type 42 destroyers of their own, the Argentines were familiar enough with British capabilities and limitations to avoid Sea Dart's firing envelope, generally attacking at or just above wave-top level. They carried out most of these attacks with "dumb" bombs and cannons, in World War II fashion. These attacks came in so low that they were difficult to detect by radar (more than one British ship



(Map courtesy of *Encyclopedia Britannica*, 2016; used with permission)

Falklands War, 1982

sustained damage when an Argentine jet struck its antennae, and at one least Argentine A4 Skyhawk crashed on landing because of sea spray coating its canopy).[10] Another consequence of the low-level attacks was that many Argentine bombs failed to explode, their fuses not having had time to arm. Many a British ship limped out of action with unexploded 500- or 1,000-pound bombs lodged in fuel tanks or magazines.

The Argentine navy's Super Étendard aircraft could also attack by launching Exocet ASCMs. Throughout the war, Argentina possessed only five air-launched Exocets. Despite British familiarity with Exocet, these five ASCMs sank two ships: the HMS *Sheffield* and the SS *Atlantic Conveyor*. In naval battles of the Second World War, ships as small as destroyers suffered numerous hits and kept fighting as long as their armored magazines were not penetrated. In contrast, modern warships are full up with relatively vulnerable fuel, electronics, and munitions. An ASCM is especially dangerous as it delivers a large warhead at high speed: 165 kilograms at Mach 0.9 for Exocet; 205–500 kilograms at more than Mach 2 for a modern Chinese YJ-12. Such large warheads, traveling at such high speeds, inevitably cause massive damage and start secondary fires that rapidly overwhelm a crew's ability to control damage. While a large aircraft carrier might absorb two or three ASCM hits and survive, a single ASCM hit on a cruiser, destroyer, frigate, or cargo ship will likely be fatal.[11]

Why is this important to the land force? In a word: risk. Unlike an infantry squad or tank platoon, if a naval commander sails her or his ships into the line of fire, the ships cannot take cover or back down behind an intervisibility line; they must fight their way out. The Argentines had only five air-launched Exocets, which they used to sink two ships. While a modern U.S. strike group has many advantages that the British lacked in 1982 (many based on lessons learned from that conflict), it is important to remember that a single Chinese H-6J or H-6K long-range bomber can carry six YJ-12 ASCMs, which they can probably launch from two hundred nautical miles away. A fast attack hydrofoil might carry eight ASCMs. If a foe such as China managed to mass a regiment of H-6s and/or a squadron of small attack boats, a modern U.S. or allied strike group could easily find itself fending off a barrage of one hundred to two hundred supersonic cruise missiles. Considering that a U.S. carrier strike group typically

A screenshot from a China Central Television YouTube video shows a version of a Chinese H-6 bomber firing a YJ-12 antiship missile July 2016 during an exercise in the South China Sea. The Falklands War demonstrated the vulnerability of surface naval ships to antiship cruise missiles, a lesson that did not go unnoticed by the United States and its rivals. (The video has since been withdrawn.) (Screenshots from YouTube)

puts to sea with a carrier, a cruiser, and two or three destroyers, the adversary would not need a 40 percent kill rate to succeed. With two hundred missiles, a 3 percent hit rate would have staggering strategic and operational consequences. If that strike group also happened to be supporting an expeditionary land force, that land force could suddenly be isolated, with little prospect of help for a long time. Our naval counterparts are valiant warriors, but they must carefully weigh the risks before exposing their ships to enemy fire.

You Can't Always Get What You Want

While successive rounds of defense budgets had whittled down the fleet of amphibious ships available to the Royal Navy, it retained one critical asset: the HMS *Hermes*. This flat-topped ship was a small aircraft carrier with a full-length flight deck and below-deck hangar. The Royal Navy had modified *Hermes* for antisubmarine warfare duties, but in its former role as the primary amphibious platform for the Royal Marines, *Hermes* had been referred to as a "Commando Carrier." (The modern, larger, U.S. equivalent is the America-class landing helicopter assault ship.) Having trained extensively with *Hermes*, it came as a shock to the commando brigade staff when they received word that *Hermes* would not serve in an amphibious role. Fieldhouse had decided air superiority was a prerequisite to any amphibious operation in the Falklands. With only a single carrier, the HMS *Invincible*, the carrier group could not possibly generate enough sorties to control the air. Thus, the amphibious force would have to make do without *Hermes*, and the landing force would have to make do without the ability to count on air assaults from the water. The primary mode of ship-to-shore movement would have to be via watercraft.[12]

At no point during the hostilities did the British ever come close to establishing air superiority. The Sea Harriers were very effective, and the Argentine pilots feared them, but they were too few and far between to control the air. Ultimately, Fieldhouse decided to execute the landing without air superiority, so Thompson had to make do once again, having neither the helicopters of the HMS *Hermes* nor the protection of air superiority.

Control of sea and air remains a prerequisite for an amphibious operation. A land force commander will certainly have unfulfilled requirements. While the land component may ultimately be the main effort, it should plan to make do with what it can get.

The Unfriendly Skies

There are simply never enough friendly aircraft to go around. An eager land force commander might assume that with two aircraft carriers in his joint task force, there would be plenty of fighters available to ensure air supremacy and provide copious close air support (CAS). Nothing could be further from the truth. As his amphibious task force approached its amphibious objective area in Falkland Sound, Clapp was particularly concerned about Argentine air attack as the amphibious objective area was just within range of bomb-laden fighter/bombers flying from bases on mainland Argentina. Clapp accordingly requested a modest three combat air patrols (CAPs) of two Sea Harriers each on the air avenues of approach to San Carlos. Unfortunately, the math did not work. To maintain six aircraft constantly on station, the naval air squadron needed an additional six Harriers in transit (to or from the CAP stations), and six on the decks preparing to go on station; this accounts for eighteen of the twenty Sea Harriers in the force. This does not allow for any Harriers down for maintenance, nor, in fact, for air defense of the carriers. CAS was out of the question.[13] As it turned out, the Sea Harriers rarely prevented an attack. They generally had to engage fleeing enemy aircraft as they attempted to return to base after

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British commandos from the 40 Commando Anti-Tank Troop march toward Port Stanley, Falkland Islands, in 1982. Royal Marine Peter Robinson brought up the rear carrying the Union Jack flag. (Photo by Pete Holdgate via the Imperial War Museums)

attacking, vectored on by controllers on the warships under attack.

Given the lack of air superiority, the amphibious group relied heavily on Army and Marine air defense assets, as well as its own Blowpipe and a handful of Stinger man-portable air defense systems, Rapier SAMs, and small arms fire from the landing force. In the relatively close quarters of San Carlos Water, much of the weight of close-in air defense fell on the shoulders of seventeen- to nineteen-year-old sailors in sandbagged emplacements on the superstructure of ships. Firing light antiaircraft guns, general-purpose machineguns, World War II vintage Bren light machineguns, and even flare pistols, these young ratings attempted to distract the Argentine pilots enough to throw off their aim. On occasion, they even knocked them from the sky. The price was high on both sides.[14]

To be fair, a modern U.S. expeditionary strike group would rely far less on merchant shipping and be better equipped with close-in weapons systems. It would presumably be within range of more capable fighters vectored onto incoming threats by airborne early warning. To counter this, a contemporary foe flying large, well-coordinated joint strikes from numerous land bases could potentially mass overwhelming force and break through and bring the fight to the amphibious force. To guard against such an eventuality or against an attack on the carrier, a carrier strike group commander would, out of necessity, focus heavily on defensive counterair operations to the detriment of land operations (including CAS in support of the landing force). A wily land force commander might ask to have dedicated Marine Corps F-35Bs, embarked on a landing ship helicopter dock or landing ship helicopter assault, in his amphibious task force. While these aircraft could certainly provide local defense and CAS missions, there is a tradeoff; as with the HMS Hermes, the fighters would displace badly needed helicopters. Arguably a CH-53, CH-47, AH-64, or AH-1Z would be far more valuable to the landing force than an F-35 in the long term.

A landing force disembarking from amphibious ships will have to accept risk. The commander of a landing force will never have everything he or she wants. Sometimes the best the landing force can do is select the best amphibious objective area in close coordination with the amphibious force and focus on getting troops, equipment, and supplies ashore as quickly as possible; only then might the landing force be master of its own destiny.

For Want of a Nail: Sustainment Rules

I have heard the quote "Amateurs discuss tactics, professionals discuss logistics," or some variation thereof, attributed to generals from Napoleon Bonaparte to Omar Bradley to Georgy Zhukov. Whoever first said it, it was never truer than when one is talking about an amphibious operation.

The British secured the beachhead around San Carlos Water early on D-Day of the landing operation. With nearly five battalions of highly trained marines and paratroopers dug in on the high ground surrounding the small bay, the focus of the transportation effort

immediately transitioned from landing troops and weapons to building a base of operations. Things immediately went awry.

Thompson, the commander of the landing force, had planned to build what the current U.S. Army would call a brigade support area (BSA) on and around the beaches near the San Carlos settlement. As is U.S. practice, this BSA would house supplies (primarily ammunition, fuel, food, water, and medical, roughly in that order), maintenance activities, and medical facilities. Transportation would generally be by helicopter. The brigade counted on the eventual arrival of four CH-47 and ten Wessex helicopters, stowed aboard the SS *Atlantic Conveyor*. The CH-47s were too large to fly from the landing platform docks, the HMS *Fearless* and the HMS *Intrepid*, with the amphibious force. They could have operated from the HMS *Hermes*, but as we have seen, its services were required as a Harrier carrier. The maintenance and aircrews on *Atlantic Conveyor* had just managed to get a single CH-47 airborne before an Exocet hit the ship. The remaining helicopters, along with critical supplies (e.g., all the land force's tentage), sank with the ship.[15]

The loss of *Atlantic Conveyor* was not the only unforeseen logistics challenge. While the Argentine air attacks on San Carlos Water were not as effective as they might have been, the pilots pressed them home with great determination and gallantry. It was not long before Clapp realized that SS *Canberra*—a large, white merchant ship affectionately known as the "Great White Whale," pressed into service as a troopship and supply carrier—was the largest and most obvious target in San Carlos. It was only a matter of time before it drew the attention of an Argentine Skyhawk pilot. *Canberra* was a merchantman, designed for efficiency, not for surviving battle damage. Having inspected *Canberra*, Clapp assessed that if a single bomb hit, even if it did not explode, the damage incurred would quickly flood the ship's massive engine room, which would send it to the bottom of the ocean. Clapp knew that Thompson planned on *Canberra* remaining anchored in San Carlos, from which it could push supplies forward on demand and constantly replenish the BSA. Thus, it was with heavy heart that Clapp ordered *Canberra* to sail out of San Carlos under the cover of darkness, to return only when called upon. Its precious cargo would remain available on a day or two's notice, but it would require planning and forecasting to get any of its cargo ashore, and it would be only in short bursts to minimize exposure. This was undoubtedly the right decision; had the Argentine air force shifted emphasis to merchant shipping, or had an enterprising or errant pilot struck *Canberra*, British land operations could well have come to a halt. Better to have limited access to supplies than have supplies under water.[16]

"The sinking of *Atlantic Conveyor* and the removal of the 'floating support area' were not just frustrating for the land force, but they dictated the shape of British land operations."

The sinking of *Atlantic Conveyor* and the removal of the "floating support area" were not just frustrating for the land force, but they dictated the shape of British land operations. Thompson had planned to build his base of operations over the course of a week or two and then begin a period of limited operations until the reinforcing British Army 5th Brigade arrived, along with Maj. Gen. Jeremy Moore to assume command of the now division (minus) land force. Thompson then envisaged executing a series of airmobile operations, leapfrogging companies and battalions forward to outmaneuver and isolate the Argentine garrisons. It was not to be.[17]

The land force had very few trucks, as the boggy soil of the Falklands would not support their weight. In fact, the only vehicles that could operate cross-country were a handful of Volvo BV tracked all-terrain vehicles and eight light reconnaissance tanks (four Scorpions and four Scimitars) of B Squadron, the Blues and Royals. The only way to move the brigade's light 105 mm howitzers was via helicopter. The only way to move artillery ammunition was helicopter. The only way to move bulk ammunition forward to the maneuver units was helicopter. The only

way to evacuate wounded to the Role II facility in the BSA was helicopter. The only way to bring up food and water was helicopter. Supplies were scarce due to the loss of *Atlantic Conveyor* and the repositioning of *Canberra* and other cargo ships; transportation was scarce due to the loss of the CH-47s. The land force commanders were hard-pressed to merely keep their troops armed and fed. There was no question of moving them by air, so once the time came for the marines and paratroopers to fulfill their role of closing with and destroying the enemy, there were only two options: walking or water movement.[18]

Argentine prisoners of war in Port Stanley, 16 June 1982. (Photo by Ken Griffiths via Wikimedia Commons)

The terrain of the Falkland Islands is some of the worst imaginable. Its peat bogs are wet, cut with gullies, and often devoid of cover and concealment for miles at a stretch. The marines and "Paras" who landed at San Carlos were among the best-trained and fittest troops in NATO, and they prided themselves on their ability to conduct long, cross-country foot marches that would break lesser units. Despite this, and the chance to acclimate before setting out on their "yomp" toward Port Stanley, the commando brigade staff found that the best rate of movement they could plan was one mile per hour. It took days to recover after the march, and the lack of helicopters denied Thompson the flexibility to reposition forces in an emergency.[19] Had the Argentine defenders aggressively employed their wealth of helicopters, artillery, and infantry to conduct a spoiling attack, the results could have been disastrous for the British.

When 5th Infantry Brigade arrived in the Falklands to reinforce the commando brigade, its leaders quickly realized the troops were not as fit or acclimated as the marines and Paras. The Welsh Guards, for example, had been performing ceremonial duties rather than training for combat prior to receiving the alert for deployment. It soon became apparent that a major cross-country march across East Falkland would render 5th Brigade combat ineffective. Denied even the option to move them by foot, the only choice was to move them along the southern coast by ship. Unfortunately, 5th Brigade also lacked adequate communications gear and had no amphibious training or experience. As a result, during one of these amphibious movements, an element of 5th Brigade, to include a large complement of the Welsh Guards, found themselves in the water off Fitzroy, conducting a painfully slow offload from the landing ships RFA *Sir Galahad* and RFA *Sir Tristram*, when two flights of Argentine air force fighter-bombers penetrated the CAP. *Sir Galahad* was lost and *Sir Tristram* damaged. Fifty men lost their lives.[20]

Ultimately, the land force overcame these setbacks. The commando and infantry brigades tightened the noose around the Argentine forces at Port Stanley and began a series of attacks against the well-equipped, entrenched defenders. Ammunition expenditure was far higher than expected, consuming so much of the available transport that by the time Argentine resistance collapsed some British units were subsisting on captured Argentine rations. It speaks volumes of the training and professionalism of the British marines and soldiers that after so much hardship, they were willing and able to close with the enemy, taking back the Falkland Islands at bayonet point, and at great cost.

In the end it truly was a "sad and bloody business" between the Argentine landings on 2 April 1982 and the surrender on 14 June; the Argentines suffered 649 killed and 1,657 wounded. The British forces sustained 255 killed and 777 wounded.[21]

As the Falklands War demonstrated, an amphibious forcible entry is truly a multidomain fight. In accordance with joint doctrine, in a contested environment, the landing force commander only assumes primacy once the landing force is ashore.[22] Even then, the land force may be totally dependent on air and maritime forces for sustainment and fires. Today, the aggressive authoritarian regimes in Russia, China, and North Korea, to name a few, continue to adapt and seek ways to challenge Western military primacy. We cannot assume the U.S. Army will always have the time and resources to deploy forces in an uncontested environment. Future conflicts may well be expeditionary in ways that challenge our preconceived notions. On 1 April 1982, few if any British military leaders expected to have to execute an amphibious assault and subsequent land campaign in the Falkland Islands. They quickly adapted, and they conquered. We would do well to learn from them. ■

Notes

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3. Ibid., 151–54.
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5. Ibid., 43.
6. Secretary of State for Defence, "The Falklands Campaign: The Lessons," vol. 437 (London: Her Majesty's Stationery Office, 1983), 27, 46.
7. Daniel K. Gibran, *The Falklands War: Britain versus the Past in the South Atlantic* (Jefferson, NC: McFarland, 1998), 144.
8. Hastings and Jenkins, *The Battle for the Falklands*, 347.
9. Brendan H. J. Donnelly and Grant T. Willis, "Death of the 42s: Type 42 Destroyers in the Falklands and Lessons for the Joint Force in the Twenty-First Century," *Journal of Indo-Pacific Affairs*, 20 April 2022, accessed 6 February 2023, https://www.airuniversity.af.edu/JIPA/Display/Article/3004451/death-of-the-42s-type-42-destroyers-in-the-falklands-and-lessons-for-the-joint/fbclid/death-of-the-42s-type-42-destroyers-in-the-falklands-and-lessons-for-the-joint.
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11. Alan D. Zimm, "Antiship Missile Lessons from Sinking of the Moskva," *Proceedings* 148, no. 5 (May 2022), accessed 6 February 2023, https://www.usni.org/magazines/proceedings/2022/may/antiship-missile-lessons-sinking-moskva.
12. Hastings and Jenkins, *The Battle for the Falklands*, 88.
13. Clapp and Southby-Tailyour, *Amphibious Assault Falklands*, 123.
14. Ibid., 142.
15. Hastings and Jenkins, *The Battle for the Falklands*, 227.
16. Clapp and Southby-Tailyour, *Amphibious Assault Falklands*, 145–46.
17. Hastings and Jenkins, *The Battle for the Falklands*, 262.
18. Ibid., 262–63.
19. Clapp and Southby-Tailyour, *Amphibious Assault Falklands*, 180.
20. Secretary of State for Defence, "The Falklands Campaign", 12.
21. Ibid., 46.
22. Joint Publication 3-02, *Amphibious Operations* (Washington, DC: U.S. Government Publishing Office, 4 January 2019), III-4.

Soldiers from 1st Battalion, 77th Armored Regiment, attack an objective during a rotation at the National Training Center in Fort Irwin, California, November 2020. Unit leadership has worked to improve the unit's culture to increase readiness and reduce harmful behaviors. (Photo by author)

Culture Change and People First

Creating a Culture that Acts as the Antibody to the Corrosive Elements

Lt. Col. Michael Soyka, U.S. Army

The U.S. Army announced a series of "People First" initiatives in the wake of the 2020 Fort Hood Report. The report provided a scathing indictment of the culture that existed at Fort Hood, which allowed the counterproductive elements of sexual assault, suicide, and racial extremism to fester.[1] Army initiatives sought to change not just the climate of organizations but the entire culture, stating "we must define, drive, and align our culture with our vision of cohesive teams."[2] The Army, however, is comprised of vastly differing organizations, and the strategic imperative of removing harmful behaviors collides with the realities of missions and constraints at the battalion and brigade levels. The Army currently struggles with a recruiting problem that has forced Army senior leaders to adjust the end strength of the Army and could cause a deficit of as many as thirty thousand soldiers below its required number by 2023.[3] There are many reasons for those recruiting issues, including the low percentage of America's youth who are eligible to enlist and a difficult jobs market, but internal to the Army we must acknowledge that part of the problem lies with the culture of our units. If potential recruits hear horror stories from enlisted soldiers and the headlines parents read are filled with stories of counterproductive leaders, recruitment will continue to be a challenge.

Many leaders across the Army have a desire to change their culture to better meet the dual needs of maintaining readiness and minimizing harmful behaviors. However, there is a lack of a systemic method of understanding what needs to change and how to go about making meaningful and long-lasting changes to the culture of units. Over the last two years, the leaders of 1st Battalion, 77th Armored Regiment (1-77 AR) embarked on a planned cultural change to better align its actions, values, and culture to both increase its organizational effectiveness and meet the imperative of reducing harmful behaviors. This change is still ongoing in the organization, but some of the changes we made and the overarching methodology may be useful to other leaders who are trying to do the same for their organizations.

Many leadership articles state that culture is "the way we do things here," but that is a superficial view. Edgar Schein, an MIT professor emeritus, defines three levels of culture: artifacts, values, and underlying assumptions.[4] Artifacts are the things we visually see upon entering an organization: unit T-shirts, cavalry Stetsons, and maroon berets. The artifacts are the easiest to see and the easiest to change. The next level is the espoused values including ideas like the Army values, dedication to maintenance in an armored brigade combat team, or humans treated as more important than hardware in the special operations community.

The deepest and most difficult level of culture to change is underlying assumptions, and those may be at odds with the espoused values in a dysfunctional culture. Assumptions that pacing items (e.g., tanks, Bradley Fighting Vehicles) are more important than people, that higher headquarters units do not care about work-life balance, or that people of a different race/gender/faith are not as valued, demonstrate a conflict between espoused values and underlying assumptions and are common in many units. Leaders in organizations must specifically look to understand where there is a disconnect between the levels of culture and must leverage significant time and resources to help resolve those conflicts over time.

The first step to cultural change is understanding what needs to change in the organization. Large organizations are complicated, and making changes without a full understanding of the interconnected system of the organization can result in unintended consequences. Having a model allows the leader and his or her team to better understand what needs to change to get to the desired end state. The Burke-Litwin model of organizational performance and change (as shown in figure 1, page 69) is an open systems model that breaks

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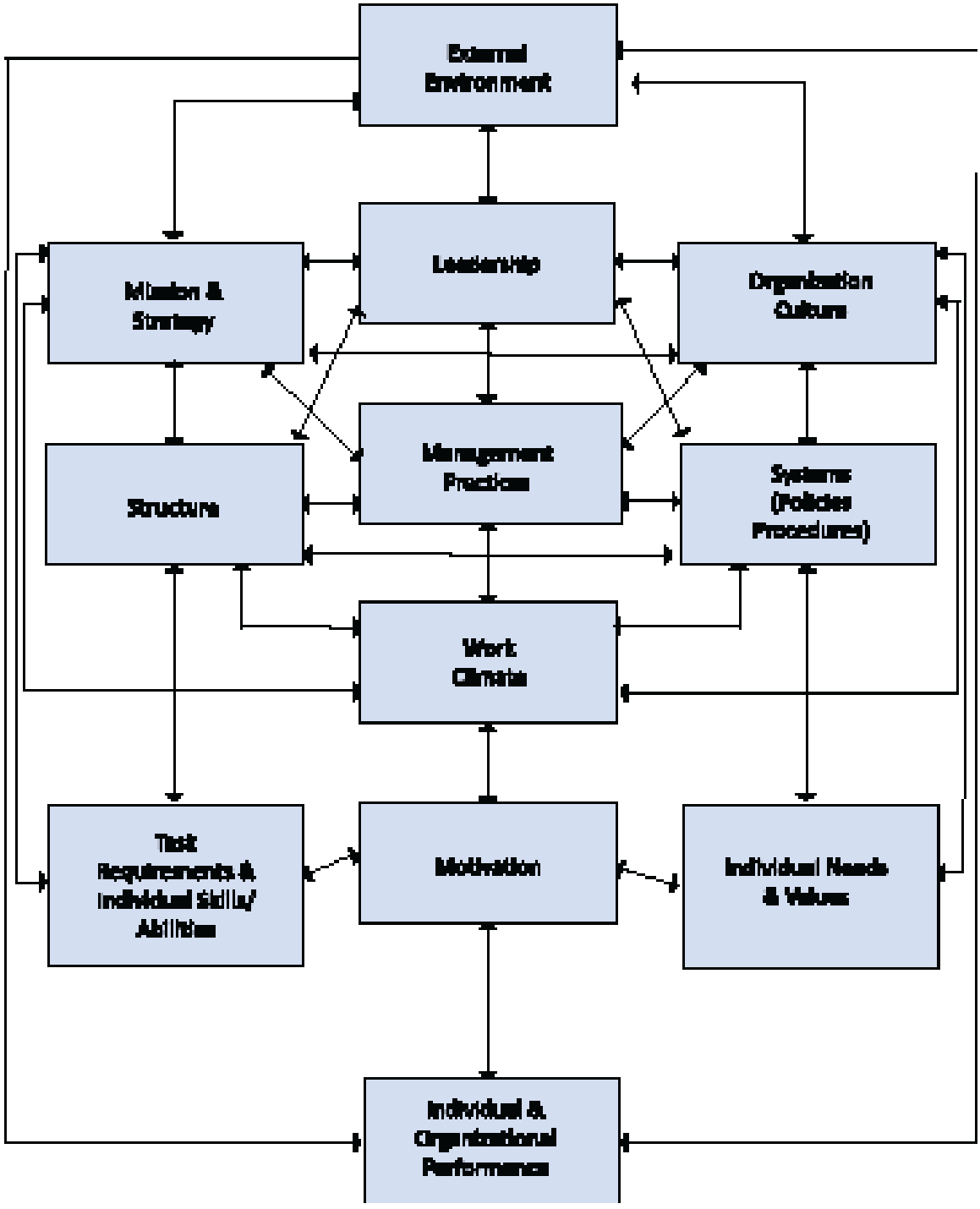


(Figure from W. Warner Burke, *Organizational Change: Theory and Practice* [2011])

Figure 1. Burke-Litwin Model for Organizational Performance and Change

the organization down into twelve variables and uses arrows to demonstrate which variables most directly influence the others.[5] Through its form, this model acknowledges the external environment is an input that the leader of an organization cannot directly control, and that the purpose of any change is to improve individual and organizational performance.

The Burke-Litwin model, through its structure, demonstrates that no one can change culture by just changing culture. Rather, the organizational variables that relate to culture should change to effect change at all three cultural levels. The Burke-Litwin model is arranged also to demonstrate that the more difficult change is in the transformational variables at the top of the model (mission and strategy, leadership, and organizational culture). Those variables have more weight, and changing them must be planned and aligned as they affect the whole system. Changes in the transactional variables are necessary but not sufficient to truly effect change in the upper portions of the model.

Transformational Factors

Employees believe that *mission and strategy* are the central purpose of the organization. This, for many military units, is a clearly defined set of mission essential tasks (MET), which are dictated by their higher headquarters, and while there is some space for commanders at the battalion level and below to adjust within those specific boundaries, it is usually in terms of prioritizing one of those METs over others. Since the Army is a collection of subcultures, some of the levers of change available to other types of organizations may not be adjusted. A combined arms battalion will always be called upon to conduct an attack, a movement to contact, an area defense, area security, and expeditionary deployment activities. Leaders within those organizations will prioritize those METs in conjunction with their higher commanders to prepare for anticipated conflicts but will only ignore one of those METs to the peril of the organization.

Leadership is also at times an immutable object for lower-echelon commanders, though the recent changes in the talent management process have allowed commanders some leeway in what type of leaders are recruited and assigned to their organization (albeit with a lag time of about one year). For the most part, battalion commanders are not given the ability to "get the right people on the bus" but rather can adjust "who sits where on the bus" in their organization with the notable exception of those commands that carefully select those entering (special operations forces units and to a lesser extent security force assistance brigades).[6] Internal to a brigade, battalion commanders do have some influence to bring in the right captain from the S-3 shop to help move their change forward, but mostly, they have an influence on moving the right people into the key roles of platoon sergeant and squad leader. Changes in the squad leaders, platoon leaders, and platoon sergeants can be very consequential in adjusting the climate of the organization and by extension, can be either reinforcing or inhibiting to a culture change initiative. Leader selection at that level is one of the most important jobs of a battalion commander, and while manning constraints may impose limits on the ability to make wholesale change, ensuring incoming leaders understand the vision and help move a change effort forward is critical.

If a battalion commander finds leadership is counterproductive at the lower levels, it must be addressed, or a culture of trust cannot be established in the organization. Leaders must be willing to take immediate action to address those problems and utilize all available tools, from sensing sessions to defense organizational climate surveys, to understand where there may be issues. Positive, inspired leadership is required at all levels to drive change, and commanders must ensure that within the limits of their control, only leaders who demonstrate those qualities are leading our soldiers.

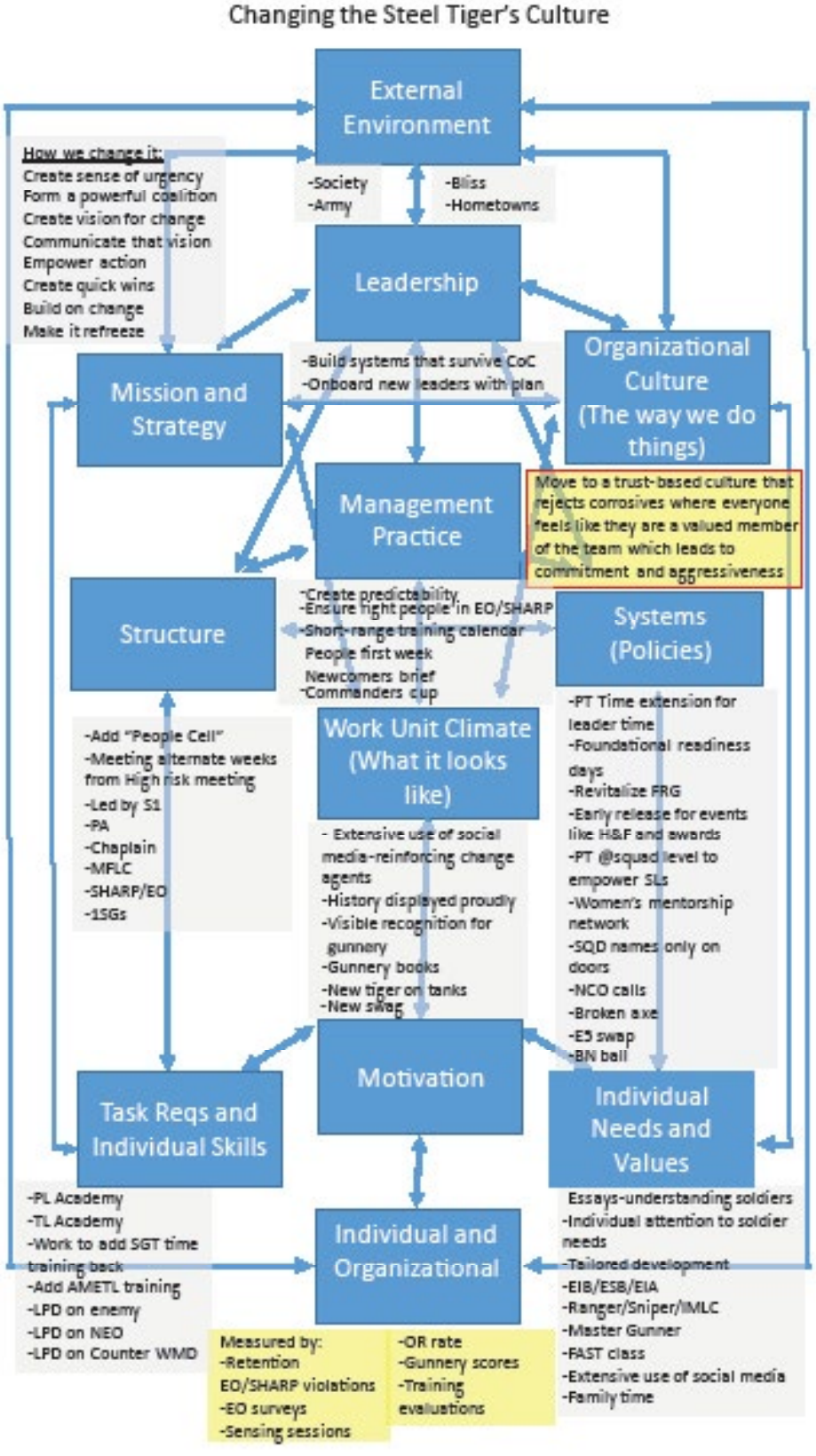
Culture is the one portion of the transformational factors a battalion-level commander can most influence. As stated, no one can change culture by changing culture, but other variables can be leveraged to make the change. No one can ignore that the other two transformational factors have limited mobility, no one can change to a culture that does not align with the leadership or the mission, and critically, no one can change to a culture that reduces the overall organizational performance. That said, there is still a lot of room for movement in most organizations when it comes to culture. A leader can investigate first to see if there is a disconnect between espoused values and underlying assumptions. The most obvious place I noticed when I took command of 1-77 AR was we espoused commitment to the organization and to the Nation, but the underlying

Members of 1st Battalion, 77th Armored Regiment, compete in a five-versus-five pugil stick fighting event 11 December 2020 during the Commander's Cup competition at Fort Bliss, Texas. This event was one of five in the Commanders Cup, designed to build competitiveness and morale within the battalion. (Photo by author)

assumption in the organization was that we had so many things we had to do in such a short time that compliance was the norm rather than commitment. This manifested in satisficing behaviors and a continual string of short-term fixes that over time would degrade the unit performance. Soldiers were interested primarily in what they had to do so that they could be done with their day and go home, rather than working continuously to make themselves and the unit better every day. In choosing to move the culture toward commitment, I recognized we would have to contend with resistance from those who felt such actions were futile in the face of mounting external pressures from an environment in which armored brigade combat teams were in great demand globally. I also realized I would need a powerful coalition to help me lead the change in the organization to overcome that resistance. To that end, I asked the company commanders to work with their platoon sergeants to discuss what they wanted the culture to be and what could change in the transactional factors to help move us toward our desired culture. Figure 2 (on page 72) is what the team came up with through numerous brainstorming sessions.

For *structure changes*, the team proposed creating a "people cell" to monitor change, and over time that transitioned into a weekly meeting we named the Tiger Lair. During that meeting, we brought together various resources including the military family life counselor, the chaplain, public affairs, a Better Opportunities for Single Soldiers representative, members of the battalion top five, and other influential leaders in the battalion on a rotating basis (e.g., first sergeants, influential platoon sergeants). We regularly checked on some of the indicators such as our high-risk soldiers but also focused on things we were working on for changes in the battalion. Building the Tiger Lair helped us allocate our most constrained resource, time, to help manage the change efforts across the battalion and monitor our progress.

Task requirements and individual skills/abilities in the Burke-Litwin model generally refer to the job/skills match of employees, whether they have the requisite knowledge and skills to effectively perform their



(Figure adapted by author from W. Warner Burke, *Organizational Change: Theory and Practice* [2011])

Figure 2. Steel Tiger Cultural Change through the Burke-Litwin Model

required jobs. We recognized several gaps that needed to be filled with the education of those leaders either new to the formation or new to important positions. We implemented biannual team leader academies and LT (lieutenant) academies to help those young leaders learn the skills to be able to perform their jobs. We also recognized we had several leader professional development (LPD) sessions we needed to conduct to get the formation ready to perform the specific tasks we would potentially be asked to execute while deployed to Korea. And lastly, we recognized we needed to provide dedicated time for our NCOs to train their soldiers on basic military occupational specialty skills, whether that was our personal soldiers or our tankers. Our time in Korea allowed us to do just that as 2nd Infantry Division maintains a sergeant's time training block in their division battle rhythm. When we returned from Korea to Fort Bliss, Texas, there was not a protected battle rhythm time for sergeant's time as the leadership explained it expected sergeants to be continuously training their soldiers, not just on Thursdays. Based on that, we adjusted by working with our younger NCOs to ensure they had available time in the weekly schedule, they understood the priorities for training, and they had the right assets to work on the fundamentals such as training for gunnery skills testing.

Management practices are the things managers do in the normal course of events to use the materials and people available to accomplish the organization's strategy. One of the biggest complaints from both the family readiness group and our soldiers was a lack of predictability. While some lack of predictability can be created by higher-level headquarters' last-minute taskings, leaders at every echelon must do everything that they can to mitigate friction through systems and proactive communication. To help with that, we made several adjustments. We extended the time of physical training by fifteen minutes to allow a specific time for squad leaders to discuss upcoming events with their soldiers, and produced a revised short-range training calendar to ensure that leaders at all echelons understood exactly what they were expected to do daily. We intentionally put focus on our battalion newcomers briefs, where the command sergeant major and I would personally meet every soldier and would discuss our culture. Introducing new members into the culture and explaining what we stood for and how the battalion works was an effective bridge into the unit. It helped frame the initial interactions the soldiers had in the unit, and if the actions of the unit met the expectations we created in the newcomers brief, we were able to quickly integrate the soldiers into the culture. We also had long discussions about who should be in positions of trust in our SHARP (Sexual Harassment/Assault Response and Prevention) and Equal Opportunity programs; we chose those who were already demonstrated informal leaders the soldiers were already comfortable talking with.

Climate of the organization is the visible artifacts and what it feels like to be in the organization. We decided we needed to do some additional "branding" for the battalion, creating new unit T-shirts and unit "swag" that would appeal to the younger generation. We also worked to visibly mark our vehicles with a tiger so they could be recognized at a distance. We were lucky our command sergeant major was an artist, and he designed an emblem that had both a tiger head and an axe with blood dripping off it (based on our motto, "Blood on the axe!"). The branding was also extended to the company level, as each company designed their own crests and started to produce company coins, T-shirts, and stickers.

We discussed that while we wanted to lower dissatisfaction, we wanted to increase satisfaction. This was based on the work by Frederick Herzberg with his hygiene motivation theory, sometimes called two-factor theory. Herzberg showed the scales of dissatisfaction and satisfaction are not connected. There are what he called hygiene factors that reduced dissatisfaction (food, shelter, safety, money), and then there were motivational factors that increased satisfaction (membership in a high-performing team, feeling a part of something bigger than oneself, feeling the amount of work put in results in a corresponding good outcome).[7] To that end, we scheduled events to help with those feelings of belonging to include commanders' cups (competitive events to compete for an axe trophy), a battalion ball, and other fun events like our broken axe ceremony (where we tell stories of the funny things people have done). We also instituted a women's mentorship program, built a lactation room, and adopted the 1st Armored Division foundational readiness days to demonstrate to all members of the formation they are valued members of our team. 1st Armored Division foundational readiness days were held one day per

month with specific discussions about corrosive behaviors and how to mitigate them across the formation.

We also recognized that our population of mostly eighteen- to twenty-four-year-olds have predominantly transitioned to the stage of adult development where they get their self-worth primarily from the view of others and no longer get their self-worth from the approval of their parents.[8] We recognized that in the current generation, approval from others comes primarily through social media. While many of the older generation used Facebook, which the battalion had already established, the younger generation operated primarily on Instagram, so we established an Instagram account, and we used it to support the change effort. We found for many of the soldiers that being on Instagram and getting likes was almost as powerful of a recognition as receiving a battalion coin. We also looked for ways to proudly display our unit history throughout the headquarters to tie the soldiers back to the unit's past.

Our chaplain developed a series of "hero" workouts that were dedicated to soldiers from the battalion who fell in battle. He reached out to some of the family members of the fallen soldiers to better understand their stories and get photos, which were discussed and displayed during the workouts. We further wanted to reinforce the lethality of the battalion and focused on reinforcing the importance of gunnery by making gunnery books for the crews who qualified distinguished, superior, or Q1 to sign in to be kept as a part of the unit history. We made the victory meal of steaks at gunnery as big as possible, with the leadership serving the soldiers. We also built a giant axe to mount on the battalion's top tank as a trophy. We made all these changes to increase both the fun and competitiveness in the battalion to make it a place where people were excited to go to work.

Lastly but very importantly, we focused on addressing the *individual needs and values* of the soldiers and leaders. We recognized if we wanted people to be valued, we had to be willing to ask them what they wanted, not just in the Army, but in life, and leaders needed to take tangible steps to help them get there. That meant we needed to put the welfare of soldiers above that of the unit at times and assume some short-term risk to maximize the gain for the greater Army.

We intentionally took some of those risks in the battalion, pushing for a young second lieutenant to get accepted into the fully funded legal education program to become a lawyer, working to get our medical officer accepted into the program to become a medical evacuation pilot, and sending our chaplain to Ranger School so he could potentially later in his career serve in the Ranger Regiment or other organizations. All these actions created gaps for the unit but demonstrated we cared about what our soldiers wanted to do in their lives.

We made getting an Expert Infantryman Badge and Expert Soldier Badge training and evaluation a priority for the unit. This is a difficult task in the current armored brigade combat team operating tempo but an important opportunity for our infantry soldiers and others to advance their careers. Obviously, each of these actions had to be evaluated for risk to the unit, but we made the conscious decision to accept more risk than other units, and this was noticed by our soldiers. We conducted Ranger School assessments and then used the results of these assessments to justify sending more soldiers and leaders to specialty schools such as Sniper School and Ranger School. All these things changed the artifact level of culture to help us begin to change the espoused values and underlying assumptions of the unit.

Enacting Change

Once a team has decided what needs to change in the organization, the next step is planning to enact the change. Change in organizations doesn't usually follow a linear pattern; rather, it follows what is termed to be punctuated equilibrium, meaning there are two general states during a change effort: stasis and dramatic change.[9] When leading change, it is important to understand that while the predominant theories of enacting change appear to be linear, the leader must be ready for periods of time when the organization seems to be standing still with respect to change—or even sliding backward due to events outside of the leader's control. One of the most popular methods for enacting change in organizations is the Kotter model; it can prove effective if managed over time. John Kotter's eight-stage process of creating a major change, as detailed in *Leading Change* and later works, can be summarized as follows:

(1) Establishing a sense of urgency
(2) Creating the guiding coalition

(3) Developing a vision and strategy
(4) Communicating the change vision
(5) Empowering broad-based change
(6) Generating short-term wins
(7) Consolidating gains and producing more change
(8) Anchoring new approaches in the culture[10]

Julien Pollack and Rachel Pollack found validity in the Kotter model through their research but discovered that to be most effective it must be more nuanced, requiring a more participative process and potential need for iterations in the change process to get to the end-state goal.[11] In an attempt at culture change in 1-77 AR, we followed the suggestions of Pollack and Pollack, and we established multiple groups in the guiding coalition first. The command sergeant major, the company commanders, and I did some initial brainstorming, and then the commanders sat down with their platoon sergeants and platoon leaders to discuss the Burke-Litwin model and recommend any additional changes.

After a couple of the initial changes to the system, we observed the effects and convened some of the more influential informal leaders in the organization to discuss the effects and recommend any additional changes. That group was composed of staff sergeants and sergeants first class who had been in the organization for a longer period, and they were the leaders the company commanders and first sergeants saw as NCOs who had reverent power in the organization. The staff sergeant and sergeant first class leaders, because of the number of daily interactions they had with soldiers, had both a uniquely clear perspective on the costs of the change at the lowest echelon as well as an ability to reinforce the change through their daily interactions. By engaging those leaders, we were able to create the case for change and communicate it to the soldier level; the commanders and I were able to reinforce it at our levels, but the power of the message was greatest when it came from those NCOs who the soldiers trusted.

To create our vision, we went through a series of five leader development programs based on the book *Culture Code* by Daniel Coyle, many of which had to be held virtually due to COVID but culminated in two sessions where we sat with the large group and discussed what we wanted the culture to be. After many iterations, we came to a two-sentence statement: "Welcome to the Steel Tigers, we put the Blood on the Axe. We fight to win, and it takes EVERYONE to punch the enemy in the face and keep attacking." While that statement will not work for every unit in the Army, it perfectly captured what we wanted in our combined arms battalion. We emphasized we are an organization that is uniquely capable of getting into a fight with a significant force and continuing to attack if everyone in the organization did their part. As we talked in the group, we specifically focused on the fact that if our tanks ran out of fuel or our mechanics didn't have parts, we would fail in our duty to the Nation. That then led directly to the conversation about the counterproductive issues of sexual assault, racism, and extremism and the deleterious effect they would have on our ability to accomplish our mission. The statement became an anchor for the change we wanted, and we tried to communicate it as often as possible at echelon.

By communicating our message and empowering our leaders at all levels to use the phrase "that is not how we do things here," we gave the change effort power and emboldened even the lowest-level leaders to make needed changes. The power in the phrase came from the fact that the person saying it was part of the "we" and was showing the person who was not doing the right thing they were in the outgroup. As already discussed, with the age group of soldiers, that powerful peer pressure element added strength to the actions of the soldier or leader making the correction.

Our short-term wins came both in training, as the battalion was able to produce great results at gunnery and at the National Training Center, and in the barracks, where we had four separate instances of attempted suicide that were stopped by intervention by young, enlisted soldiers and two incidents that could have resulted in sexual assault that were similarly stopped. Each of those events was highlighted and reinforced as the soldiers were held up as positive examples, which helped to build on the change efforts. As the change efforts began to take hold, similarly sized units in our brigade experienced much higher levels of both sexual assault and suicide, while our battalion maintained very low levels of self-harm and sexual assault and did not have a suicide completed in over two years. While we had the goal of reducing those harmful behaviors to zero instances, the comparison to other units under the same stresses demonstrated that we were making progress.

Consolidating gains and creating more change is a difficult proposition at the battalion level as the traditional permanent change of station cycles mean a unit will lose between 30 and 50 percent of personnel each year. I did not fully appreciate the impact the high level of leader and soldier turnover would have on the organizational change effort until I began to feel the culture backslide. Our battalion changed out all but one company commander and one first sergeant as well as the executive officer, S-3, and command sergeant major in a two-month period, and we changed most of our platoon leaders and 45 percent of the platoon sergeants. I found that I had to be intentionally clear and repetitive with my messaging that could easily translate to the soldier level. Our culture statement provided me and the subordinate leaders with the message, and while at times I felt like I was repeating myself, it took several months and many engagements before I began to hear soldiers utilizing the same messages in conversation with each other. With the large changeover, we found we had to reinvigorate the LPD programs, and I had to be intentional with my initial counselings to reinforce the messaging associated with the change effort.

Immediately after the changeover of the large number of leaders, our battalion began a rotation to Korea, which afforded us the opportunity to have more engagement with our leaders as there was not as high of a pressure to balance family activities. We were able to create additional events to continue to build the culture with a brown bag lunch series with rotating groups of leaders (e.g., platoon leaders, executive officers, first sergeants) and additional opportunities for competition and engagement such as our commanders' cup events, broken axe awards, and intramural sports. By the end of our nine-month rotation, the culture had stabilized again, but I didn't anticipate the challenge that would come from redeployment and an additional COVID lockdown. As we were beginning the redeployment, a surge in COVID cases in Korea meant we had to have nearly the entire battalion on lockdown for two weeks, and we were limited for almost six weeks on how much in-person interaction we could have to minimize the chances of an outbreak affecting the relief in place with the next unit. This lockdown had an increased effect on the battalion because the battalion had gotten so accustomed to the family environment our culture was seeking to create. We had an uptick in suicidal ideations that was compounded by the dispersal of our personnel as we began the redeployment process and block leave.

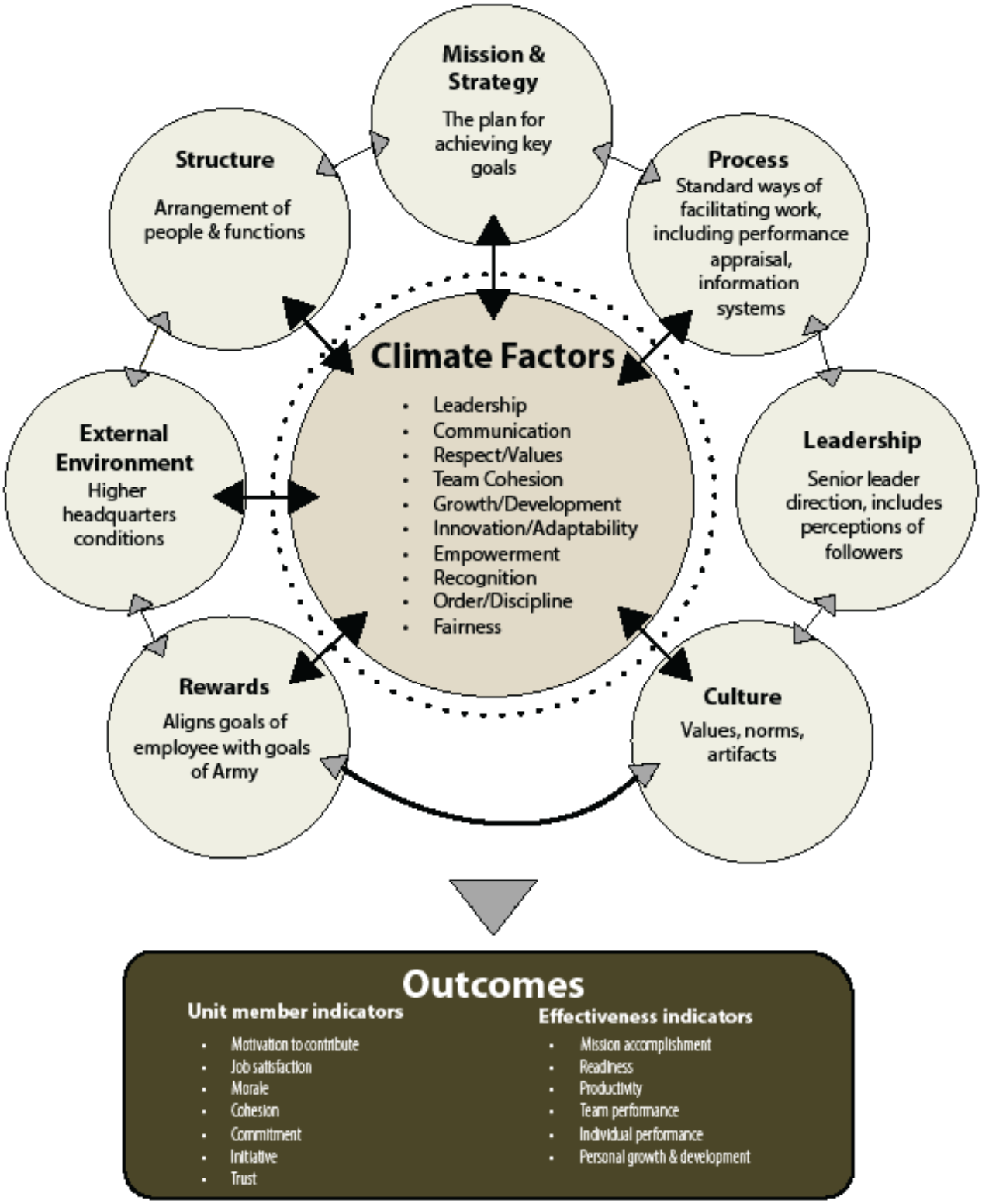
Those changes to the external environment and our daily processes meant we didn't have as much daily interaction to reinforce the culture and the battalion struggled a bit with some issues both in terms of behavioral health and indiscipline as we returned home and began to integrate our rear detachment personnel. The battalion then undertook a series of events culminating with our battalion ball, which helped bring the culture back into line prior to the next summer permanent-change-of-station cycle. Consolidating our gains was perhaps the most difficult part of the change effort, and we did not make as much progress as we would have liked, but the overall trend remained positive. Kurt Lewin states that the process of change is unfreeze-change-refreeze, and while we did well in the first two parts of that process, we were not as successful in the final portion.[12] We did our best to continue many of the comradery-building events such as traditional hail and farewells, and when the environment did not allow them in person, we continued them using virtual means, but it did not have the same magnitude of effects and resulted in a punctuated equilibrium of change as we went through the process.

Through the work of the Center for the Army Profession and Leadership, the Army has started to add similar concepts to the Burke-Litwin model into Army publications such as the *Building and Maintaining a Positive Climate Handbook*, which uses a similar model (see figure 3, page 77) to demonstrate the factors that affect a unit's climate.[13]

The Center for the Army Profession and Leadership handbook is directed predominantly at company level leaders with vignettes and a similar model, as well as the recommendation to utilize the Kotter model for implementing change. The use of this resource in conjunction with a battalion-level or higher change effort will give organization leaders the tools to help communicate the purpose and direction of their change efforts to the leaders of their formations and will provide additional resources for LPDs and discussions with leaders.

What We Did Not Do Well

In any major effort, soldiers must be self-reflective to learn from it, and as an organization, there were



(Figure from the Center for the Army Profession and Leadership, *Building and Maintaining a Positive Climate Handbook* [2020])

Figure 3. Factors that Contribute to Climate

things we tried that did not go well through the process. First, I regrettably took a long time to work with the team to finalize our culture; I wanted the process to be participative, but it took too long for us to fully flesh out our culture. That meant that for the first several months, we were changing but without a defined end state. While we were making small changes to the climate, we were at risk of creating friction by making changes for the sake of change. Not having the fully defined culture also limited the ability of lower-level leaders to make changes at their level using disciplined initiative enable through understanding the end state.

Looking back, we did not do a great job of marketing our change; we did not put together banners and other artifacts talking about why it was different and pushing the change forward. In retrospect, we would have likely increased the pace of change if we matched the word-of-mouth efforts from the leaders at echelon with visual aids to help the process, both in the office spaces and the digital world. We made some of the changes without fully communicating the purpose. For example, we instituted an additional fifteen minutes of physical training time to allow leaders to talk with soldiers about upcoming events to create more predictability but did not communicate the purpose well. That led to squad leaders initially just conducting longer physical training sessions and not having the necessary discussions with their soldiers. To aid in our communications efforts, I also should have provided every new soldier with a copy of our culture statement in our monthly welcome briefs.

We also did not acknowledge and integrate some of the resources that were already there. Particularly, as we instituted a women's mentorship program, we did not tie into the existing Army-wide and national-level assets that could have increased the efficacy and excitement around the program.

Finally, we were reactive when understanding the potential effects of the external environment on our culture and our change efforts. If we had taken more time to understand how potential changes in the environment external to the battalion would affect the changes we were implementing and intentionally included in our plan opportunities to reframe the problem, we might have found better solutions to keep the change effort on track and reduced the amount of time the culture was either in stasis or backsliding.

Members of 1st Battalion, 77th Armored Regiment, compete in a hot dog eating competition (a Commanders Cup event) on 11 December 2020. The photo shows soldiers from our HHC, A Company, and C Company competing and having fun. (Photo by author)

Conclusion

Changing any organization is hard, but it is also incredibly important, and the Army efforts at change to meet the objectives of the "People First" initiatives are aiming at the right targets. However, at the battalion level, each organization must examine itself critically to understand what needs to be altered to get to the culture that is desired. The Burke-Litwin model is a valuable tool to help leaders understand their organization and what can be done to make it better. Utilizing the Kotter model can help those leaders see a path to success. The result of our change was demonstrated in the words of the soldiers and leaders leaving the organization; at hail and farewells, the consistent theme was that the battalion was a special place, a place where people truly care about each other. People spoke about the feeling of being in the organization—it was truly a family, one that was inclusive and that they wanted to create in their next units. We also consistently heard the same thing from soldiers coming into the brigade, asking to come to the battalion because everyone they talked to said it was a great unit, one they wanted to join.

This culture change effort and the use of the Burke-Litwin model could be scaled up to a brigade level, but it may be more difficult as the types of units vary so greatly across a brigade combat team (BCT). At a BCT level, it may be more functional to have each of the battalions conduct its own assessment and then examine what can be done at the BCT level to support its efforts. For functional brigades such as sustainment, military intelligence, field artillery, or aviation, conducting this as a brigade level would likely be more effective than in a traditional BCT due to the commonalities of some of the units and the individuals therein.

Creating units with the type of culture that makes people want to be there and willingly tell their friends about has impacts beyond the unit. Those type of interactions are the ones that encourage soldiers to reenlist and cause young soldiers to spread positive opinions about the Army, which has a trickle-down effect into both recruiting and retention. This article may be about how to change the culture in a battalion, but the potential effects for the Army are much greater if multiplied across the force. ■

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Air Force Staff Sgt. Gaberial Solazzo, 701st Munitions Support Squadron, leads a dismounted patrol at Baumholder, Germany, 9 October 2019. The airmen practiced mounted and dismounted patrol tactics and reaction procedures to indirect fire and improvised explosive devices during a four-day exercise. (Photo by Ismael Ortega, U.S. Army)

Toward a Vernacular of Risk

Unmiring Mission Command through Risk Education

Capt. Noah Taylor, U.S. Army

Whether it comes directly as the result of an enemy action or threat-based activity or as the result of other factors (hazard-based), RM [risk management] attempts to identify, assess, and control factors that may adversely affect the capabilities of a military unit or organization. Additionally, RM application ensures the leader at the appropriate level approves the action or operation.
—Army Techniques Publication 5-19, *Risk Management*

The twenty-first-century battlefield demands decisions from junior leaders in tactical situations that can have effects at operational and strategic levels. Whether those effects shape operational and strategic outcomes is still very contested. "Strategic" corporals have played outsized roles in the international media environment, but as Col. Thomas Feltey points out, they have marginal, if any, effect on major operations.[1] On aggregate, however, the emergence of strategic corporals as a concept has had a net negative effect on military leadership—not because of their actions but because senior leaders have since "elevated decision authorities far away from anyone but themselves."[2]

This has left the Army facing a crisis of hypocrisy between the doctrine and praxis of its command-and-control philosophy. On the one hand, it espouses empowered, decentralized execution in its mission command doctrine. On the other hand, it struggles to implement this doctrine, requiring "reinvigoration" to achieve its ends.[3] While running with scissors is a fun metaphor, its premise as the solution for the Army's mission command problem ricochets off some of the Army's deeper struggles with trust and delegation. Simply accepting or promoting more risk, as many suggest, is reckless and lacks nuance. For instance, one does not see many soldiers literally run with scissors; that would create unnecessary risk. Instead, soldiers stow trauma shears, secured in their kit, and perform a variety of hazardous tasks without posing much additional risk to themselves or their comrades.

The crux of the problem is not that the Army is inherently risk averse, but rather that its conception of risk and the education of its soldiers and junior leaders do not go far enough to support its doctrine of mission command. Risk has always had its place in mission command, from the ambiguous, now-rescinded "prudent risk," to its current version as "risk acceptance."[4] Yet these conceptions do little to emphasize the role risk plays in decision-making on a complex battlefield where decisions made at lower levels can have outsized effects.

To alleviate the risk aversion created by the anxieties surrounding distributed decision-making, we must realize that individuals on the modern battlefield must make hard decisions, often with ethical consequences, at all levels. Risk can and should be seen as a tool for educating subordinates on how to approach hard decisions, and how those decisions will affect conditions and actors elsewhere on the battlefield. For this tool to be effective, the Army must do two things: it must refine its conception of risk to see it as a commodity that can be transferred between all actors on the battlefield, and it must adopt a vernacular of risk at the company level and below to educate its junior leaders and cultivate a culture of risk awareness that will support decentralized decision-making.

Operationalizing these ends will require doctrinal and cultural change across four lines of effort: junior leader development, training design at the company level, senior leader engagement, and training and doctrine reform. Junior leaders should learn to apply risk decision-making (RDM) in garrison and tactical environments. Company commanders and company-grade leaders should educate subordinates on risk and Army risk management. Senior leaders should foster a risk-aware, but not averse, climate. And the Army should further integrate risk into its command-and-control doctrine.

Mission Command in Context

For our mission command approach to work, leaders must encourage subordinate leaders to use their initiative to achieve the commander's intent and to measure and accept risk when doing so.
—Gen. Stephen Townsend et al.[5]

Before we can begin a discussion of how to adopt and implement a refined concept of risk, we must first understand where it fits in the current professional discourse on mission command. In April 2019, Gen. Stephen Townsend published his inaugural installment of "Reinvigorating the Army's Approach to Command and Control" with the subtitle "It's Okay to Run with Scissors."[6] Since then, the series has had two more installments, with risk

acceptance featuring most explicitly in "Leading by Mission Command (Part 2)."[7] Part 2 highlights George Washington's Delaware River crossing as an example of one where "all of the options were high risk" but does not differentiate between risk to force versus risk to mission, which clearly informed his decision-making.[8] Using a commanding general as an example also neglects to address how risk figures into the subordinate-driven, disciplined initiative of mission command. While this series provides exposition of senior leaders' thoughts on mission command—a good thing—it jumpstarts the professional dialogue on the topic of mission command with flawed and incomplete examples of risk.

In the years since, many have taken up the pen—including this author—to engage with Townsend on the topic of mission command's implementation. The most direct attempts to engage with the topic have thus far been descriptive and diagnostic. In a prize-winning 2022 *Military Review* article, "We Don't Run with Scissors," Maj. Michael J. Rasak offers a comprehensive, empirical analysis of how the Army struggles with risk acceptance.[9] While this is a good step, and empirical analysis is helpful, it is only just that—a helpful first step.

Other recommendations like Maj. Justin T. DeLeon and Dr. Paolo G. Tripodi's "Eliminating Micromanagement and Embracing Mission Command," mire themselves in historicism and cultural critique. DeLeon and Tripodi recommend an idea from social psychologist Edgar Schein that commanders establish "cultural islands," where "societal rules can be suspended and people are encouraged to be more open about what normally they would withhold."[10] This is a good addition to the conversation. However, it gets overshadowed by the authors' historicist critique of French military influence on the Army's current organizational culture, and a focus on micromanagement as the most significant symptom of a sclerotic mission command.

The question of how to effect cultural change within the institution remains. This article hopes to offer some answers to that question.

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Risk as a Commodity and What Happens to "Accepted" Risk

In the above cases, risk *acceptance* features prominently as a panacea for mission command's ailments.[11] This throughline focuses on relinquishing control and the risks associated with underwriting others' decisions in the face of potential adverse outcomes.[12] Unfortunately, this myopic approach exacerbates the problem of Feltey's elevation of authorities, viewing risk as an esoteric concept that should remain cloistered in the hands of those who have the authority to officially approve controls. While understanding the dynamics of relinquishing control is important, it is an uncreative and incomplete framework for understanding RDM.

This approach frames commanders as actors who must continuously relinquish decision-making opportunities to subordinates. With recent advances in command-and-control technology, this is no doubt true and must be emphasized. Changes to decision-making levels like Gen. Stanley McChrystal's "empowered execution" have clear, positive effects on the collective productivity of military units to be sure.[13] Nevertheless, this misses a critical and often overlooked premise of mission command, namely that all actors are decision-makers whether turning wrenches in the motor pool or leading a brigade on the battlefield.[14] Understanding this, leaders should focus their efforts twofold: on how to responsibly relinquish control, yes, but more importantly on how to develop informed decision-makers in their formations. To do this, they must be more creative. They must decode risk as an element of decision-making and repackage it for use at every level.

Applying the Marine Corps' single battle concept to RDM allows for a fresh interpretation of risk. The maxim that "actions anywhere in the operational environment can affect actions elsewhere," clearly applies to risk decisions.[15] As Col.

Todd Simmons noted in lectures to subordinates and students at the Marine Corps' Expeditionary Warfare School, accepting risk does not make it disappear but often shifts that risk, and therefore the risk decisions associated with it, onto other actors in an organization.[16] Viewing risk through this lens permits individuals at every level to see risk not as something to be mitigated away to a point of acceptance but rather as a commodity whose acceptance demands energy and decision-making brainpower from other actors on the battlefield.

Alternatively, Army Doctrine Publication (ADP) 6-0, *Mission Command: Command and Control of Army Forces,* uses the example of Capt. William Carpenter Jr., who called for a napalm strike on his company's position as it was about to be overrun by the North Vietnamese Army in June 1966.[17] ADP 6-0 highlights this as an instance where a leader made informed decisions—he was familiar with the impact patterns of napalm—and accepted risk to save his subordinates. Firstly, this case illustrates valorizing a risk taker whose actions resulted in positive outcomes without a critical interrogation of how his decision would have been received had the napalm strike been less precise and accurate. This is an example of *outcome bias,* where hindsight provides a "halo of prescience and boldness."[18] More importantly it does not reflect how Carpenter's decision to accept risk transferred residual risks onto his subordinates. While this was probably the only right decision in that scenario—and Carpenter's actions should be lauded—its use by ADP 6-0 only captures risk acceptance from an individual decision-maker's perspective. An improved interpretation of this example would highlight the fact that Carpenter was forced to make a *hard* decision where he had to intentionally transfer risk to his subordinates who had little means to mitigate the residual risk of his decision. While this may appear to be a negative critique of Carpenter's decision-making, it should be seen as an opportunity to highlight the hard, ethical decisions that military leaders will inevitably have to make—with risk calculus and transferal at the center.

"While this may appear to be a negative critique of Carpenter's decision-making, it should be seen as an opportunity to highlight the hard, ethical decisions that military leaders will inevitably have to make—with risk calculus and transferal at the center."

A couple examples help illustrate how this applies both up and down the chain of command. Consider a hypothetical mechanized infantry company commander whose mission is to clear a defile in order to pass the rest of her battalion and brigade onto follow-on objectives. Upon reaching a large open danger area on the far side of the defile, she identifies a bridge over a swollen river as key terrain and begins to deliberate on whether to extend her formation another five to ten kilometers. Seizing the bridge would ensure the brigade would be able to cross a major linear obstacle. Alternatively, it would stretch her logistics tether back to her battalion, place her formation out of range of the brigade's self-propelled artillery, and challenge her formation's ability to secure the defile. This would force new decisions associated with the risks of supporting her company onto her battalion and brigade commanders. Without an understanding of risk as a transferrable commodity, she may decide to seize the bridgehead—accepting the risks at her level—without implementing controls to mitigate spreading risk across echelons. In this case, accepting the risk would transfer it onto other decision-makers, namely her superiors, and expose the rest of her battalion and brigade to new and unanticipated hazards.

If risk can transfer from one actor to another, and if we expect individuals at all levels to confront hard decisions, it should be the Army's responsibility to ensure that its members, especially its junior

leaders, have an understanding of how RDM plays out in a complex environment. In short, they must have a vernacular of risk.

Some Challenges in the Current Risk Decision-Making Framework

I learned that good judgement comes from experience and that experience grows out of mistakes.

—General of the Army Omar N. Bradley[19]

Strategic corporals are inherently limited by their short term of service and the absence of a framework of risk in which to consider their decision-making—both tactical and garrison. This is no fault of their own and is why team leaders are so often seen as the leaders where the "rubber" of the Army meets the "road" of the battlefield. This lack of experience is not a strict drawback; rather, it is simply a fact of their location in the institution. And yet the operational environment demands decision-making that requires critical thinking and familiarity with the tradeoffs of risk environments. This is where the second limitation—lack of a framework—becomes a potential unnecessary risk for units and the Army as a whole. To develop intuition and judgment, individuals require a "sufficiently regular environment" in which to practice.[20] In the case of RDM, the structures to facilitate this kind of practice—usually unit leader professional development programs—do not formally exist, are underresourced, or do not focus on topics like risk. As a result, junior leaders have the potential for making consequential decisions without sufficient understandings of risk and how it figures in their environment.

On the other hand, company commanders—those in charge of training design—face the challenge of having more experience but are the first level of command in the Army. In this light, they usually have minimal levels of exposure to Army systems and processes, namely Army risk decision-making doctrine, and have only just entered the community of leaders who traditionally hold the authority to officially implement controls and approve risk management. This presents a challenge of legitimacy where company commanders hold sway over junior soldiers but often appear young and naive to their noncommissioned officers and superior commanders.

Commanders at echelons battalion and above have more experience and often much more education than their subordinate commanders and leaders. However, saturated in professional discourse that focuses on the decisions and effects of strategic corporals, senior commanders have "sacrificed (trust) for the illusion of control of risk," which they see as emanating from their own formations.[21] This breakdown in trust has driven a perception of micromanagement and hypocrisy.

At an institutional level, the Army can do more to refine its doctrine and systems for RDM. RDM at the right level is an important part of existing doctrine as it highlights individual agency of all battlefield actors. Yet this is as far as the Army's doctrine goes in systematizing the language of risk as it applies to decision-making. The Army needs a more versatile conception of risk to aid in its application of mission command.

The Criticality of the Company and Below

Before discussing what a vernacular of risk should look like, an examination of the location of companies in the Army will provide a better platform for understanding the importance of implementing a vernacular of risk at the company and below. In short, the company is the optimal echelon at which to cultivate a vernacular of risk for circumstantial and educational reasons.

Circumstantial. As the strategic corporal team leaders who translate collective, tactical movements into individual actions, company-grade officers translate operational objectives into tactical actions. The culture of risk within a company can greatly affect how that unit performs in stressful and inherently risky environments. Tactical examples are easy to consider. For instance, if a company commander tasked with guarding a critical piece of equipment (e.g., a Patriot system) has an uninformed preference for mitigating risk to force, their tactical decisions could leave the critical asset unnecessarily vulnerable to enemy attack. Alternatively, if a signal company had a culture with little awareness of risk, it might focus on training mission-essential tasks without adding the friction of variables like degraded or jammed communications; weather effects; or

Capt. Beverly Nordin (*left*), 173rd Airborne Brigade Support Battalion operations officer, and Command Sgt. Maj. James LaFratta make decisions about the employment of heavy machine guns as their paratroopers conduct a base defense live-fire exercise in Slovenia on 13 March 2018. (Photo by Lt. Col. John Hall, U.S. Army)

chemical, biological, radiological, and nuclear operations. This would leave the higher echelons it supports vulnerable in uncertain environments, characterized by such frictions. These examples show how lack of education or even a particular preference for mitigating risks to force at the company level could transfer risks to higher-level commanders and have operational effects.

Educational. Furthermore, the company is the first level that can truly self-support internally planned training. The internal resources of company commodity shops and the number of officers and noncommissioned officers create a rich environment where the commander can organize training yet maintain personal relationships with most of the formation. This enables company commanders to leverage personal connections and develop programs aimed at individualized, professional growth. In this light, the company is the ideal place to cultivate RDM education. When combining the educational accessibility with the circumstantial importance of companies, the Army must focus its efforts on the company and below if it wants widespread implementation of mission command.

A Vernacular of Risk

Mission command is the U.S. Army's philosophy of command that empowers subordinate leaders using mutual trust, cohesion, and shared understanding to make decentralized, risk-informed decisions in complex, inherently hazardous environments harmonized through commander's intent.[22]

To begin building a vernacular of risk within companies, company commanders and leaders should begin the conversation by focusing on why risk is an important component of military operations. This should involve an in-depth discussion of cost-benefit calculus culminating with the significance in interpreting hazards efficiently and effectively. In this portion, clarifying the concepts of severity and probability to subordinates is of paramount importance. When confronting situations that have high severity and low probability—as soldiers and leaders

Staff Sgt. Jessica Spencer, a small group leader from 640th Regional Training Institute attached to the U.S Army Central Noncommissioned Officer Academy, evaluates a squad leader's mission preparation at Camp Buehring, Kuwait, 5 March 2016. The soldiers rehearsed with a sand table to ensure everyone understood and coordinated their movement throughout the operation. (Photo by Sgt. Youtoy Martin, U.S. Army)

inevitably will in their military careers—it is common for people without common language to make drastically different risk decisions. Take gun ownership for self-defense against home invasion or disaster preparedness as examples. Even though home invasions and natural disasters are relatively low-probability events, some people choose to purchase firearms or invest thousands of dollars in "prepping" because of the severity associated with these events. On the other hand, others look at these events and choose not to own firearms or "prep," because they place emphasis on the low probability of such events. Both are rational interpretations of the risk environment yet offer drastically different approaches to controlling against hazards.

To create a common approach to severity and probability, company commanders must articulate their priorities and vision for company. This would come through the commander's values, unit mission statement, and an emphasis on programs like the thoroughness of preventative maintenance, the importance of incorporating *relevant* safety briefs in all training and articulating the relationship between critical information requirements and significant incident reporting. In the end, the goal should be to establish a common outlook and approach to risk management that helps junior leaders understand how to balance severity and probability.

Second, company commanders should educate platoon and squad leaders to understand information requirements as RDM tools. Commander's critical information requirements serve to inform commanders of constantly changing mission variables to enable their decision-making. A vernacular of risk would take this a step further and articulate to junior leaders the costs and benefits to a commander of having or not having information from subordinates. Commanders could use this to their advantage in garrison, training, and combat environments. Articulating and framing information requirements effectively, in all environments, will show individuals and leaders where the unit's risk tolerances lie and will enable those leaders to make their own risk-based decisions at the right level.

Third, a vernacular of risk should incorporate an understanding of risk decision-makers at other echelons,

especially higher. This includes describing how the level of the decision-maker's responsibility changes the considerations and controls required to effectively manage risk. For instance, a battalion commander makes risk decisions that affect five hundred soldiers as opposed to a squad leader who makes decisions that affect nine soldiers, yet the consequences can be equal for those soldiers. For example, a squad leader can verbally tell a soldier to find cover, but the battalion commander publishes the entire unit's combat uniform. Both are efforts to physically protect the soldier but they exercise different controls to reduce the risk posed by potential hazards.

With this laid out, leaders should finally frame risk acceptance as a zero-sum concept. Put simply, risk acceptance does not abolish that risk, but often transfers it, sometimes in another form, to another group or actor on the battlefield. Understanding this will help junior leaders look up and out, and better understand the context in which their decisions take place. Ultimately, the vernacular of risk should establish an understanding of risk, to the lowest private, as a commodity whose acceptance changes the battlefield environment and the decisions other actors will have to make.

Before moving on, we should disclaim the idea that a vernacular of risk is meant to create "good" decision-makers. As Townsend et al. point out, many fear being "criticized or censured if the result of their acceptance of risk and employment of initiative comes up short."[23] Instead of seeing decisions as good or bad in themselves, this article understands that "good" decisions do not necessarily yield good outcomes and vice versa. As such, it does not intend to suggest that the Army can "optimize" decision-making. Instead, a vernacular of risk should be seen as a way of including risk calculus as an element of decision-making.

Recommendations for Every Level

To develop a vernacular of risk, individuals at all levels can make small adjustments to enhance common understanding and help manage the impacts of risk transfers vertically and horizontally in their organizations.

Individuals and Junior Leaders

- **Learn the vernacular of risk.** Junior leaders should commit themselves to understanding how leaders above them frame decisions in terms of risk.
- **Frame all decisions in terms of cost-benefit strategies with hazard mitigation techniques.** Breaking down decision-making into the doctrinal components of risk will begin shaping the way junior leaders understand complex problems and can be used in any environment from the barracks room to combat.
- **Seek out risk-taking opportunities.** Risk decisions should motivate junior leaders to grow in their attributes and competencies. They should view risk decisions as opportunities.
- **Embrace acceptable failure.** Junior leaders should see failure as a positive learning experience when done in a controlled environment, and where failure is acceptable. This will help them build a growth mindset and develop their judgment and personal understanding of RDM.

Company Commanders

- **Make risk language accessible to junior leaders.** As the "first commanders" in the Army, company commanders have the obligation to translate concepts of risk, authority, and responsibility into layman's terms and establish a common understanding of right-level RDM within their units.
- **Train, educate, and mentor platoon, squad, and team leaders in deliberate risk planning using DD Form 2977, *Deliberate Risk Assessment Worksheet (DRAW).*** The *DRAW* is the Army's most accessible way for coaching inexperienced leaders through deliberate risk management. This will help leaders begin to develop their judgment and transition their thinking from deliberate to intuitive.
- **Plan and prioritize ethical/tactical decision-making exercises (EDMX) that highlight risk decisions.** EDMXs and case studies are low-risk opportunities for developing subordinates' decision-making abilities and intuition. This should be an environment where junior leaders can receive feedback in a "sufficiently regular environment" to begin building their judgment. These activities require dedicated time and adequate resourcing. As such, company commanders must schedule these on their unit training calendars and protect the allocated time and resources to execute them effectively.

Senior Commanders

- **Provide copies of Army Techniques Publication (ATP) 5-19, *Risk Management*, to subordinates.** Many units struggle to maintain publications accounts. Senior commanders should prioritize unit doctrine libraries to ensure that subordinate units have adequate, print reference materials to build a vernacular of risk.
- **Emphasize RDM in professional development programs.** Targeting RDM through EDMXs in battalion and higher leader professional development programs will not only offer commanders an opportunity to focus on risk with their subordinate commanders and leaders but will allow them to share their personal interpretations and nuanced understanding of RDM as a way of establishing trust and shared understanding.
- **Highlight risk locations in their commander's intent.** Senior commanders should indicate where they personally see risk to shape their subordinates' understandings of the unit's risk tolerances. Framing these "risk locations" as critical vulnerabilities and including them in their intent will help subordinates to couch their decision-making in terms of leveraging the unit's strengths while protecting its vulnerabilities.

Commanders at All Levels

- **Foster a risk-aware climate.** Commanders should prioritize risk awareness instead of risk acceptance. Doing so through a vernacular of risk will unlock the "ways" to implement the "means" of disciplined initiative that will help achieve the "ends" of mission command.
- **Create spaces for candid communication.** Creating "cultural islands," as recommended by DeLeon and Tripodi, will create collaborative spaces where senior commanders can deliberately reduce the stress of performance anxiety produced by overzealous careerism.[24]
- **Exercise patience and forgiveness with subordinate commanders.** "Some mistakes are made with great confidence."[25] While poor risk calculus from subordinates may frustrate more experienced commanders, patience, forgiveness, and humility will create a positive environment in which subordinates can learn to be more effective risk decision-makers.

The Army as an Organization

- **Publicize and integrate the Joint Risk Assessment Tool (JRAT).** Many leaders are unaware of JRAT's existence. JRAT streamlines the deliberate risk assessment process by offering a flexible tool for filling out the DD Form 2977, *Deliberate Risk Assessment Worksheet (DRAW)*. Using this tool will help more leaders avoid simple mistakes, like not listing the highest risk hazard first on a *DRAW*. Like many things in the Army, the tool exists; many are simply unaware of its existence.
- **Elevate the position of risk in ADP 6-0.** The Army should make risk the "language" of mission command. Mission command requires disciplined initiative informed by shared understanding, and a vernacular of risk is the framework through which commanders and leaders achieve that. Making risk as a commodity central to ADP 6-0 will synthesize how leaders and subordinates use risk to communicate and interact in inherently hazardous situations and will support junior leaders in participating in collective problem-solving.
- **Introduce the concept of risk earlier in its professional education.** The Army should formally introduce the concept of risk, ATP 5-19, and the DD Form 2977 in precommissioning programs and in advanced leader's courses. Introducing a working understanding of risk earlier in professional military education will jumpstart the process of building a vernacular of risk.
- **Realign the values emphasized for promotion.** As Rasak notes, the incentive structure for officer promotion does not incentivize "boldness, creativity, and aggressiveness."[26] Instead of relying on extrinsic motivators like the number of "most qualifieds" an officer receives on evaluations leading up to promotion, the Army should continue to emphasize and develop programs like the Command Assessment Program and Leader 360 assessments that can better target attributes of intrinsic motivation. As DeLeon and Tripodi note, "intrinsic and autonomous motivation allows people to have the power of choice, which has a strong effect on performance."[27] Tools like the Command Assessment Program and Leader 360 provide opportunities

to assess qualitative data that captures individual behaviors driven by intrinsic motivation.

Challenges to Implementation

Some might argue that a vernacular of risk could lead to risk averse behavior at junior levels or that teaching risk decision-making to inexperienced people will overcomplicate their understanding of military operations. Under this critique, junior leaders would find themselves in decision paralysis, made anxious by the task of considering all the risks and ramifications of their potential decisions.

While this concern has validity, its premise—that junior leaders are young and susceptible to information overload—is an affront to the capability of our junior leaders and does a disservice to the institution as a whole. Teaching RDM earlier and developing a vernacular of risk should not be construed as an expectation for tactical genius at junior levels of leadership. It is also not intended as a cure-all for the Army's inconsistent implementation of mission command. Instead, a vernacular of risk gives a working language that focuses on risk locations and risk tolerances, that units can use to develop the trust and shared understanding required to build better decision-makers and realize mission command's ideals.

Alternatively, some might argue that RDM education would incentivize more reckless behavior in the name of pursuing the limits of a unit's risk tolerances. This also runs afoul, as the premise for a vernacular of risk is that the Army operates in inherently hazardous environments that require informed decisions prioritizing the mission. A vernacular of risk, with risk as a transferrable commodity, promotes decision-makers who clearly see the tradeoffs of the environment, not ones who seek to push the boundaries of risk.

In this light, leaders at all levels, and in all locations, should use the recommendations above to work with subordinates and develop a risk-aware climate through training and education. This is a leader responsibility that should be treated with care. A vernacular of risk should be used to flatten the framework of risk so that junior leaders can use the definitions and terms of risk management to understand their decisions and learn from them. In an organization that strives for "decentralized execution," it is never too early to start learning, and only through learning a vernacular of risk will decision-making become a collective endeavor.[28]

Conclusion

To fix the Army's mission command implementation problem requires clear language to harmonize disciplined initiative within the commander's intent. It requires a vernacular of risk that democratizes the terminology and gives a framework to decision-makers down to the lowest-level individuals in the Army. To achieve this, the Army will have to implement a strategy across individual and organizational lines of effort. It should refine its training and doctrine to reflect risk as a commodity and adopt RDM as a collective effort that all individuals are engaged in.

The fulcrum for effecting this change resides at the company level. Company commanders should embrace a risk-aware culture and communicate using a vernacular of risk, both up and down the chain of command. As translators between senior commanders and junior leaders, they should use risk as the terminology to translate operational objectives into tactical actions. Only through a shared understanding of RDM, can the company commander and his or her unit exercise mission command.

Commanders at all levels should work to create "cultural islands" and training scenarios where subordinates can learn from acceptable failures before applying RDM in more critical environments. The success of junior leaders depends on their ability to learn in hazardous situations with sufficiently regular feedback to help them develop their judgment. This should happen in the classrooms as well as the field.

At the end of the day, our junior leaders are intelligent and motivated to accomplish the mission. Given the right tools and framework, the strategic corporals of the Army are the ones who will put mission command into practice. To enable that, we need to help them become risk decision-makers who understand the environment and context within which the act. If we fail to do so, we cannot expect mission command to materialize. We must invest in those who will make mission command a reality. ■

Notes

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Understanding Combined Arms Warfare is a film that defines and outlines the important aspects of modern combined arms operations. Designed to support the Captains Career Course, this documentary is not a complete history of combined arms warfare, but is intended to highlight the most important aspects of the subject.

Covering doctrinal and equipment developments in World War I, contrasting French and German armies mechanization during the interwar period, and showing how the United States applied combined arms operations in World War II, the film can be found on YouTube at https://www.armyupress.army.mil/Educational-Services/Documentaries/Combined-Arms-Warfare/.

Furthering the Discussion on METT-TC

Lt. Col. Brian R. Hildebrand, Texas Army National Guard

Healthy debate from multiple perspectives encourages critical analysis and stimulates creative thought. Moreover, embracing differences in cultural perspectives promotes the Army profession and enhances interoperability amongst allies. Maj. Gintautas Razma from the Military Academy of Lithuania presents important insights about a new way to prepare for combat in his October 2022 online exclusive article for *Military Review*.[1] He offers a competing analytical framework to the long-standing mission analysis framework, METT-TC (mission, enemy, terrain, troops, time available, and civilian considerations). Razma thinks hard and smart about mission analysis and invites others to do the same.

In the spirit of doctrinal debate, this article constitutes not just a furtherance of the discussion but a response to his work and its underlying assumptions. Razma's framework, called MT-GLEO (mission, time, geospace, local, enemy forces, own forces), explores new concepts and questions old ones; it uses a conceptual discipline to challenge METT-TC. MT-GLEO recasts the mission elements as components of an equation and emphasizes the importance of sequence as if solving a mathematical expression. As a result, the MT-GLEO framework rests on several critical assumptions and implications. Namely, mission and time are givens in an operational premise, thereby reducing their role to a part of an equation. Furthermore, MT-GLEO emphasizes the importance of conceptual discipline in combat analysis, implying that military history is second to scientific reasoning in military problem-solving.[2]

The MT-GLEO framework uses precise, prescriptive, and scientific language to describe variables, givens, and factors.[3] Within the MT-GLEO framework, higher headquarters assign missions to units and allot time to achieve them.[4] Once handed down from higher headquarters, MT-GLEO presupposes missions cannot be changed during combat—to change the mission is to alter the equation.[5] Experience, however, suggests

A New Combat Analysis Framework

Maj. Gintautas Razma, Military Academy of Lithuania

Few would disagree with the assertion that management, when combined with leadership and command and control, is one of the core combat competencies of commanders, whatever their rank. The general expectation is that a commander should manage combat dynamics effectively, lead troops in the face of uncertainty, give clear orders, and ensure they are carried out. To read Razma's October 2022 *Military Review* online exclusive, visit https://www.armyupress.army.mil/Journals/Military-Review/Online-Exclusive/2022-OLE/Razma/.

The U.S. Army's Multidomain Task Force operates from a tactical command post as a part of their premier appearance at Valiant Shield on 20 September 2018. Valiant Shield is a biennial, U.S.-only field training exercise with a focus on integration of joint forces. (Photo by Mass Communication Spc. 1st Class Danica M. Sirmans, U.S. Navy)

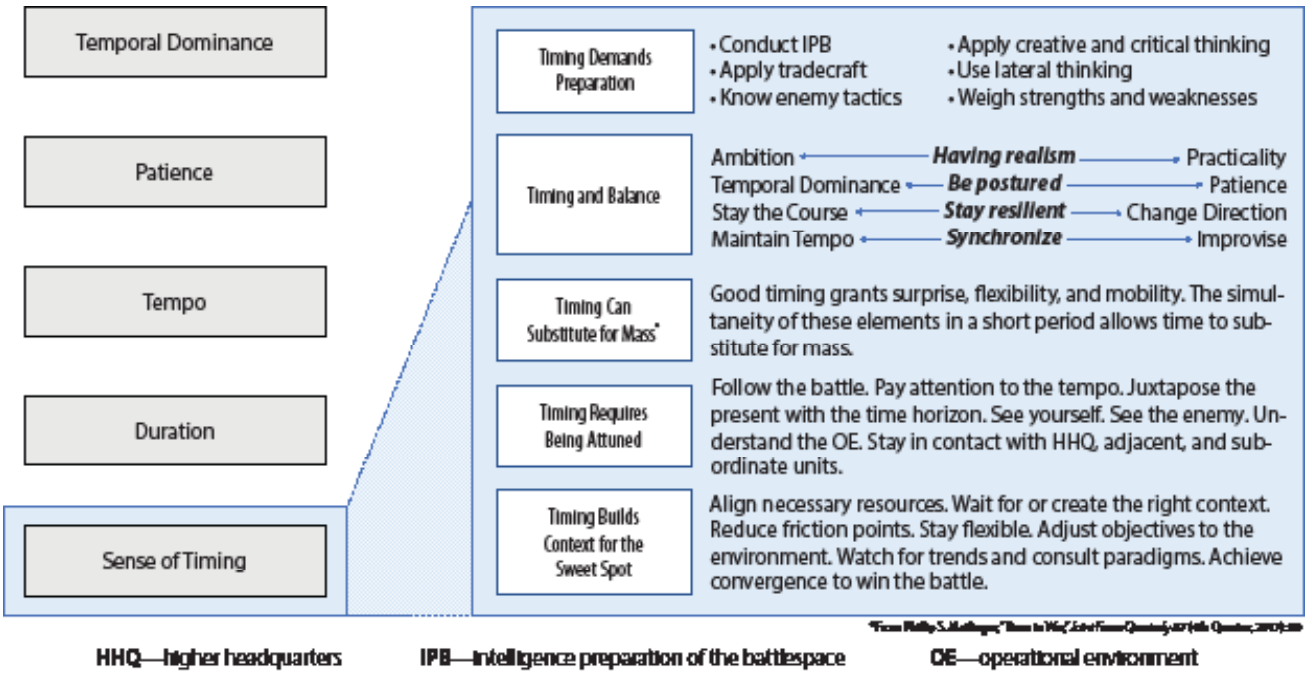
otherwise. Missions do change during combat and change often. U.S. Army commanders on the ground have the trust of their superiors to change missions as the situation dictates.

Unplanned transitions are unanticipated changes in the operational environment that cause the commander and unit to react and evolve to meet the new demands of the situation.[6] They can be both points of friction and opportunities. In combat, this transitions among offense, defense, and stability operations to maintain the initiative or consolidate gains.[7] Consolidating gains is an operational imperative that takes on slightly different meanings along the range of military operations, from competition to conflict.[8] In conflict, consolidating gains means exploiting tactical success in bypassed areas by defeating the enemy's will to resist.[9] To accomplish this, units must transition and change mission quickly.[10] At any one time, elements of one unit may be in the defense, the offense, or stability operations.

The U.S. Army has empowered commanders to change their mission through a two hundred-year tradition of mission command.[11] The Army concept of mission command inherently expects subordinates to exercise disciplined initiative to achieve the commander's intent.[12] No one knows the ground truth better than the soldiers in the fight. In essence, subordinates with disciplined initiative

> follow their orders and adhere to the plan until they realize their orders and the plan are no longer suitable for the situation in which they find themselves. This may occur because the enemy does something unforeseen, there is a new or more serious threat, or a golden opportunity emerges that offers a greater chance of success than the original course of action. The subordinate leader then takes action on their own initiative to adjust to the new situation and achieve their commander's intent, reporting to the commander about the new situation when able to do so.[13]

In this way, the U.S. Army prepares for the many planned and unplanned transitions by allowing subordinate leaders the discretion to adapt to and overcome obstacles, seize the initiative, capitalize on opportunities, and change the mission to achieve success. Mission



(Figure by author)

Figure. Factors of Time

changes happen through commander-to-commander dialogue and nest within the overall scheme of maneuver, campaign objective, overarching mission, or strategy.

Razma's explanation of time is not wrong; it is just incomplete. By limiting time to simply an immutable given, Razma reduces time to a mathematical factor of an algorithm.[14] Razma fails to consider the psychological aspect of time, where time is a factor that is both a given and a variable.[15] Time is a given because it is a constraint imposed on the battlefield's strategy, operations, and tactics. In this sense, action depends on the time available—*leaders are using time*. Time is a variable because leaders can understand the situation to create windows of opportunity. In this sense, time depends on action—*leaders are making time*.

Making time requires perspective. Leaders from across the world understand and use time differently. Richard Lewis developed a model to explain the differences in perspective regarding time.[16] In addition, Kevin Cunningham and Robert Tomes argue that time is inextricably linked to geography and that all military strategy, operations, and tactics have a spatial-temporal component.[17] As time expires, so does the window of opportunity. Opposing forces move, make decisions, and alter the course of events. For example, in defense, leaders attempt to slow down the enemy's sequence and actions, trading space for time to delay the enemy and concentrate forces at the right place and time. In the offense, the focus shifts to offensive maneuver, and leaders attempt to speed up time to disrupt the enemy's decision cycle, what John Boyd described as the Observe, Orient, Decide, and Act (OODA) loop.[18] In both cases, leaders consider time a window of opportunity to control. Opposing forces vie with each other to compress or extend these windows throughout the battle. The more time they have to act, the more opportunity they have to beat their enemy, and vice versa. Ultimately, Lewis, Cunningham, Tomes, and Boyd contribute valuable insights to the conversation on time. Standing on their shoulders, we see that time is more than just a given; it is also a variable.

Building on their work, leaders can think more broadly about the psychological aspect of time. Top of mind for leaders should be making the best use of the time available and creating windows of opportunity that make time for military operations or actions on the objective. To do this, leaders should consider how time can factor into their mission analysis and battle plans, such as temporal dominance, patience, tempo, duration, and sense of timing (see figure).

Cunningham and Tomes explain temporal dominance as a preference for compressed decision cycles and rapidity of action, which is designed to disrupt the enemy's timeline, push leaders to think faster through the action-reaction-counteraction sequence, and gain and maintain the initiative in battle.[19] This way, temporal dominance "creates a climate favoring preemption, rapid dominance, and campaigns designed to achieve shock and awe."[20] The U.S. military emphasizes temporal dominance over all other factors.[21]

Opposing temporal dominance, patience factors into the perspective that cultivates the long-term view of winning the war, not just battles. Hence, patience occurs at the strategic, operational, and tactical levels. Strategic patience allows for the fullness of thought and the opportunity to develop a superior strategy that avoids predictability and harnesses the full potential of national powers.[22] Operational patience is a term borrowed from the U.S. Air Force.[23] It allows time for certain changes and courses of action to have their desired effects, promotes understanding of the operational environment and its impact on the mission, and allows commanders and staff to more fully determine threat intent, systems, culture, and probable courses of action.[24] Tactical patience, most often heard in the vernacular of U.S. Army combat units, charges leaders with the requirement to make sure conditions are set to ensure success, resources are committed at the appropriate time and place, and leaders shape the situation to achieve success.[25] Ultimately, patience at all levels builds a long time tolerance for the necessary delay between two actions with a shared dependence.

> Understanding when and how to create windows of opportunity or operational windows into different domains requires knowledge of capabilities and a good sense of timing.

The perspectives of temporal dominance and patience loom large in the figurative equation of operational tempo. Commanders control and adjust tempo based on the other mission variables; sometimes, they are patient but often temporally dominant. U.S. Army doctrine writers define tempo as the "relative speed and rhythm of military operations over time with respect to the enemy."[26] Tempo is an essential characteristic of offensive operations. It should be "repetitive, recurring, unstoppable, and inevitable."[27] Most U.S. Army leaders understand only rapid tempo. A rapid tempo creates opportunities, reduces vulnerabilities, and denies enemy forces the chance to rest, synchronize, or mass.[28]

If the tempo is the rhythm and speed by which forces act, duration is the time forces have to act and figures into a leader's calculations for how long they can or must hold the initiative. Within the context of duration, "time itself emerges as an area of conflict, a flank, a dimension, a domain, and not just as a competitive edge or weakness in our well-established operationalization of timing."[29] Ultimately, duration is important for understanding the strategic context of the range of military operations and the windows that open between domains in the context of the multidomain battle.[30] Leaders attempting to create windows of opportunity to make time are intently focused on duration.

Understanding when and how to create windows of opportunity or operational windows into different domains requires knowledge of capabilities and a good sense of timing. A good sense of timing develops from personal and shared observations, assessments, intuition, expertise, and knowledge. A good sense of timing

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flows from our decisions and actions and differs at each level of warfare.[31] At the strategic level, a good sense of timing helps to determine when to compete along the continuum of the range of military operations and the appropriate national response or action.[32] A good sense of timing at the operational level helps to figure out the tempo and duration of operations.[33] A good sense of timing at the tactical level helps determine the right time and place to apply force.[34] Sometimes called *fingerspitzengefuhl*, or "the fingertip feeling," leaders have to pick the right time to act, to seize the initiative, and to drive momentum.[35] Sense of timing requires preparation, balance, and attunement to the operational environment. Good timing grants surprise, flexibility, and mobility. The simultaneity, or in a broader sense, the convergence of these elements in a short period allows time to substitute for mass.[36]

A good sense of timing ultimately depends on aligning the necessary resources in advance, identifying trends, and consulting paradigms.[37] It reduces friction points and builds the context for the sweet spot to manifest itself so commanders can achieve convergence.[38] Convergence is how commanders exploit opportunities, generate combat power throughout the depth of the battlefield, and ultimately win.

In this sense, Army leaders can factor time as both a given (using the time available) and a variable (creating opportunity and *making time*) when applying it within an analytical framework. As commanders orchestrate their staff and orient them onto the military problem set, it is important to consider a twofold approach: historical and scientific. As the MT-GLEO framework manifests, the scientific approach is not only methodical, but it is also very prescriptive and emphasizes conceptual discipline, sequence, and order.[39] In contrast, the historical approach includes perspective from the past applied to the future, what Michael Neiberg coined as "historical mindedness."[40] It begins with the already known outcomes and studies factors, intentions, and points of view to determine how they were achieved and what they may offer to the current situation. Leaders in the Army need both approaches to succeed.

MT-GLEO has many incredible insights for a thorough combat analysis. While these insights highlight a scientific approach toward combat analysis, they subdue the benefits of the historical perspective. History has much to offer to the military mind in terms of analysis.[41] Leaders can learn by revisiting the factors that antagonists on historical battlefields considered in their preparation for combat and prosecution of the battle. Gen. Donn Starry thought historical perspective was important enough that he took his leaders on military terrain walks across Europe and America, revisiting the battle sites, playing out the sequence of events, and reimagining the factors that fed into the success or defeat of the units.[42] This tradition is carried on by the Army today.

MT-GLEO has many incredible insights for a thorough combat analysis. However, while these insights highlight a scientific approach toward combat analysis, they subdue the benefits of the historical perspective.

As witnessed in the doctrinal debate during the U.S. Army doctrinal renaissance, a scientific approach and historical perspective combined produce the best ideas. One could make a case that it was during this time that METT-TC in its original incarnation was born, though as Razma points out, its pedigree is not thoroughly documented.[43] Regardless, the scientific approach from Active Defense and the historical perspectives from AirLand Battle were combined in 1986 to produce Field Manual 100-5, *Operations*—often labeled as the operations bible and the source from which the many editions of Field Manual 3-0, *Operations*, spring.[44] Gens. William Depuy, Donn Starry, Glenn Otis, and William Richardson created one of the greatest evolutions in military doctrine by providing the operational level of war.[45] Evident from the interplay of ideas during this period is the antiphony of historical perspective and scientific analysis—sometimes historical analysis plays the second chair to the scientific approach, and sometimes it is reversed.[46]

The point is that you cannot promote one at the expense or exclusion of the other, which the MT-GLEO framework inadvertently does by narrowly defining mission and time.

Razma is right to question the creation and evolution of the METT-TC framework. The formulation of the MT-GLEO framework represents critical analysis and creative thought and is a significant contribution to a healthy doctrinal debate. Divergences in how armies use mission analysis tools create opportunities for perspectives to converge. While MT-GLEO is unique to Razma's military culture and METT-TC to the U.S. Army military culture, embracing these differences will help produce better mission and combat analysis and leadership tools. With the Russian threat looming, we will need tools that contribute to a repeatable and scalable solution, enable analysis (both hasty and thorough) of real-time information, and allow for speedy discrimination of various factors within the decision-making process. The furtherance of the discussion about METT-TC or MT-GLEO promotes interoperability between allies, a necessary ingredient for large-scale combat operations. As this debate continues, keep in mind Winston Churchill's wise words, "There is only one thing worse than fighting with our allies and that is fighting without them."[47] ■

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38. FM 3-0, *Operations*, 3-3. The FM 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."

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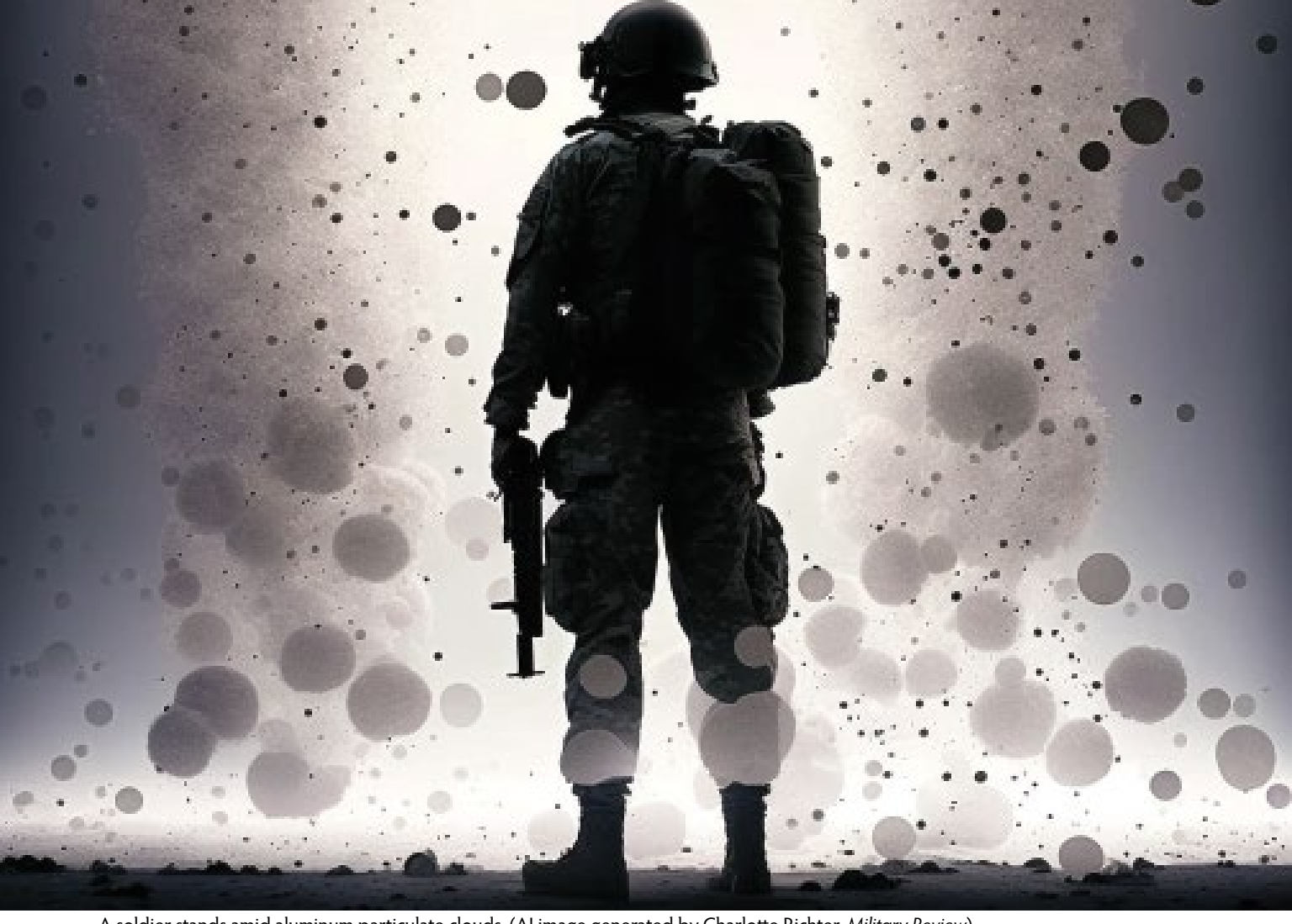

A soldier stands amid aluminum particulate clouds. (AI image generated by Charlotte Richter, *Military Review*)

Nanoenergetic Materials for Microscale Tactical Applications

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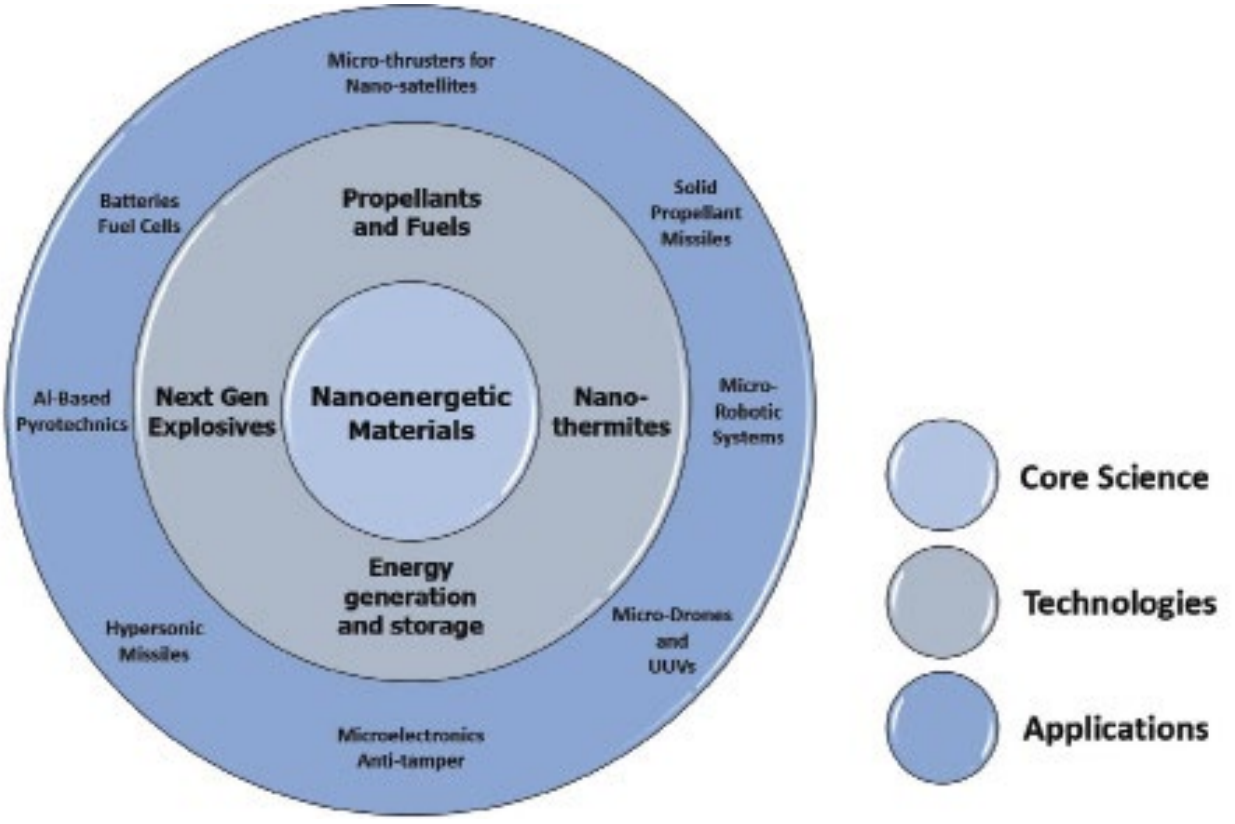
Military missions require small energy-dense formulations to power future generations of miniature autonomous systems and satellites, and to provide sufficient destructive energy yields in small explosive payloads. The weapons effects will need to be tailorable; that is, tuned for explosive yield or impact resistance, and the materials sufficiently robust to operate within the unique constraints of hypersonic missiles that are subject to extreme aerodynamic forces. In addition to their formulation as explosives and propellants, nanoenergetic materials can also be employed as pyrotechnics for breaching fortifications by destroying advanced materials such as ceramics, composites, and metal alloys, which are used for collective protection, and in antitamper devices and systems. In addition, their superior energy density relative to traditional mono-molecular materials such as TNT make them ideal candidates for future energy generation and storage devices. The figure illustrates the range of applications of nanoenergetic materials.

A key reason to explore nanoenergetic materials for fuels and propellants hinges on potential improvements resulting from altered chemical kinetics rather than thermodynamics. For example, 1-nm aluminum particles (nanoscale) reacting with oxygen release only 1.04 times as much energy as does ultrafine aluminum (traditional micron particle-size range), but the rate of energy release (i.e., the kinetics) of the former is potentially faster because the balance of the rate-controlling factors shifts as the particle size is reduced.[1] This is because the rate of combustion, or the balance of the generally slower mass transport rates and faster chemical reaction rates, controls the explosion process.

This fact frequently makes mass transport a controlling energy release process in conventional



(Figure by authors)

Figure. Applications of Nanoenergetic Materials

munitions and propellants in which micron and larger particle sizes of energetic materials are used. Mass transport simply means that with larger-scale traditional explosives, the longer distance between a molecule of fuel and a molecule of oxidizer is a more important factor than the speed or kinetics of reaction. By contrast, the opposite is true of nanomaterials: the high surface area of small particles and the short diffusion length between particles are expected to enhance the role of chemical kinetics, an important consideration in designing energetic materials because particles that are closer together are going to react more quickly. In addition, an unprecedented degree of control of the energy release rate may be possible by varying the composition on the nanodimensional scale. The burning rate might be accelerated, the delivered specific impulse, or shock wave, could be increased by improved combustion efficiency, and the detonation might achieve greater results while not increasing the size of the fuel package.[2]

“By contrast, the opposite is true of nanomaterials: the high surface area of small particles and the short diffusion length between particles are expected to enhance the role of chemical kinetics, an important consideration in designing energetic materials because particles that are closer together are going to react more quickly.”

Nanoenergetic materials such as nanothermites are generally formulated as an elemental metal such as aluminum combined with a metal oxide (i.e., a metal with an oxygen bond; for example, rust); the former is the fuel and the latter is the oxidizer.[3] These have superior reaction rates and energy yields relative to their “meso-scale” traditional formulations and to conventional explosives but pose problems unique to reactions at these small scales. Recent advances in understanding the physical and chemical properties of nanomaterials have begun to address these problems, and formulations with superior energy yields now show promise for applications in miniature military systems and to be the next generation of explosives and propellants. This is due to their decreased sensitivity to impact, friction, and shock waves, and increased energy release and burning rate.[4] These characteristics make them much safer to handle than current munition fills.

In addition to traditional military mission applications, there is an increased emphasis on the use of autonomous systems such as unmanned aerial, ground, and underwater vehicles, and other autonomous systems to perform surveillance, reconnaissance, search and recovery, and search and destroy missions. There are advantages to miniaturizing these systems such as signature reduction, ability to penetrate small, enclosed spaces, and reduced logistics. In addition, the potential for such microrobotic systems to be deployed as distributed, coordinated networks or swarms both increases mission flexibility and complicates an adversary’s countermeasures.

Space assets are now at risk from numerous potential adversaries, especially at the onset of a conflict, and will have to be rapidly reconstituted, most likely with swarms of “nanosatellites,” each about the size of a shoebox. Compact, energy-dense nanoenergetic materials will power the tiny thrusters needed to maneuver such satellites in orbit.

A ***nanometer*** is a unit of length in the International System of Units equal to one billionth of a meter (0.000.000.001 m). One nanometer can be expressed in scientific notation as 1 x 10 -9 or 1/1,000,000,000 meters. This article is focused on discussing the potential for generating greatly increased amounts of energy from the energy conducive properties of collected quantities of aluminum particulates (about one nanometer each in size) than can be generated by current materials. These would take less space, be lighter and more resilient to stress, and produce much greater amounts of energy for various uses than those currently employed.

Expected Operational Developments by 2040

The next twenty years will see the development of small, highly energetic explosive payloads for microdrones, which could be deployed in virtually undetectable swarms to disable power grids and communications networks, penetrate life support systems of underground facilities, and disable electronics and life support systems. In addition, smaller payloads for hypersonic missiles and conventional artillery will result in reduced logistics and smaller radar, heat, and optical signatures. Ultimately, the energetic yields of such materials could be dialed up or down to restrict collateral damage or maximize destructive effects.

The military will also need propulsion systems to enable maneuvering in orbit of critical space assets for communication and targeting.[5] Nanoenergetic materials will be critical for solid fuel propulsion systems with much lighter weight and greater energetic yields than current solid fuel systems with minimal environmental impact.

Breaching and antimateriel applications rely on much the same chemistries as propellants and explosives but have their own unique requirements. These include stable and low-temperature ignition but extremely high-temperature combustion for breaching fortifications such as underground bunkers or destroying advanced materials such as ceramic composites and metal alloys, as well as for welding during forward repair or industrial manufacturing.

Finally, energy storage and power generation in forward-deployed units with limited logistics reachback will require new energy dense materials for batteries with greater yields per mass than current materials.[6]

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General Technology Limits

Controlling particle size of nanomaterials and their tendency to stick together in larger clusters during synthesis is a major challenge that has yet to be resolved. The goal is to prepare monodisperse particles—that is, particles of identical size and shape, in the optimal range of 10–100 nm, since metal particles smaller than 10 nm tend to be pyrophoric and spontaneously combust in the presence of an oxidizer such as air. New

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Concept for an artificial intelligence drone (AI image generated by Charlotte Richter, *Military Review*)

surface particle coating materials are needed to enhance energy content, control ignition temperatures, tailor the rate of combustion, and mitigate processing issues.[7]

Ignition behavior of nanoparticles is not well understood, and most research has focused on aluminum. Therefore, a systematic analysis of other elements and chemical compounds that may be superior to aluminum is needed. A better understanding of the thermomechanical properties of the oxide layer, a layer that spontaneously forms and interferes with combustion, on nanoparticles is required to develop a complete model for particle ignition. Combustion temperatures are dependent on several properties, and the relative importance of vapor-phase and surface reactions is not currently sufficiently worked out to allow for the predictive modeling needed to tailor the materials.[8]

Nanofluid fuels hold great promise, but some basic mechanisms need to be examined. These include the relative catalytic and thermal effects of the addition of nanoparticles to fuel, the agglomeration of the nanoparticles in the fuel that can lead to uneven burn, and the multiphase flow dynamics in the exhaust nozzle of rocket engines. In short, will adding nanoparticles enhance propellant burn or have unpredictable negative effects on the combustion process?

This article is organized according to the three operational capabilities, which the authors posit as the prime beneficiaries of advances in nanoenergetic materials. The capabilities are described generally in terms of current performance and technological advances required within the year 2040 time frame, which was selected to align with Under Secretary of Defense for Research and Engineering mission-level assessment exercises. These operational capabilities are explosives for improved weapons effects; propellants for terrestrial, underwater, and space systems; and breaching and antimateriel operations.

Explosives for Improved Weapons Effects

General background. We have reached the limits of energy that can be released as an explosive or

pyrotechnic using traditional chemical formulations, which rely on the energy inherent in CHNO—carbon, hydrogen, nitrogen, oxygen—chemical bonds.[9] Weapon systems benefit by reducing their size, hence signature and logistics burden, and by the ability to tailor weapons effects depending on mission requirements. New energetic materials with increased yield and more flexible applications are required.

Current explosives such as HMX, RDX, and TNT are monomolecular formulations in which fuel and oxidizer groups are present on a single molecule and the rate of reaction is determined by breaking chemical bonds. The speed of the reaction—hence the explosive power—is largely determined by mass-transfer limitations; that is, the larger the particles, the slower the speed of reaction, and the density of these formulations is very limited.[10]

Adding metal particles, particularly aluminum, to pyrotechnics, explosives, and propellants is known to increase the energetic output.[11] Future explosives will incorporate metallic and other energetic nanoparticles and a nanoparticulate oxidizer to greatly increase the surface areas for reaction, thus liberating vastly more energy in a shorter time than conventional explosives. They will also be tunable for specific weapons effects by manipulating the chemistries of the surfaces of the particles, or by introducing fluidizer components.[12]

"Adding metal particles, particularly aluminum, to pyrotechnics, explosives, and propellants is known to increase the energetic output." (AI image generated by Charlotte Richter, *Military Review*)

Technology challenges. The combination of molecular self-assembly techniques, colloquially referred to as "crock-pot chemistry," and supramolecular chemistry, a field that studies the bonds between different molecules rather than within a single molecule, will result in next generation nanoenergetic materials. For example, self-assembled nanocomposites significantly improve combustion performance in aluminum and bismuth trioxide nanoparticles.[13] Graphene oxide directed self-assembly can be used to synthesize nanocomposites with diverse combustion properties and controlled ignition sensitivity and directed self-assembly lays the foundation for preparing multifunctional, highly reactive combustion systems in the future. Metal nanoparticles smaller than 10 nm are pyrophoric, meaning they can ignite spontaneously in the presence of air, which poses a significant safety problem. The challenge is to produce uniform particles at sizes within the critical range of 10–100 nm.

The percentage of atoms on the surface of a particle increases from 2 percent to 92 percent as the particle size decreases from 100 nm to 1 nm, and the surface atoms are much more energetic that those in the particle core.[14] This increases speed and completeness of reactions. Conversely, formation of an oxidation layer on the surface, which can represent 60 percent of the mass of the particle, will have

Concept for a nanosatellite (AI image generated by Charlotte Richter, *Military Review*)

analogous outsized effects and, depending on the material, could increase or decrease energy content and shelf life. The ideal energetic material is composed of uniformly sized and dispersed unoxidized metal clusters. Clusters of metals have been shown to mimic the properties of one or more elements and have been called "super atoms." This suggests the use of clusters as basic building blocks for new classes of nanoscale materials with tailored properties.[15] The technical challenge is to develop techniques for the directed design of metal clusters with specific particle and cluster sizes and distribution and relate that to physico-chemical characteristics. That is, how do size, shape, and clustering of particles affect their properties as explosives or propellants? Current manufacturing methods have some drawbacks, including incomplete heat transfer to precursor molecules, deposition of clusters on the furnace wall, and impurities from reactor walls. These issues can be minimized by using combustion flame chemical vapor condensation (CF-CVC) methods.[16]

Ignition of metals is caused by phase transformations—rapidly transitioning from a solid to a gas—of the metal core and/or the oxide layer and tend to occur at high temperatures. The ideal material would have a low ignition temperature and ignition delays, which would maximize energy release rates. Combustion can take place in the vapor (gas) phase away from the metal core, at the particle's surface, or both. A complete model of particle ignition and combustion has not been developed and such a model would enable one to tailor different materials for specific energetic effects.

Supercomputing platforms are facilitating first-principles-based simulations to predict behavior of complex systems never previously achieved.[17] These simulations can integrate chemical reactions at the atomic level and mechanical processes at the meso-scale to solve mechano-chemistry (i.e., chemical reactions under mechanical stress) problems such as the sensitivity of high-energy density nanomaterials whose chemical reactions undergo shock waves.[18] Within a decade, supercomputing performance has progressed from 0.478 petaflops (10^{15} floating-point operations per second, or one thousand million million operations) for solving

linear systems of equations to 148.6 petaflops in the summit supercomputing machine at the Department of Energy's Oak Ridge National Laboratory.[19]

The Collaboratory for Advanced Computing and Simulations at the University of Southern California successfully tested simulation frameworks on multiple parallel supercomputers as well as on a grid of six supercomputers in the United States and Japan to assess the scalability of molecular dynamics and quantum mechanical algorithms. They also used an additional embedded cellular decomposition simulation framework to determine how processes at the atomic level inform material processes such as nanoindentation on nanocomposite materials, oxidation of nanoenergetic materials, hypervelocity impact damage, fracture, and the interaction of voids with nanoductility.[20] They used *ab initio* molecular dynamics simulation (simply put, simulation of complex molecular systems and processes on a computer) to evaluate the various electronic processes that occur during a thermite reaction. The quantum mechanical simulation further allowed a quantitative study of the combustion rates that could not be explained by conventional diffusion-based mechanisms.[21] Their collective work resulted in the development of high-end reactive simulation programs at the atomic level, which are critical for developing new nanoenergetic materials by enabling billion-atom simulations of mechano-chemical processes.[22]

A supercomputer concept (AI image generated by Charlotte Richter, *Military Review*)

Tunable Propellants for Terrestrial, Underwater, and Space Systems

General background. Solid-state propellants have several operational advantages relative to liquid fuels such as ease and safety of handling and superior readiness to launch. However, they are limited in their energetic yields and ability to control burn rates. The space shuttle's solid-state boosters used a composite energetic material consisting of ammonium perchlorate crystals and aluminum particles in a polymer binder to increase energy yield and burn rates. This is a well-known approach to increasing the energetic yield of solid propellants used in strategic ballistic and tactical missiles. Future hypersonic missile systems will require new, more powerful solid fuel compositions while providing improved shelf life, stability, and safety over current solid fuel systems.

Future formulations incorporating energetic nanoparticles will have superior energy density relative to conventional solid fuels, making them suitable as propellants for both missiles and small space assets. They will be tailorable for burn rates and will have increased production, storage, and safety handling characteristics as well as reduced human and environmental toxicity.[23] In addition, underwater propulsion could use aluminum-water reactions to power unmanned underwater vehicles.[24]

Hypersonic missile technology is a priority for Russia, China, and the United States. Some systems use liquid fuels, but others will be developed using solid fuels, which are advantageous because they do not require fueling just prior to launch. Current solid fuels under investigation are now limiting high Specific Impulse (Isp) characteristics to below 273 since high Isp fuels have been banned from U.S. Navy ships and submarines due to the explosive hazards they present. As fuels for hypersonic missiles mature, a greater emphasis will be placed on using insensitive munitions (IM), which are stable enough to withstand shocks, vibration, fire, and impact by shrapnel but can explode on target as intended.

Exhaust plume of a nano-composite fuel hybrid rocket (AI image generated by Charlotte Richter, *Military Review*)

Technology challenges. The technical challenge in manufacturing is spatial patterning to assure optimal proximities of oxidizer and fuel molecules. The closer and more evenly spaced the molecules are, the more efficient the reaction. The enabling technologies are polymer chemistry, micro-emulsion synthesis, cage and cluster chemistry and, more recently, artificial intelligence (AI)-driven modeling and simulation. The great contribution of AI is the ability to review vast quantities of data and identify obscure relationships and patterns which elude the human brain. The nexus between AI and modeling and simulation (M&S) is worthy of exploration in the context of examining its potential to inform computer simulations focused on both the reactivity and decomposition of nanostructured materials. While much work has been done on simulations of nanoenergetic particles, the extrapolation into the realm of AI M&S and its potential for designing new molecules remain relatively unrealized.[25] Previous research on the intersection of AI and M&S underscores how the latter, with its inherent problems and challenges, may benefit from AI concepts and techniques.[26] Simulation has been used to develop AI applications including how AI components can be inserted into a simulation to establish machine learning or adaptive behaviors, key aspects in determining structure-function relationships at the molecular level. Simulation is now recognized as having the ability to evaluate the impact of incorporating AI into real world systems such as manufacturing processes.[27] Another innovative opportunity in M&S is the application of AI for production process optimization and calibration.[28]

The application of AI M&S to nanoenergetic particle research creates multiple opportunities. Advances in AI M&S can lead to future identification and development of nanoenergetic materials, including new methodologies for assembling these materials in specific functional architectures (say, propellants vs. explosives) with concomitant increases in performance and managed energy release rates. These advances can also inform new and more innovative applications of their use.[29]

Breaching and Antimateriel

General background. Advances in ceramics, carbon fiber composites, high density concrete, and metal alloys will create new advanced materials which are resistant or impervious to current munitions. Special operations, whether terrestrial or underwater, will require new super-energetic materials which are stable and have low ignition temperatures but extremely high combustion temperatures. Nanothermite metastable intermolecular composites (MICs), discussed in a previous section, can be formulated into thin films, metal organic frameworks,

nanothermite colloids, and other formulations which will have these desirable characteristics.[30]

Current nitramine explosives such as RDX and HMX and formulations such as Semtex (RDX and PETN) are used for demolition, and recent experimental formulations using nano-nitramines show a roughly 60 percent decrease in shock sensitivities, hence a significantly increased safety factor. Nanothermites are the only nanoenergetics currently used in the military.[31]

Nanoenergetics will move beyond aluminum-based nanothermites with resulting decreases in sensitivity, increases in energetic yields, and capacity to tune these characteristics to mission requirements. Novel formulations such as tapes and foils for use in special operations will also be available. Production techniques such as inkjet printing with > 90 percent nanoenergetic materials and < 10 percent polymers or microsphere technology will enable development of stable but highly energetic strips or sticks.[32]

Technology challenges. Going beyond aluminum-based nanothermites to other metals as fuels, to surface functionalized or energetically filled carbon nanotubes, or to new cluster chemistries will require a "rules-based" approach to molecular screening, and practical applications will be facilitated by ordered molecular self-assembly. AI algorithms for determining structure-function relationships, discussed in an earlier section of this article, will also be critical.

New energetic materials must have low sensitivity to shock, low pyrophoricity, low ignition temperatures, and high combustion rates to be viable candidates to replace current propellants and explosives. Ignition and combustion physics are not currently well understood in a comprehensive manner and a predictive model is required as materials go beyond aluminum-based nanothermites into more exotic chemistries. The technical challenge is to develop optimal ignition and combustion characteristics to enable the energetic material to breach a diverse set of metals, reinforced glass, and advanced polymeric materials used for personal and collective protection.

As with all applications of nanoenergetic materials, the rate of ignition and combustion is affected by the oxide layer in the nanometer range that forms on the surface of the core particle. These layers significantly reduce the energy content of the particles at nanoscales.[33] As previously mentioned, coatings such as boron can enhance energy release, while others can inhibit the reaction, a critical issue that all formulations must account for. The consummate coating material will amplify both energy content and shelf-life and facilitate ignition without impacting the low sensitivity characteristics.[34] The technical challenge is selecting the ideal coating material and applying it in a uniform manner to enhance the energy content, improve reactivity, and reduce particle agglomeration.[35]

Concept of a nanoelectronic battery (AI image generated by Charlotte Richter, *Military Review*)

Conclusions

Future operational impact. Next generation space, terrestrial, and marine weapon platforms will require higher energy densities for explosive payloads, propellants for hypersonic missiles and nanosatellite thrusters, breaching materials for advanced ceramics and alloys, and lightweight energy storage. Any mission that requires the force to "shoot, scoot, or toot" while operating at a long distance from resupply will have significant logistical advantages in lighter weight and physically smaller packaging, increased lethality due to the advantages conferred by nanoenergetic materials on payload yields, and decreased time-to-target enabled by advanced propellants. In addition, the impact and friction resistance of these materials and their low ignition but high burn temperatures represent important

safety advantages to both operators handling energetic materials and in manufacturing processes.

Future research directions. Thermite compounds have been studied extensively and there exists significant scientific literature in the field.[36] More recently, an understanding of the techniques needed to produce uniform monodisperse nanoparticles and to passivate (coat) the surfaces to reduce oxidation have yielded an order of magnitude increase in reaction rates and energetic yields but may have reached the limits of these improvements. The recent design of new classes of highly energetic cage and cluster molecules—which increase energy density and solve the "architecture" problem of arranging the proximity of fuel and oxidizer—and the potential to organize these structures systematically in a manner analogous to the periodic table of elements appear to be the next advances in the design of nonthermite energetic materials with even greater reaction rates and energetic yields. As with any new material and especially those formulated at the nanoscale, the impact on both the environment and human health will need to be assessed using advanced toxicogenomic and toxicoproteomic assays that assess the potential toxic effects on human genes and proteins, respectively, as well as studies of the environmental microbiome, the beneficial microbes that inhabit the environment. Large-scale incorporation of these materials into weapon systems will also require the development of future manufacturing capabilities. ■

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China's Belt and Road Initiative in East Africa

Finding Success in Failure?

Edward A. Lynch, PhD

In recent years, few initiatives by any nation, great or small, have received more attention than the Belt and Road Initiative (BRI) of the People's Republic of China. The BRI has been described by the Chinese government as "an initiative promoting economic prosperity and regional economic cooperation, principles of mutual consultation, joint construction and sharing, policy coordination, and mutually beneficial development."[1] Attention to this series of plans, objectives, projects, and aspirations has been mingled with both admiration and apprehension. Some observers see a sedulous, focused, and purposeful attempt by the communist Chinese government to extend its political and economic influence throughout Eurasia, and even beyond Eurasia to Africa and Latin America. These observers tend to see the purported spread of Chinese influence as dangerous to global peace and security, and certainly dangerous to American objectives in those regions. Other observers see a disjointed, episodic, and even incoherent collection of initiatives that add up to very little once stripped of the hype generated by both the Chinese government and its critics.

Chinese President Xi Jinping has significant global objectives in mind, and the BRI projects can contribute to those objectives whether these projects achieve their stated goals. Put differently, the Chinese are attempting to change the international system through the BRI. Its individual components' success is only a fringe benefit.

Theoretical Background

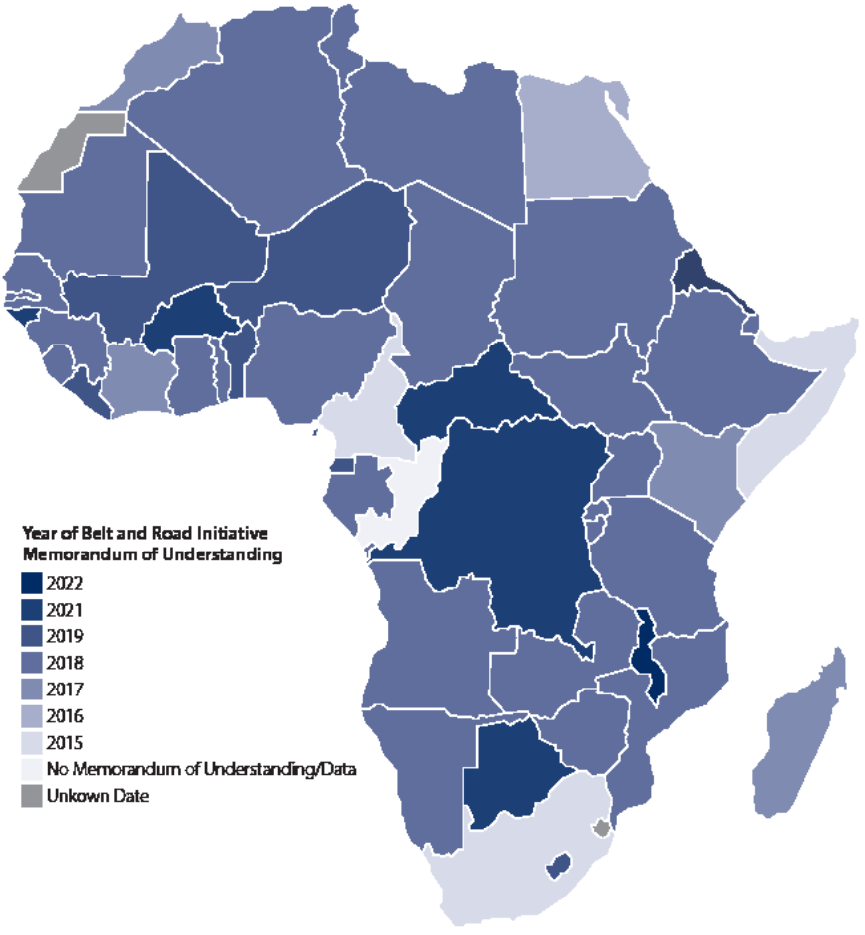
Some previous studies have focused on how the BRI has an impact on regional diplomatic dynamics. Since the end of the Cold War, regional political and economic dynamics, as defined by Oscar Otele, have become more salient.[2] Ian Taylor writes about southern Africa and China, using case studies. Sara van Hoeymissen examines China's role in the regional economic communities in Africa, while Francis Ikome explores interactions between China and the African Union.[3] Mukwaya and Mold use the Global Trade Analysis Project to assert that only the larger countries in East Africa will benefit from BRI projects.[4] Adam Saud and Shabir Ahmad Khan see China's efforts to influence regional integration as "more or less in line with the dictates of Neo-Functionalism and the theory of Complex Interdependence."[5]

Yet there is also considerable theoretical work that emphasizes the ability of smaller and weaker states to withstand even significant pressure from great powers and pursue their own objectives, parallel to or even at odds with the objectives of those great powers. Sasha Davis, Lexi A. Munger, and Hannah J. Legacy, writing about island nations in the Pacific, argue that island states have the ability to pursue their own interests and "not allow themselves to be squeezed into great power competition."[6]

Of greater interest for my purposes, however, are the theories about the overall direction of Chinese foreign policy, particularly under Xi and his predecessor Hu Jintao. Evan Feigenbaum, for example, wrote as early as 2008, "In the years since Beijing's 1996 missile exercise in the Taiwan Strait, Chinese leaders have begun to articulate a decidedly alternative vision of the underlying principles of international relations. This

clarification has emerged gradually, in an ad hoc fashion, and has yet to cohere into a neatly bundled grand strategic vision."[7] Feigenbaum goes on to urge U.S. officials to "note just how much Chinese and U.S. views have diverged on the most fundamental organizing principles of international politics."[8]

The disagreement of the greatest consequence is over the definition and extent of national sovereignty. Chinese officials point to Western-led interventions in Panama, Haiti, and Kosovo as a tacit acknowledgment by the West that national sovereignty is no longer inviolable. In response, the Chinese have championed sovereignty, at least as far as its sovereignty over Taiwan is concerned. At the same time, China has come to view international alliances, especially mutual defense alliances, "as a threat to peace and intrinsically aggressive in nature."[9] China has also demanded deference by nation-states to the United Nations Security Council since sovereignty is more likely to be threatened by a coalition of strong states than by all states working through the world body. The same author acknowledges that the promotion of the UN Security Council by the usually fiercely independent Chinese "contains no small degree of irony."[10]



(Map adapted from Xuewu Gu et al., *China's Engagement in Africa*; graphic courtesy of www.freepik.com)

African Member States of the Belt and Road Initiative

Along the same lines, Yong Deng and Thomas G. Moore point to what Chinese officials call their "new security concept [that] advocates an economic and political order in which mutual trust, benefit, equality, and cooperation characterize bilateral relations and multilateral institutions to reduce insecurity and safeguard global strategic equilibrium and stability."[11] Boiled down, such rhetoric is directed at undermining U.S. alliances and ultimately making those alliance structures irrelevant. Deng and Moore cite China's sponsorship of the Shanghai Cooperation Organization in 2001 as an example of China's efforts to marginalize U.S. influence in central Asia. Two years later, Beijing signed a Treaty of Amity and Cooperation with members of the U.S.-led Association of Southeast Asian Nations.[12]

Some of the projects included in the BRI are not economically significant but can serve to increase goodwill and good feelings about China. An example is China's donation of office equipment to the Tanzania Paralympic Committee.[13] Thus, it is also useful to consider China's efforts in Africa in relation to theories of soft power. Joseph Nye's work is foundational here, and Garrison Daly et al. add a description of soft power based on his research in East Africa: "A noncoercive strategy in which culture, political ideology, economic strength, and foreign policy are used to persuade other nation-states to adopt aligning values."[14]

China's Communist Party took American democracy to task, sharply criticizing a global democracy summit to be hosted by President Joe Biden the following week and extolling the virtues of its governing system. (Photo by Mark Schiefelbein, Associated Press)

What these theories have in common is the possibility that seemingly unrelated and even disparate policy initiatives can indicate a larger and more comprehensive policy direction on the part of a great power whose foreign policy is marked by sophistication, subtlety, long-term vision, and an impressive use of multiple tools to achieve both short-term and long-term goals. In this regard, both the successes and failures of the BRI merit examination. China's BRI initiatives in East Africa include multiple examples of both success and failure.

Background: China and East Africa Before the BRI

According to recent (and disputed) scholarship, Chinese trade with East Africa flourished in the fifteenth century, when Chinese "treasure ships" purportedly sailed all over the world, carrying out diplomatic and economic missions like today's BRI.[15] But with the death of the Chinese emperor who sponsored these expeditions, China turned inward again. Its trade and economic contacts with Africa became marginal, distant, and usually conducted through non-Chinese and non-African middlemen. China would not attempt to become a major maritime power again until the late twentieth century.[16]

Soon after sub-Saharan African nations achieved their independence in the early 1960s, China appeared on the continent with offers of economic and diplomatic assistance. China presented itself as similar to the ex-colonies in that China also suffered at the hands of colonizers. In addition, China epitomized the sort of government-led development programs fashionable among many African independence leaders. China's leaders saw themselves as the leaders of the nonaligned nations and in that role, sought to increase their visibility and influence in the developing world, including Africa.

One of the more famous projects from this era was the Tanzania-Zambia railway, built in the 1970s with Chinese financial backing. It soon became a symbol of the drive for South-South trade (trade among developing countries) in the waning days of the Cold

The Tanzania-Zambia Railway crossing a bridge near the Zambian-Zimbabwean border on 25 November 2009. (Photo by Richard Stupart via Wikimedia Commons)

War.[17] The World Bank had rejected the project as unworthy of funding, but Mao Zedong's government came up with $500 million and recruited thousands of Chinese laborers who were then brought to East Africa at China's expense. Five years later, the railbed was complete, rolling stock had been procured, and stations had been built.[18] More recently, the discovery of oil in Uganda prompted Ugandan president Yoweri Museveni to push for his country's entry into the Lamu Port-South Sudan-Ethiopia-Transport (LAPSSET) corridor, a multinational infrastructure project begun in the early 2010s that serves as a precursor to the BRI.[19]

The BRI Takes Shape

When Xi took over the leadership of the Chinese Communist Party in 2012, it soon became clear that he was more ambitious and less tolerant of opposition than his predecessor. Starting with the publication of the first official China-Africa White Paper in 2006, which was followed by Chinese-sponsored projects in Bangladesh, Sri Lanka, and Pakistan, U.S. officials were warning of what they called China's "String of Pearls" strategy, which consisted of Chinese-funded infrastructure and trade projects along the Indian Ocean littoral. At the time, Chinese sources denied that these projects were part of a larger strategy. Nevertheless, China's success in avoiding the worst of the 2008 global financial crisis prompted Chinese officials to refer to a "peacefully rising Middle Kingdom" for the twenty-first century.[20]

But in a series of speeches starting in 2013 (most notably in Kazakhstan and Indonesia), Xi openly spoke of a connected and purposeful strategy.[21] Although the exact title varied before the Chinese settled on Belt and Road Initiative, Xi made it clear that China aimed to massively extend its diplomatic, economic, and political reach, and that this reach was not going to be limited to neighboring East and South Asian nations. Xi made repeated references to the ancient Silk Road, a series of trade avenues across Central Asia that provided tenuous and temporary links between Europe and China. Rebuilding the Silk Road soon became a priority for the Xi regime.

Eventually, Xi and other Chinese officials talked about a twenty-first-century "Maritime Silk Road" as a supplement to the overland new Silk Road, and even talked about a Polar Silk Road, referring to the possibilities that a less ice-bound Arctic Ocean might provide.[22] In 2018, China established the China International Development Cooperation Agency and housed supervision of the BRI in this new agency.[23] China hopes to forge links with sixty nations in Asia, Africa, and Europe, all of which will acquire an interest in continued good relations with the People's Republic.[24]

> Most of Africa suffers from inadequate roads, railroads, ports, energy pipelines, power grids, and water projects, to say nothing of the challenges of connectivity and internet access.

For East African nations, the BRI represents an opportunity to acquire financing and material support for infrastructure projects that have been on the drawing board for years. Most of Africa suffers from inadequate roads, railroads, ports, energy pipelines, power grids, and water projects, to say nothing of the challenges of connectivity and internet access. Other items on East African wish lists included industrial parks, shipping facilities, and exhibition halls for trade fairs and tourist attractions. Some experts compared the seemingly glittering possibilities of the BRI to the nineteenth-century Cape-to-Cairo railroad dreams of Cecil Rhodes.[25]

Xi's Kazakhstan and Indonesia speeches were followed by a long series of meetings, conferences, and summits, all of which provided opportunities for Xi and other Chinese officials to promote the program, flesh out its details, solicit participation by potential partners, and in stages, reveal BRI's ambitious scope. For example, the Silk Road Archipelagos conference took place in Fuzhou, China, in November 2019. More than a dozen Chinese government, academic, and foreign ministry agencies were listed as cosponsors.[26] In August 2022, twenty-nine diplomats from fifteen African nations attended the "In-Depth China-Africa Economic and Trade Cooperation Program" in China's Hunan Province.[27]

Journalists and business representatives from six African nations were invited to the "Promoting the Spirit of China-Africa Friendship and Cooperation with Joint Action on the Global Development Initiative," a two-day meeting that featured an address by China's vice foreign minister. This meeting was the last in a series of ten conferences held in China, Ethiopia, South Africa, and Senegal.[28] China reserved a pavilion at the Dar es Salaam International Trade Fair in July 2022 that was visited by hundreds of attendees. The pavilion was sponsored by the East Africa Commercial and Logistics Center, one of many business concerns that straddle the line between public and private ownership. The center provided for fifty-two Chinese firms to share the large pavilion.[29]

With the onset of COVID-19, some of the meetings went virtual, such as the "Growing Economic Diplomacy and Opportunities Available in Northern Africa, Middle East, and Asia" conference.[30] As panic over COVID receded, senior Chinese officials made dozens of trips to Africa to resolve disputes and strengthen relations.[31] China has appointed a special envoy to East Africa, Xue Bing, who visited with delegations from six African nations in Addis Ababa in June 2022. Xue asserted that China was best positioned to "restore stability" to the Horn of Africa region.[32]

Goals and Objectives

China's BRI has some reasonably clear goals, among them a diversity of trade relationships and an increase in the country's soft power reach, and like the colonial powers of old, new markets for Chinese goods. At the same time, China is also continuing its effort to supplant and replace U.S. influence in the areas included in the BRI. This effort began soon after the United States established a larger military and diplomatic presence in Central Asia in the aftermath of the September 2001 terrorist attacks and the subsequent U.S.-led invasion of Afghanistan.

In the early 2000s, when American attention shifted almost exclusively to Central and west Asia, China

Xue Bing, China's special envoy to the Horn of Africa, speaks during the first Horn of Africa peace conference in Addis Ababa, Ethiopia, on 20 June 2022. (Photo by Amanuel Sileshi, Agence France-Press)

began to invest more heavily in Africa. Chinese manufacturing had been growing, resulting in a need for markets and an outlet for investment capital. China was able to offer African governments a ready source of investment free of the sometimes contentious focus on human rights violations that often marked dealings with American officials.[33] For example, China's lack of concern over human rights opened a path to better relations with Kenya when Uhuru Kenyatta was elected in 2013. The International Criminal Court had named Kenyatta as a suspect in the violence that occurred after the 2008 Kenyan election. Kenyatta was invited to visit China soon after his election, prompting one Kenyan newspaper to contrast the welcome in China with the "abandonment by the West."[34]

By 2019, forty of Africa's fifty-five independent nations had taken out Chinese loans for infrastructure projects.[35] By 2021, China had surpassed not only the United States in the value of its African investments but also such longstanding partners as France, Germany, and India.[36]

China has also taken advantage of the U.S. preoccupation with Russia's invasion of Ukraine to cultivate partnerships with African nations, especially those the Americans were pressuring to impose economic sanctions on Russia. Soon after the invasion, Russia's foreign minister toured the continent, making stops in Egypt, Uganda, Ethiopia, and the Democratic Republic of Congo. China, for its part, has promoted its centralized and authoritarian governing model as well, reviving an effort at political evangelization that started under Mao. China's International Liaison Department, a powerful branch of the Chinese Communist Party, opened the Julius Nyerere Center in Tanzania and immediately welcomed future leaders from six African one-party states.[37] Maneuvering to take advantage of the belated American response to China's inroads, and hoping to gain international recognition as an independent nation, Somaliland offered the Americans military use of a seaport and airfield in exchange for such recognition.[38]

Complex Relations within the BRI

The large number of projects and initiatives that China is launching as part of the BRI allows African nations considerable breathing room to co-opt

participation in BRI for their own purposes. With so many footholds in the continent, it is barely possible for China's foreign ministry to control all of them or to ensure that Chinese investment and economic activity is serving Chinese foreign policy priorities. Some analysts have focused their work on the numerous ways in which recipient nations in Africa, along with private business owners on the continent, have been able to "adapt the BRI vision in an attempt to steer their way into Chinese investment streams and benefit from infrastructural, transport and strategic synergies."[39] Kenya, for its part, deliberately tries to pit China and the United States against each other to negotiate more favorable deals.[40] Even smaller nations like Uganda and Rwanda have used the opportunities presented by the BRI to maneuver between Kenya and Tanzania.

East African nations also see the BRI as a catalyst for reviving the East African Community. Such a revival fits with the Chinese government's promotion of regional organizations that exclude the United States. As early as 2004, nations that later established the East African Community directed a design for a Railway Master Plan, eventually developing into more concrete plans for a Standard Gauge Railway that would connect Kenya, Uganda, Rwanda, Burundi, and South Sudan.

Double-Edged Debt Trap

African participants in the BRI have been the recipients of huge loans from the Chinese government and semiofficial Chinese enterprises. As the Americans found during the Latin American debt crises of the 1980s, at a certain amount, debts cease to be a source of leverage for lenders and become a source of leverage for debtors. An announcement by a large debtor that repayment may not be possible can threaten the institution or government that holds the debt. China accounts for 17 percent of Ethiopia's foreign debt, 33 percent of Kenya's, and 70 percent of Djibouti's.[41] At the same time, China has found a reluctance to accept debts in renminbi, forcing the country to expand its dollar-dominated debt to acquire the hard currency African nations insist on.[42]

China, for its part, has been reluctant to write off debts, except for relatively small amounts and under very specific circumstances. Like U.S. banks and government lending agencies forty years ago, the Chinese prefer to refinance loans, hoping to maintain the financial upper hand. In 2018, for example, Ethiopia was able to get $3.3 billion deferred. The year before, Sudan saw just $160 million written off, which was only 2.5 percent of its total debt to China.[43] Yet China continues to expand its exposure in Africa. It is currently the largest single creditor nation.[44] Again imitating colonialists of the nineteenth century, China has sometimes demanded resource concessions in return for extended repayment concessions. China usually has foreign policy goals in mind during debt negotiations. It recently forgave $78 million of Cameroon's debt, perceiving Cameroon to be a gateway to the central African region.[45]

Results of the BRI

Some results of the Belt and Road Initiative will be hard to read. China will almost certainly increase its total annual trade with Africa, but since that trade only amounted to $150 billion as late as 2021, up from $10.6 billion in 2000, it will be difficult to attribute any increase to the BRI. At the same time, China certainly recognizes Africa's vast untapped mineral wealth, its potential as an oil and gas exporter, and its potential as a source for strategic metals.[46] Similarly, although boosters of the BRI note that ten thousand Chinese-owned firms are operating in Africa, that number pales in comparison to American- and European-owned enterprises.[47]

On the other hand, Africa assuredly serves as a stepping-stone to another vital Chinese interest. China's inroads with Horn of Africa nations, especially

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Djibouti, provide a conduit for goods headed for the BRI port of Gwadar, Pakistan. Chinese concerns are working to build a railway from Gwadar to Xinjiang. When completed, the project will not only shorten travel time from forty-five days using the existing maritime route to ten days overland but also provide energy and other resources to China without going through the Malacca Strait, which can be closed by a hostile navy. Overcoming the "Malacca Dilemma" may be a central goal of the BRI.[48]

For the African nations participating in the BRI, benefits can also be in the eye of the beholder. Tanzania recently used its BRI participation to become one of only twelve nations that may export soybeans to China. Of more obvious advantage to Tanzania, the Chinese are building two new ports in the country, Lamu and Bagamoyo. One expert contends that the ports' depth and development as major trans-shipment points could undercut competitors like Mombasa. With China providing most of the estimated $10 billion in construction costs, Tanzania has been promised that the new port could, by 2045, handle twenty-five times the cargo that currently goes through Dar es Salaam.[49]

The BRI also provides the bandwidth and other assets necessary to expand e-commerce from Africa to China. In April and May 2022, businesses from twenty-three African countries were invited to take part in the African Products Shopping Festival. Using livestreaming and e-commerce platforms provided by the Chinese, consumers in China could easily order Ethiopian coffee, Kenyan black tea, and South African wine, among other goods.[50]

However, these benefits, some of which are conjectural, have not brought universal support for the BRI, neither in China nor in Africa. At least a quarter of the BRI projects began with great fanfare, only to fall into disrepair due to inadequate follow-up. An expert at the Atlantic Council predicted that BRI projects would include "an impressive photo-op but no concrete plan that addresses the many national and transnational fault lines that are putting such enormous stress on the region."[51] Equally grandiose promises of jobs to be created also fell short or turned out to be only casual or temporary employment.

The Kenyan Standard Gauge Railway, once the poster child for the BRI in Africa, became a conduit for cheap Chinese imports to Kenya, severely hurting the Kenyan manufacturing sector.[52] Similarly, the Tanzania-Zambia Railway failed to attract local or regional investment and served only to increase Zambia's dependence on Tanzania.[53] Early in 2022, then Tanzania president John Magufuli called the $10 billion Bagamoyo port project "exploitive" and suspended its construction. Chinese financiers set "tough conditions that can only be accepted by mad people," he said.[54]

"At least a quarter of the Belt and Road Initiative projects began with great fanfare, only to fall into disrepair due to inadequate follow-up."

Such failures have brought a rapid increase in Sinophobia to East Africa. For example, to Kenyans interviewed by one expert, the Chinese are all but indistinguishable from nineteenth-century European colonialists or twentieth-century purveyors of debt dependence.[55] China's almost unvarying policy of transporting Chinese workers to Africa to build BRI infrastructure projects has left Africans bereft of new jobs and created a growing perception among young people, at least in Ethiopia, "that there is already a sufficient cohort of Chinese individuals living and working in Ethiopia."[56]

Even where outright resentment has not appeared, language barriers, a lack of cultural sensitivity, and overpromising have created ill will that seriously undercuts China's soft power potential and even its more hard power foreign policy objectives. Some African participants complained that loans and grants were forced on them, even if the specific type of aid offered was not needed. In other cases, the Chinese failed to adhere to local policies and procedures and made little to no effort to consult with local officials before finalizing aid or loan arrangements. In Tanzania and Malawi,

China's military base in Djibouti houses some two thousand troops along with armored vehicles and gunboats, with a pier constructed to allow aircraft carriers to dock (*top left*) along with helipads and a runway (*center*). (Photo courtesy of Google Earth)

the Chinese did surveys to improve their image, but used Chinese researchers exclusively, skewing the results.[57] The Asia Society Policy Institute said in July 2022 that many BRI projects ignore factors related to land rights, community health and safety, gender equity, and labor standards.[58]

On occasion, Chinese officials acknowledged the problems with the BRI projects in Africa but insisted that they had to act as they did. One Chinese official, asked by a U.S. reporter why his country mostly bought raw materials from Africa and not goods with more value added, replied, "We have determined that the biggest threat to any regime is internal unrest, not external factors. War we can handle ... the biggest cause of internal unrest is unemployment. That is why we try to get raw materials and not products that have had value added to them. The more value that has been added to the products means less employment for our people."[59]

BRI has also generated opposition in China, with one expert insisting that the project has never been popular among Chinese officials, in part because they see it as "too generous" to recipient countries. Scholars and banking officials who have examined the various elements of the BRI expected to find "clear and coherent financial planning. What [they] found was the exact opposite."[60] Outside observers also noted the near impossibility of tracing or even knowing the full extent of Chinese lending, since "much of China's external lending is shrouded in secrecy."[61] The BRI began and survives, according to these experts, because it has the unwavering backing of Xi, backed up with sanctions for those Chinese officials who express skepticism.[62]

Compounding the stated difficulties in analyzing Chinese lending connected to the BRI is the confusing mingling of public and private economic activity in China and in China's economic and financial dealings with its partners. Semiprivate and quasi-private enterprises have proliferated in China in the twenty-first century, often headed by relatives of ranking government or Communist Party officials, known locally as "the Princelings." Officially private, but almost certainly acting with the acquiescence of the Chinese government, these enterprises act in almost total secrecy and make even simple calculations, like the total amount of Chinese lending to Africa, all but impossible. "Nongovernment" Chinese intrusion, however, is just as likely to spark opposition and Sinophobia in Africa as anything the official Chinese government does.

Evidence from Djibouti and Ethiopia

The experiences of these two Horn of Africa nations serve as useful illustrations of the progress and the challenges of the BRI. Chinese concerns have funded a number of infrastructure projects there such as the Addis Ababa-Djibouti railway, financed by the Ethiopian government and a large loan from the Chinese import-export bank. The Chinese government sees Djibouti as a likely entry point to the Middle East, given the small state's membership in the League of Arab States and its close ties with Saudi Arabia.

> For Djibouti, the opportunity to entice two superpowers to invest in projects important to Djibouti is obvious. 'If someone comes and brings investment, we'll roll out the red carpet,' said the president of the Djibouti Chamber of Commerce.

Possibly the apotheosis of extended Chinese influence because of the BRI is China's first-ever overseas naval base in Djibouti, which opened in August 2017 on the ninetieth anniversary of the Chinese Communist Party. The base, only a few miles from a U.S. military base, commands one of the most important maritime choke points on the planet. The Red Sea, the Bab al Mandab, and the entry to the Indian Ocean from oil-rich Saudi Arabia all meet off the shores of Djibouti. U.S. officials say the Chinese base is large enough to accommodate an aircraft carrier and nuclear submarines.[63] It could also house up to ten thousand troops. Besides the immediate power projection potential and the potential excuses to project such power, ostensibly to protect Chinese nationals working on BRI projects, a permanent military presence in the region adds credibility to China's offers to mediate regional disputes, combat local piracy, and to assist after natural disasters.[64] In June 2022, China's special envoy to the Horn of Africa, Xue Bing, sponsored the first meeting of the Horn of Africa peace conference. High-level visits from Chinese leaders have become quite common in both Djibouti and Ethiopia. In June 2018, a Chinese antipiracy task force visited Ghana, Cameroon, and Gabon.[65]

It is not clear that China will be satisfied with a single African base. The head of the U.S. Africa Command recently told Congress that China is seeking basing rights in the United Arab Emirates, Pakistan, and Equatorial Guinea in west Africa.[66] For Djibouti, the opportunity to entice two superpowers to invest in projects important to Djibouti is obvious. "If someone comes and brings investment, we'll roll out the red carpet," said the president of the Djibouti Chamber of Commerce.[67] At the same time, Djibouti officials must be concerned about the example of Sri Lanka, which had to cede control of its largest port to a Chinese concern after defaulting on its debt.

In Ethiopia, the Chinese presence is strong, going well beyond the Addis Ababa-Djibouti railway. Another rail project aims to connect Ethiopia with South Sudan. China is also heavily involved in a massive plan to expand Addis, known as the Addis Ababa Master Plan. China's Export-Import Bank provided financing and labor for the continent's first light rail system (serving Addis Ababa). In the end, 85 percent of the cost came from a loan from this Chinese bank. Like many BRI projects, the light rail system began with great fanfare but failed in its primary mission, which was to address the overburdened traffic system in the capital.[68] The project succeeded in saddling Ethiopia with huge debts to China. Ethiopia currently has the second largest foreign debt in sub-Saharan Africa, owing the Chinese more than $13 billion.[69]

Here again, it is hard to see a significant increase in China's political influence in Ethiopia. China's Horn of Africa Special Envoy offered to mediate the internal strife causing humanitarian nightmares in Ethiopia, but with no visible success. Ethiopian officials did not even provide him with a date for starting the proposed talks.[70]

Conclusion

The impact of the BRI was hard to measure even before the reaction to the COVID-19 virus caused

so much disruption to the global economy. (Some BRI projects shut down for over two years.) For China, the global slowdown meant that its debtors were even less likely to repay their loans and even more likely to request (or demand) massive forgiveness or rescheduling. One expert concluded that China is "stuck." Forgiveness and long-term restructuring will anger Chinese citizens who will not be repaid. On the other hand, strict demands for repayment will alienate the very developing countries China hopes to entice. The most likely outcome is China's leadership trying to split the difference, which could alienate both Chinese and Africans.[71] At the same time, grandiose promises to commit money and resources to help African nations deal with COVID have largely gone unfulfilled.

(Map adapted from Deutsche Welle; graphic courtesy of www.freepik.com)

China's Investment into African Ports

Enthusiasts of the BRI, inside and outside China, often point to the Kenyan Standard Gauge Railway as a success story, but the very repetition of that example is evidence of how few successes have come from the BRI.[72] Other supporters of the initiative speculate about proposed BRI projects, such as the new ports in Tanzania, which may or may not ever get built. Fanfare, high hopes, and grandiose predictions have been a much larger part of the BRI than actual measurable successes. In a global recession, such successes are likely to become even rarer.

The Djibouti base not only represents a departure from China's past foreign policy but also a change in its traditional stance on noninterference. It also demonstrates that China is reneging on its promise that its global economic expansion would not be accompanied by a global expansion of its military. China long criticized overseas military bases as neocolonialist and specifically condemned U.S. bases as "instruments of hegemony."[73] Now, Chinese officials wrote in the Vision for Maritime Cooperation white paper that China reserves for itself the right to a role in "non-traditional security issues such as crimes on the sea, search and rescue and marine disaster prevention and mitigation."[74] China also reserves the traditional role of "effectively protect[ing] the security and legitimate rights and interests of overseas Chinese people, organizations and institutions."[75]

Sri Lanka's surrender of the Hambantota port also could prove to be a negative for China's foreign policy. With rumors of threats to partially take control of Mombasa from Kenya if the Kenya Railways Corporation does not repay, China seems even more like a traditional colonial power rather than an innovative twenty-first-century rising power. Even in areas of considerable Chinese BRI investment like Ethiopia, China's attempts to extend its diplomatic influence have met with little success, as evidenced by Ethiopia's abrupt refusal of China's mediation offer.

However, Xi's goals for the BRI are more likely to be found in the long term. China does not need a long string of economic or diplomatic advances in the short term for the BRI to be deemed a success. To a considerable degree, China has supplanted U.S. influence in East Africa, as it has in Central Asia. By presenting itself as a willing (and nonjudgmental) source of aid and loans, China has strengthened the hand of East African nations in their dealings with U.S. aid and banking officials. Even if Chinese loans are not paid back, or payments are extended into the not-so-near future, Xi can still perceive a gain in China's global status due to the decline in America's influence.

As noted, Chinese foreign policy is marked by sophistication, subtlety, long-term vision, and an impressive use of multiple tools to achieve both short-term and long-term goals. China does not need a large number of working railroads, busy ports, or successful mediations to regard the BRI as successful. They do need raw materials, assured access to global maritime choke points, and a growing perception that the country is the paramount rising power of the twenty-first century. If the initiative is sustained over the next ten years or so, China will have more global visibility and prestige than it has now. The question of the BRI's longevity is inseparable from the question of the longevity of the current Chinese regime. ■

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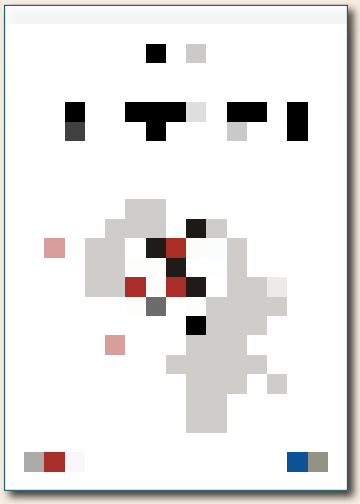

China's Engagement in Africa: Activities, Effects, and Trends is a collection of data and other timely information pertaining to the status of China's Belt and Road Initiative in Africa. This short work might serve well as an effective tutorial for those unfamiliar with the history and issues related to Chinese investment activities within a wide variety of African nations.

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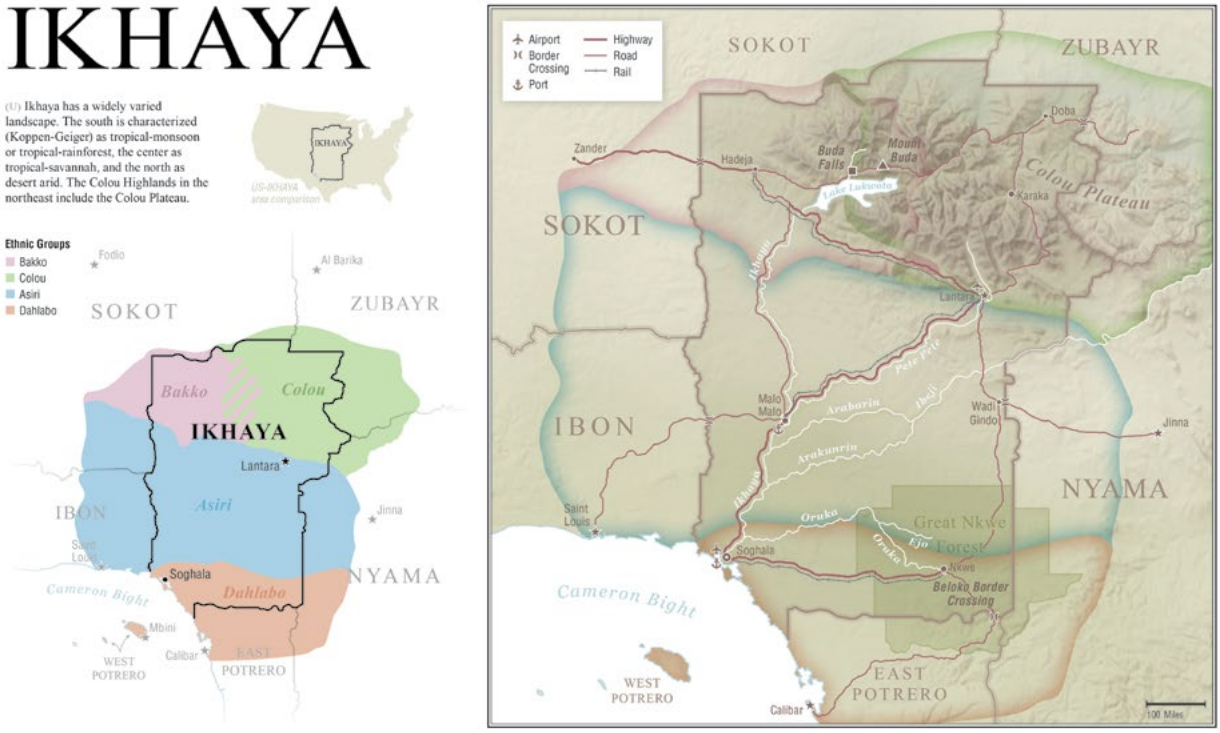

Representatives from various U.S. departments and agencies form a country team to manage a complex crisis in the fictional country of Ikhaya during their participation in the Peace Game. During the exercise, the country team must develop responses to political instability, terrorism, a health crisis, various great power complications, and an environmental catastrophe resulting in social collapse. (Map courtesy of U.S. Diplomatic Studies Foundation)

Peace Games

Preparing U.S. Officials for Challenges and Opportunities Abroad

Kathryn Elliott
Thomas P. Sheehy
with Ambassador David C. Miller Jr., Retired

A crisis is unfolding, but the U.S. ambassador has seen this before. She is on her third tour as an ambassador and already has two mandatory embassy evacuations under her belt. However, many members of her current country team are young, and she can feel the confusion and concern in the room.

The African country they are stationed in—where they live, work, and raise families—is being torn apart in front of them. Growing unrest due to prolonged drought and hiked up food prices finally sparked street demonstrations and a predictable violent crackdown from the desperate government. This government violence undermined the veneer of cooperation between ethnic groups within the country, with many ethnic and tribal factions quickly choosing sides and picking up arms. Rumors of an impending coup began to circulate, accompanied by other claims ranging from the foreign minister's arrest to foreign power intervention. It was up to the ambassador and her country team to discern the confusing facts on the ground and construct a swift plan for responding to the potential collapse of a country that is important to the United States and its allies.

The ambassador knew her first step needed to be working with her deputy chief of mission to restore calm and order among the country team. To accomplish this task, she convened the team to review what each member needed to focus on to swiftly manage the growing crisis. She began by going around the room, starting with the most important and always the first report, which was confirmation from the consular officer that all Americans in country were successfully sheltering in place and that there had been no injuries suffered or American hostages taken. Emergency air evacuation plans were also under development, but assets would not be available for at least another twenty-four hours. The international school had been closed in an orderly manner and all the American children were with their families. This welcome news markedly reduced tension in the room.

Next, the ambassador turned to the head of the political section to summarize the cable his team had prepared to send to Washington as soon as he received final inputs and clearance from the country team. The message candidly stated that the mission suffered from more confusion than clarity about conditions on the ground. The station chief followed the political officer's report, sharing her knowledge gained through close ties with key government officials. She agreed that the situation was murky, though there was certainly a credible threat of a coup; she possessed some solid information on two or three factions moving to seize control. The attaché's report followed, revealing that troops remained in their barracks at this point, not moving to seize power. The representative from the U.S. Agency for International Development (USAID), which had by far the most personnel in country, chimed in to share that many outside the capital reported that the riots had spread to the port city, threatening port operations and desperately needed food shipments. Next, the regional security officer, working with the Marine security detachment, presented plans to secure the chancery should a mob form. Of critical importance, classified materials were being burned. Plans for the evacuation of the embassy staff were also in development.

The ambassador followed these reviews with reassuring comments, though she did not sugarcoat the discouraging exchange with Washington leadership. The press was lambasting the White House and State Department for letting this situation get out of hand, but the message from State and the National Security Council was straightforward: resources to help were limited. The USAID budget had no funds left to help address the unanticipated crisis, although the office could dispatch a disaster assistance response team. The U.S. Army's 3rd Special Forces Group (Airborne), a military unit assigned to the embassy's area of responsibility, could also dispatch a few officers to support the U.S. military attaché who knew the local military well enough to encourage them to exhibit responsible, measured behavior. Generally, though, the ambassador and her team were left to work with the very limited resources they currently possessed. Coordination and communication among the different departments and agencies that comprised the country team would be critical now more than ever.

A Continent of Challenges and Opportunities

The challenging crisis environment portrayed above is not unique, especially when it comes to posts in Africa. U.S. diplomatic personnel in forty-nine embassies, plus the African Union, throughout sub-Saharan Africa contend with similarly difficult issues, operating in taxing environments. These include the current food crisis, now impacting over three hundred million Africans, growing insurgencies in several parts of West Africa, tens of millions of displaced persons, and environmental degradation.[1] Six successful African coups have occurred since 2020, which stressed the duty to protect Americans in those countries and undermined efforts to foster democracy and rule of law.[2] The varied challenges facing the United States are illustrated by

UNICEF nutrition specialist and emergency response team member Joseph Senesie screens a woman for malnutrition in southern Tigray Province, Ethiopia, on 19 July 2021. The woman was identified as severely malnourished. An ongoing famine in Ethiopia has resulted in approximately fourteen million people in need of food aid. Exacerbating the crisis, a war since 2020 between the Ethiopian government and forces from the breakaway province has resulted in an estimated five hundred thousand killed. (Photo by Nesbitt, courtesy of UNICEF via Wikimedia Commons)

its activities in Somalia, Democratic Republic of the Congo (DRC), and Ethiopia.

Somalia. Abutting the Gulf of Aden and perennially food insecure, Somalia is a U.S. geopolitical and humanitarian focus. Somalia's government, with the backing of the African Union Mission in Somalia, has been fighting the al-Qaida-affiliated extremist group al-Shabab for fifteen years.[3] With hundreds of troops in country, the United States trains Somali military forces and has conducted airstrikes against militants for over ten years.[4] The United States and other international donors provide development aid focused on many areas, including economic growth, government services, political reconciliation, and governance and rule of law. In 2022 alone, the United States provided Somalia an estimated $560 million in bilateral aid.[5] Despite these efforts, al-Qaida remains an adaptable and potent enemy, expanding into neighboring countries, while Somalia remains deeply divided by region, clans, and subclans, challenging the central government's rule and counterterrorism efforts.[6] The government must also contend with Somaliland's press for independence and increased foreign activity, including by China.[7] To compound these challenges, Somalia faces a fifth consecutive failed rainy season that puts half its population in a food crisis.[8] Having reestablished a permanent diplomatic presence after an absence dating to the 1991 government collapse, the U.S. embassy in Mogadishu must tackle these many challenging issues while operating in a fundamentally insecure environment.

Democratic Republic of Congo. U.S. diplomats in this country of 110 million, the geographically largest country in sub-Saharan Africa, are mainly constrained to the capital of Kinshasa in the far west due to sparse infrastructure.[9] Compounding their challenges, militias, some backed by neighboring countries, battle

over the country's immense natural resource wealth in eastern DRC, which has been in conflict for twenty-five years.[10] The DRC possesses the world's largest known reserves of cobalt, which is key to the energy transition and has thus drawn U.S. attention, especially given China's dominance in this sector. The abuse of children in mining operations has attracted global attention.[11] Regional tensions are high, with Rwanda continuing its years of intervention in the east.[12] Despite a near twenty thousand-member UN peacekeeping force, the DRC suffers one of the most dire humanitarian situations in the world, with more than five million Congolese displaced.[13] This situation is worsened by the outbreak of cholera and other communicable diseases.[14] The United States is the largest donor to the DRC, with varied programming, including efforts to stop environmental degradation intensified by the DRC's location in the Congo Basin, which is the largest carbon sink in the world.[15] The country faces elections in December 2023, which many predict will be destabilizing.[16]

Ethiopia. Ethiopia, the second most populous country in sub-Saharan Africa, until recently has been suffering what some call the world's deadliest war since 2020, fought between the national government and its breakaway Tigray Province.[17] The conflict has claimed an estimated five hundred thousand lives. While a cease-fire now exists, the humanitarian situation remains dire, with some fourteen million people needing food aid.[18] To complicate matters, Eritrean troops are in Ethiopia, where they have fought Tigrayan forces and committed human rights abuses.[19] Continued U.S. diplomatic engagement will be important to build stability, including in other rebellious regions of this country of eighty ethnic groups, particularly Oromia.[20] Regional tensions have also spiked with Egyptian and Sudanese concerns over Ethiopia's Blue Nile dam.[21] The United States provided nearly $1.5 billion in emergency food aid to Ethiopia in 2022, making it the largest bilateral donor.[22] Ethiopia is an important counterterrorism partner for the United States, though there is growing concern over its perceived drift toward Russia, highlighted by Ethiopia's failure to vote to condemn Moscow's Ukraine invasion.[23] The United States also has concerns over Ethiopia's close commercial and political ties with China.[24] The significance of Ethiopia's relationships with the United States' strategic rivals is magnified given it is home to the African Union, which expands its clout in African political affairs.

Opportunities. While the continent is increasingly rife with challenges, there are also a plethora of growing African opportunities, recognized by the Biden administration's Africa strategy and U.S.-Africa Leaders Summit.[25] Specific opportunities include Africa's growing youth population that is increasingly in need of work. Ten to twelve million youth enter the African workforce each year, while only 3.1 million jobs are created, providing growing industries with a potential workforce source in an age where many leading economies are suffering from population decline.[26] Additionally,

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Thomas Sheehy is the principal of Quinella Global, a Washington, D.C.-based public policy consultancy. Sheehy served for over twenty years on the staff of the Committee on Foreign Affairs in the U.S. House of Representatives, where he was its staff director, responsible for committee operations, from 2013 to 2019. His time on the committee included serving as staff director of the Africa Subcommittee for eight years. Prior to joining the committee staff, Sheehy was a policy analyst at the Heritage Foundation, where he codeveloped the Index of Economic Freedom, a globally recognized analysis of national economies, now in its twenty-sixth edition.

Ambassador David C. Miller Jr., retired, is a founding member and president of the U.S. Diplomatic Studies Foundation. He served on the National Security Council as special assistant to the president in 1989 and 1990. Previously, he served as ambassador to Tanzania from 1981 to 1984 and ambassador to Zimbabwe from 1984 to 1986. He is a graduate of Harvard College and the University of Michigan Law School. He is a member of the Council on Foreign Relations and the District of Columbia Bar.

a 2022 White House fact sheet illustrates that in 2021, U.S. goods and services traded with Africa totaled $83.6 billion.[27] Mobile money technologies, broadband internet access, and renewable energy technologies are all promising sectors for significant investment on the continent.[28]

challenges in areas like Africa. State Department personnel are particularly in need of greater training and professional development opportunities. As DSF's president, Ambassador David Miller stated in his November 2021 testimony before the Senate Foreign

"The uniformed services conduct war games of various scales and varieties as an integral part of training their personnel, but there is no equivalent that allows civilians to practice winning the peace."

Overall, perhaps the greatest opportunity involves the United States' ability to better compete with China in an era of growing tensions between the two superpowers.[29] The United States can work with African partners to break China's stronghold on the rare earth mineral industry, where China has 60 percent of global production and 85 percent of processing capacity.[30] Investment in rare earths is an advantageous strategy in general, given global rare earth mineral demands are projected to rise from 208,250 metric tons in 2019 to 304,678 metric tons by 2025.[31] Greater U.S. investment on the continent can also begin eroding the influence China exercises over the countries where its banks account for the bulk of bilateral lending; as of October 2021, Chinese banks accounted for one-fifth of all lending in Africa.[32] This Chinese influence supersedes the economic realm and permeates the security realm. For example, early this year, South Africa, China, and Russia conducted joint military exercises.[33]

To successfully face this variety of complex issues and opportunities, an effective country team must excel in communications and teamwork, and enjoy strong leadership. U.S. diplomatic posts in Africa must contend with challenging operating environments where reliable local information is often lacking. Crises, some impacting the lives of Americans, are not uncommon. The U.S. diplomatic corps abroad cannot operate within these complicated conditions by merely learning on the job; they require higher levels of rigorous training.

A Way Forward

Since its inception in 2018, the U.S. Diplomatic Studies Foundation (DSF) has strived to elevate the need to better prepare U.S. officials abroad for the growing

Relations Subcommittee on State Department and USAID Management, "I have never seen an institution work so hard to select people and do so little to train them once on board."[34] Fortunately, the need for greater training and professional development has become more widely recognized in the discussion surrounding broader State Department reform. Arizona State University, the Quincy Institute, the Council on Foreign Relations, and Harvard's Belfer Center all released reports in the last three years that call attention to the need for more and higher quality training and professional development.[35] These reports seem to be gaining attention. The Biden administration's *National Security Strategy* posits that successful U.S. foreign policy hinges upon a strengthened national security workforce, which includes greater support for "professional development opportunities."[36]

The foundation, led by an esteemed group of former diplomats, has in recent years highlighted that the uniformed services conduct war games of various scales and varieties as an integral part of training their personnel, but there is no equivalent that allows civilians to practice winning the peace. For the last twenty years, America's major foreign engagements have been focused on kinetic success. Prior to committing the U.S. military abroad, the foreign policy community rarely takes the time or is given the opportunity to ask whether we are equipped to win the peace. The challenges facing us today are only increasing in complexity, especially as competition with China grows. If we keep leading with military engagement without understanding how to win the peace on the ground before tensions dissolve into crises, we are sure to fail. A critical first step is ensuring that our civilians on the country team practice winning the peace just as hard as our military

U.S. embassy located in the Ethiopian capital Addis Ababa (Photo courtesy of B. L. Harbert)

officers practice winning the war. DSF created the Peace Game to do just that.

DSF partnered with the ICONS [International Communication and Negotiation Simulations] Project at the University of Maryland to create an initial scenario centered around the fictional country of Ikhaya, which has national characteristics and challenges resembling various African nations. The Peace Game brings together representatives from various U.S. departments and agencies that comprise a country team and challenges them to manage a complex crisis simulation like the scenario that opened this article. In the Peace Game iterations conducted to date, representatives from the State Department, USAID, the intelligence community, and the military participated on the country team. The exercises also included participation from senior retired officers who played on the control team, which simulates Washington leadership responses to the country team and dictates the pace at which it receives new plotlines.

The Peace Game is a two-day exercise in which the country team must develop a response to political instability, terrorism, a health crisis, various great power complications, and an environmental catastrophe resulting in social collapse. Their response must consider all the U.S. government assets available to help mitigate the crises as well as tools the private sector and nongovernmental organizations could contribute. The team is required to present this plan to national leadership in Washington and, after receiving approval, execute it, including selling the plan to the host government. To varying degrees, this is an everyday process in U.S. embassies around the world. The Peace Game allows government officials to confront these complications in a simulation before they are faced with similar challenges at post, ensuring they are better prepared to craft effective responses.

Participants in the first three Peace Game exercises, conducted in October 2021, April 2022, and September 2022, all expressed during the end-of-exercise feedback session that the scenario was remarkably realistic. As one participant who has held multiple senior positions within the State Department observed, "The problem set involved in the exercise will come up with everyone, regardless of their posting, at some point during their career." Another currently serving State Department officer expressed, "I'm a strong believer that this is exactly the kind of training that benefits our folks heading out to some of our more challenging posts, where these sorts of scenarios are often regular occurrences." Importantly, one piece of feedback has been particularly consistent: participants express the biggest benefit of this exercise is the interactions with their cross-departmental colleagues. The exercise reveals different departments' and, even more granularly, different bureaus' resources as well as their bureaucratic responsibilities, characteristics, and limitations within crisis situations.

This unique interagency element of the Peace Game fills gaps in U.S. preparedness that have been recognized across the government, with Secretary of State Antony Blinken himself emphasizing in an October 2021 speech, "We want both the Foreign and Civil Service to have more opportunities for professional development throughout your careers, including exchanges and rotations in other government agencies."[37] Congress has taken a more concrete step toward embracing the benefits of the Peace Game. In the 2023 National Defense Authorization Act, it requires the secretary of state to "provide the opportunity to participate in courses using computer-based or computer-assisted simulations,

allowing civilian officers to lead decision-making in a crisis environment, and encourage officers of the Department of State, and reciprocally, officers of other Federal departments to participate in similar exercises held by the Department of State or other government organizations and the private sector."[38] This provision describes the Peace Game.

Fortunately, the Peace Game model is incredibly versatile and can be adapted to provide training for the variety of complex issues that dominate the twenty-first-century geopolitical landscape. For example, the scenario's focus could be narrowed to solely address commercial diplomacy and how the U.S. government can foster better private-sector access to and success in historically high-risk markets like Africa. The model could also be broadened to address different regions such as the Indo-Pacific. DSF plans to work with the U.S. Institute of Peace (USIP) to take advantage of this versatility and expand the exercise's scale and scope. USIP is a world-renowned, nonpartisan institution that understands that integrated, well-functioning diplomacy is critical to its core mission of promoting peace and stability worldwide.

A crisis action "matrix-game" exercise conducted by the U.S. Army War College 19 May 2017 for the incoming class of International Fellows that focuses on analysis and resolution of international crises. (Photo courtesy of the U.S. Army War College)

Initiatives like the Peace Game that originate in coordination with but ultimately are external to the government are critical for keeping training on pace with the rapid changes in the global environment. Training at the Foreign Service Institute, the State Department's training center, is underresourced and underfunded, with the resources that are allocated to training frequently commandeered for other purposes within the department. To help alleviate these challenges, the department should embrace partnerships with other organizations, such as nonprofits, think tanks, and academic institutions, that can quickly mobilize resources and fill the training gaps that exist at a pace unachievable through government action alone.

The military has a critical role to play as well. Wargaming is an essential component to ensuring military readiness. However, if the government continues to prioritize training in which the military is the first tool selected to address crises, every conflict will begin to look like one requiring a military solution. This mindset is a dangerous one. The security sector must devote significantly more time and resources to bolstering diplomatic and development tools so they can be used as first lines of engagement in conflicts.

Ultimately, the United States cannot shoot its way out of every problem that arises. This statement may seem trite, but a foreign policy community that neglects the training and professional development of its diplomats is not a foreign policy community that takes the prospect of mitigation through diplomacy seriously. The men and women of the military will continue to be burdened with the responsibility to resolve issues that should not be in their area of responsibility until preparedness for the rest of the security sector is taken more seriously.

Thus far, the military participants in the Peace Game have been some of the most enthusiastic supporters of the concept. They are eager to have broader operational support from their country team colleagues at missions abroad during crises. The military should more proactively press upon leaders in the executive and legislative branches that training and professional development of their civilian counterparts requires far greater attention and prioritization.

Overall, as the opening scenario illustrates, in times of crisis there are a multitude of individuals that must break away from their day-to-day operations and begin to operate as a coordinated unit. Unfortunately, the national security apparatus lacks

opportunities to regularly participate in training that brings together cross-governmental participants. The military offers occasional slots in its wargaming for civilians, but the roles such participants play are typically marginal. As the conditions on the African continent illustrate, the challenges facing the United States in the years to come will increasingly require a concerted effort across various U.S. departments and agencies; sufficient training to accomplish this complex coordination during crises simply does not exist. The Peace Game is an innovative approach to ensuring the men and women representing the United States at posts abroad are prepared to face the challenges and seize the opportunities presented by their host countries. It is an approach whose time has come. ■

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Upon the Fields of Friendly Strife

An "Athletic Charter" to Reform the Army's Sports Culture and Build Better Leaders

Maj. Scott A. Clark, U.S. Army

What role do sports play in support of the Army's mission to fight and win our Nation's wars? General of the Army Douglas MacArthur, former Army chief of staff and United States Military Academy (USMA) superintendent, best articulated the athletics-combat relationship: "Upon the fields of friendly strife are sown the seeds that, upon other fields, on other days, will bear the fruits of victory."[1] His mantra encapsulates the immense benefits sports can bring to Army formations, such as honing coaching and leadership skills, developing character and grit, and improving fitness in garrison to build esprit de corps in a safe but competitive context. Athletic facilities abound on nearly every Army post, none more than at West Point, where every cadet is an athlete.[2] Over the last century, competitive athletics in the Army gradually expanded with the establishment of Morale, Welfare, and Recreation (MWR) to govern garrison sports teams and all-Army competitions, as well as through the creation of the World Class Athlete Program (WCAP), an Olympic training program for elite Army athletes.[3] Similarly, USMA steadily enlarged its sports program to field eleven intramural teams, sixteen competitive clubs, and twenty-eight sports affiliated with the NCAA.[4] The Army's Holistic Health and Fitness and combatives programs complement athletics as an essential element of physical and tactical readiness, but both fall short in replicating the benefits unique to competitive sports. Despite an abundance of opportunities, athletics in the Army fall short of its potential. Fundamentally, the culture of athletics in the Army has gone awry.

The Army writ large fails to capitalize on its sports structure for the widest possible benefit, and the purported "lifetime athletes" matriculated through USMA inadequately reinvest their athletic talents back into operational forces.[5] Highly trained cadet-athletes display an alarmingly low propensity for continued service after commissioning or achievement of higher ranks and positions of responsibility.[6] To build better leaders and stronger tactical-level organizations, the Army must redress the untapped potential latent within its leaders and appreciate a return on a significant investment in its sports programs. This only begins with leader involvement. The "Abrams Charter" offers a ready solution to the Army's athletic shortcomings, whereby Gen. Creighton Abrams envisioned that his elite Army Rangers would "Lead the Way" by serving as role models for the conventional Army. These specially selected and trained leaders would then return to the

Staff Sgt. Lucas Sheridan pins his opponent to secure a national title in the 97 kg weight class in the finals of the 2022 USMC U.S. Open Wrestling Championships on 1 May 2022 in Las Vegas. (Photo by Sgt. Michael Hunnisett, U.S. Army)

regular force to pass on their higher standards, ethos, and skills.[7] By adapting the Abrams Charter into an "Athletic Charter" to reform the Army's athletic culture, highly skilled leader-athletes might later lead and coach unit sports teams throughout the Army, raising the fitness and quality of the soldier by imparting essential leader competencies, attributes, and values.

The Value of Sports: Leadership Skills and Building Teams

After forty years of military service, MacArthur developed a strong conviction that sports have value for the Army. Writing to his immediate successor as the president of the American Olympic Association in 1939, MacArthur cogently explained,

> The training of the athletic field which produces in a superlative degree the attributes of fortitude, self-control, resolution, courage, mental agility, and, of course, physical development, is one completely fundamental to an efficient soldiery.[8]

Subsequent senior Army leaders echo MacArthur's view that sports improve the soldierly disposition. Of the most prominent examples, Dr. Mark Esper, former secretary of the Army and U.S. defense secretary, contends that athletes are more likely to succeed in the Army.[9] Gen. James McConville, Army chief of staff, also attests to sports' positive relationship to soldiering, success, and resiliency.[10] Another former Army chief of staff, Gordon Sullivan, empirically defends the long-term benefit of military sports, concluding that sports impart a lasting, positive effect on a soldier's social and emotional development.[11]

Sports participation alone does not automatically make better military leaders.[12] Deriving the utmost value from sports participation and culture requires deliberate leader involvement and a collective vision. Army leaders are akin to team captains or coaches: both serve to build and lead a winning team. Recent

Army research identified many consistent commonalities between Army leader competencies and successful athletes to support the Army leader-coach construct, such as "Judging Talent, Communicates, Develops Staff, Builds Trust, and Gives Clear Guidance."[13] Moreover, Army doctrine maintains that coaching is a principal role of a leader. The best Army leaders effectively coach others by teaching and guiding subordinates toward a focused goal to reach their highest potential.[14] Demonstrating this growing recognition of coaching in leader development, the Army piloted four different personal skill identifiers for the mastery of coaching.[15] Though great coaches are not necessarily great athletes, and athletic prowess or experience is no guarantor to becoming a great coach, participation in sports nevertheless provides maximum exposure to reliable and tested coaching styles and techniques that are directly applicable to Army leadership.

Sports also add value to the Army by supporting an effective command. They are a conduit to generate a positive command climate through team building while also creating an effective way to practice making timely decisions.[16] The time-constrained, high-stress context of a competitive athletic contest affords the leader an unscripted opportunity to hone leadership skills, build and lead teams by habit and reflex, and exercise intuition for decisive action.[17] Furthermore, sports present a commander with a safe, familiar practicum to nurture the soldier's never-quit mentality and to develop military-specific skills through such competitive sports as rifle, pistol, biathlon, orienteering, and wrestling. Most importantly, sports in the Army cultivate such skills and values without the risk of professional retribution, in turn developing a critical component of strong teams: trust. Sports can systematically support Army leader development but only if properly institutionalized.

USMA: The Wellspring of Army Sports

Gen. Colin Powell famously referred to West Point as the "wellspring of my chosen profession," to emphasize the vital role USMA plays as an Army institution for the leader and character development of all Army officers, regardless of commissioning source.[18] USMA's sports warrant added scrutiny considering its historical impact on the Army's sport culture, its substantial institutional investment, and its high visibility amongst the American public. USMA effectively functions as the wellspring of Army sports.

While only one sixth of the Army's officers commission from USMA, this thousand-strong annual cohort forms a powerful plurality and expression of the Army's identity, both in leadership and in sports.[19] For example, 87 percent of applicants admitted to USMA in 2021 lettered in a high school varsity sports, with nearly two-thirds captaining a varsity team.[20] At the USMA Preparatory School, a federally funded junior college at West Point originally intended for prior-service soldiers, over half admitted were recruited athletes.[21] While only 6 percent of high school graduates continue into intercollegiate sports, nearly 20 percent of the Corps of Cadets at USMA compete in a NCAA sports, with the rest participating in club or intramural sports.[22] By comparison, just 2–3 percent of Army Reserve Officers' Training Corps (ROTC) cadets are NCAA athletes.[23] West Point's most talented cadets-athletes even have the option to play professionally upon commissioning, though USMA designs its curriculum to prepare all cadets to emerge as "lifetime athletes" in the profession of arms through one of nineteen "lifetime sports" (see table 1, on page 136).[24]

USMA's concept of lifetime athletics

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Table 1. Lifetime Physical Activities Courses

USMA Department of Physical Activity's Mandatory "Lifetime Sports" for Upperclass Cadets			
Aerobic Fitness	Badminton/ Pickleball	SCUBA	Skiing
Basketball	Cycling	Snowboarding	Soccer
Combat Grappling	Emergency Water Safety	Tennis	Strength Development
Golf	Lifeguarding	Racquetball	Rock Climbing
Volleyball	Olympic Weightlifting	Modern Army Combatives Level 1 Certification	

(Table by author)

emerged under Capt. Herman Koehler's transformative tenure as the head of West Point's Department of Physical Education from 1885 to 1923. Koehler meticulously reformed the curriculum to incorporate martial sports like boxing and wrestling. He envisaged the academy's new culture of sports spreading throughout the Army as cadets dispersed to myriad posts after graduation.[25] Koehler presciently cautioned against elite, exclusive sports since "if indulgence in athletics is to be confined to a limited few … and if winning is to be made the sole and only desideratum, then athletics fail of their object."[26]

Athletics continued in a modest capacity until MacArthur's superintendency in 1919. His personal experiences in World War I convinced him of the need for universal participation in athletics, noting that physically unfit soldiers were "worthless" in combat.[27] Accordingly, MacArthur championed competitive athletics' unique ability to develop "the qualities of leadership, quickness of decision, promptness of action, mental and muscular coordination, aggressiveness, and courage."[28] His passion for sports in the military led him to implement lasting institutional reforms at USMA. A century onward, competitive sports constitute a core pillar of USMA's character and leader development program by providing a "higher purpose" that challenges cadets to realize their aptitude for leadership and prepare to win the Nation's wars as future Army officers.[29]

The Army's Approach to Athletics: MWR and WCAP

West Point and the wider Army separate athletics from physical fitness, utilizing mutually supporting but nevertheless different efforts. The Army's new Holistic Health and Fitness (H2F) Program forms the core doctrine of routine and periodic physical training that "combines the sciences of health and fitness with the art of coaching."[30] However, H2F lacks the dynamic nature and pressure unique to athletic competition that forges leadership while strengthening unit pride and cohesion. The Army's closest approximation to a universal unit sports program under an established training and competition structure is the Modern Army Combatives Program (MACP), a close quarter, hand-to-hand combat-oriented mixed martial art. While MACP promotes important skills such as personal courage, confidence, and resiliency, combatives do not sufficiently develop leadership skills or reliably build and maintain effective teams.[31] MACP and H2F inadequately meet the intent or purpose of competitive sports, leaving the Army's MWR and WCAP to fill the void.[32]

Sports under Army MWR oversight began in earnest in 1903, expanding gradually to encompass intramural to international competitions.[33] Army MWR offers a comprehensive, year-round Garrison Intramural Sports Program to cultivate teamwork skills, soldier readiness, military bearing, and the warrior spirit. MWR promotes familiar, safer sports maximizing group participation like flag football, basketball, soccer, softball, and volleyball.[34] The availability of sports reflects the installation athletic infrastructure, constituent unit training calendars, and soldier interest.

In 1973, MWR established the All-Army Trial Camp Support Activity to support higher-level competitions and better standardize regulation of apparel, play, and facilities.[35] The MWR's All-Army Sports Program organizes credentialed coaching staffs to select outstanding soldier-athletes for competition in interservice, national, and international

Table 2. Interservice/International Sporting Opportunities for Army Soldiers (as of May 2022)

INTERSERVICE/INTERNATIONAL SPORTING OPPORTUNITIES FOR ARMY SOLDIERS AS OF MAY 2022		
WCAP (12)	**ALL-ARMY (13)**	**CISM (6)**
Boxing	Boxing	Judo
Rugby Sevens	Rugby Sevens	Parachuting
Taekwondo	Taekwondo	Sailing
Wrestling	Wrestling	Skiing
Cycling	Basketball	Swimming/Lifesaving
Modern Pentathlon	Bowling	Modern Pentathlon
Shooting	Cross-Country	International Military Sports Council [CISM] opportunities are available to All-Army Sports competitors through Armed Forces Sports, which fields twenty-four programs.
Track Field	Golf	
Winter Sports	Marathon	
-Bobsled	Soccer	
-Nordic Combined	Softball	
-Luge	Triathlon	
-Skeleton	Indoor Volleyball	

(Table by author)

championships in conjunction with the Department of Defense's (DOD) Armed Forces Sports Program and the International Military Sports Council.[36] Conspicuously, MWR categorizes both intramurals and All-Army Sports under "recreation," highlighting the perception that team sports are an extracurricular or off-duty activity rather than representing a regular adult activity or an integrated command prerogative. This reflects a tendency from former collegiate athletes to shun participation in MWR sports unless command directed.[37]

While MWR opportunities offer short-term competitions for the general masses, a select few talented athletes can pursue permanent assignment to the Army's premier sports body: WCAP. Elite U.S. military sports programs began under federal law in 1948, allowing Armed Forces personnel to train for and attend international amateur sports events.[38] By 1997, MWR ultimately founded WCAP in Fort Carson, Colorado, near the U.S. Olympic team's headquarters and training center. WCAP could thereby serve as a well-resourced, full-time opportunity for soldiers to train for the highest levels of competition in up to forty different sports at Olympic facilities around the nation (see table 2).[39] WCAP athletes may spend years away from their military occupational specialty in pursuit of athletic success but with the intent to one day return to the operational force. WCAP athletes strive to balance basic Army requirements while conducting outreach opportunities for recruitment and strategic messaging.[40] Namely, the Total Soldier Enhancement Training (TSET) returns WCAP's talents to the larger Army through mobile training teams of WCAP soldier-athletes who lead tactical-level units through customized resilience and performance enhancement skills training.[41]

Other athletic opportunities exist for ROTC cadets who cannot participate in WCAP or MWR programs, though unlike USMA, they have negligible institutional oversight, nor do they possess a deliberate vision for leader development. The Army's Cadet Command has no prescribed approach toward athletics, yet some schools like the University of Southern California's Army ROTC adopt a scholar-athlete-leader slogan to harness the power of their robust sports programs.[42] Also, four of the six senior military colleges, the Citadel, Texas A&M, Virginia Military Institute, and Virginia Tech, support large cadet populations and share a leader-development structure like USMA's while competing in NCAA

Sgt. 1st Class Elizabeth Marks, a five-time paralympic medalist and multiple world record holder, prepares for the 2022 Para Swimming Nationals on 10 December 2022 in Colorado Springs, Colorado. Marks, an active-duty combat medic, is assigned to the World Class Athlete Program at Fort Carson, Colorado. (Photo by Staff Sgt. Michael Hunnisett, U.S. Army)

Division I.[43] The University of North Georgia participates in NCAA Division II and Norwich University plays in NCAA Division III. Although all six senior military colleges are analogous to USMA in their intercollegiate, club, and intramural athletic programs, the key difference is optional participation.

To Whom Much Is Given, Much Is Expected

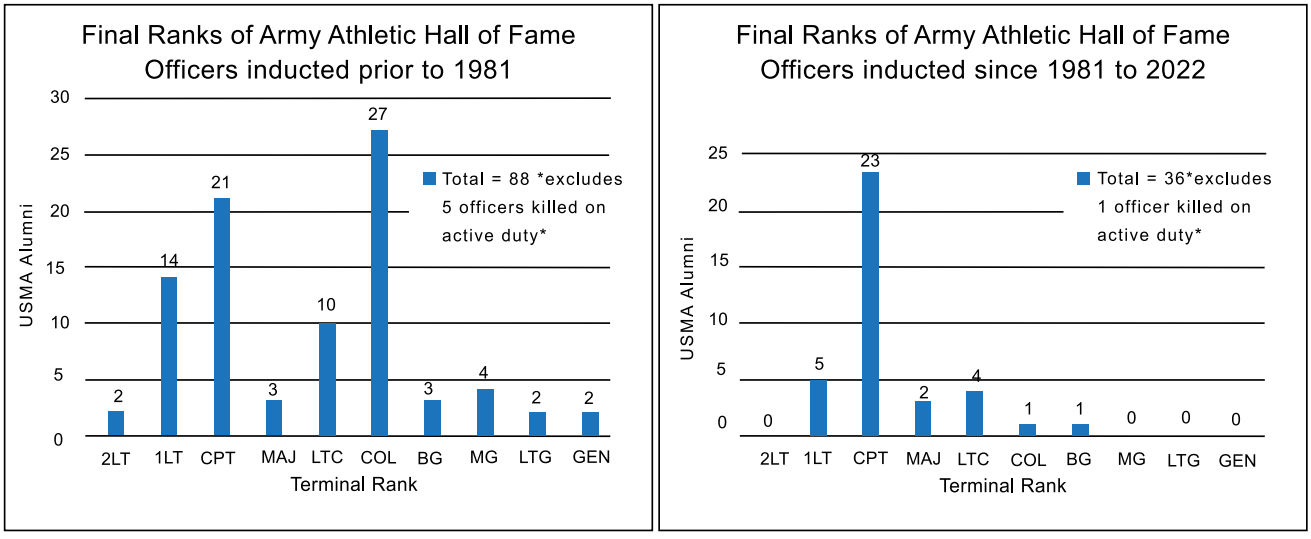
The Army's WCAP and All-Army Sports Program draw talent from USMA's graduates, and like ROTC, inspiration from USMA's successful athletic program. Nevertheless, the net benefits to the Army remain uncertain because the premium placed on athletic development often comes at the expense of other initiatives. Even at ROTC, which enjoys greater flexibility to tailor its military programs to their university curriculum, integrating athletics is equally daunting as most of its higher-performance athletes cannot balance the competing demands and scheduling conflicts of intercollegiate sports and military training.[44] USMA's athletic program elicits strong resentment among Academy faculty by consistently overriding the academic, military, and physical programs when competing over West Point's finite resources for cadet development.[45] The success of West Point football in the 1940s precipitated the Athletic Department's present hegemony, causing its unintentional divestment into "an institutional goal unto itself."[46] Further considering repeated instances of academic misconduct and notoriety for accommodating lower standards, athletics at USMA face intense scrutiny.[47]

The popularity or success of Army sports cannot mask that the return on investment remains speculative. For example, the Army West Point Athletic Association generates considerable revenue, totaling over $14 million in 2020.[48] This revenue stream is vital to West Point's margin of excellence in intercollegiate

1st Lt. Sarah Beard, a shooting soldier-athlete assigned to the World Class Athlete Program, takes aim during the 2022 Winter Airgun Championships, hosted by USA Shooting in Colorado Springs, Colorado, 11 December 2022. Beard won the gold medal at the championships and recently earned a spot on the U.S. team for the 2024 Olympic games. (Photo by Staff Sgt. Michael Hunnisett, U.S. Army)

athletics to sustain a competitive edge over NCAA opponents.[49] In comparison, the DOD's entire Armed Forces Sports Program cost ranged no more than $2.1 to $2.8 million in fiscal years 2014 through 2016.[50] Athletics aside, an officer commissioned through USMA costs the U.S. government between $400,000 and $600,000, an investment that is four times more per new officer than an ROTC scholarship student and eight times more than Officer Candidate School.[51] Therefore, a USMA cadet-athlete receives more financial investment in development toward commissioning than any prospective peers, hence intuitively the Army could expect more from former cadet-athletes. The efficacy of MWR's WCAP and All-Army Sports is no less ambiguous. In 2017, the U.S. Government Accountability Office found that regardless of DOD Armed Forces Sports' successes (championships, Olympians, records, etc.), there is insufficient evidence or linkage to achievement of its stated goals of readiness, recruitment, retention, or positive exposure.[52]

The time and effort required of a soldier or cadet for success in high-performance athletics precludes many other unique opportunities for career development. ROTC cadets struggle to manage time for intercollegiate athletics, whereas USMA's intercollegiate athletes struggle to accommodate time for cadet life. For example, USMA cadets participating in competitive athletics have up to three fewer hours per day dedicated to academics and military training, with weekday and weekend competitions replacing classroom instruction or field training.[53] WCAP navigates similar challenges to professional development since participants must reconcile annual military training requirements, certifications, and qualifications with athletic training schedules but without the added pressures of rigorous undergraduate coursework. Inadvertently, however, officers competing in WCAP potentially hinder their



(Figure by author)

Figure. Military Career Length of USMA Alumni Inducted into the Army Sports Hall of Fame for Exceptional Athletic Achievement as a Cadet

military careers, as Department of the Army Pamphlet 600-3, *Commissioned Officer Professional Development and Career Management*, does not recognize the assignment as a suggested broadening or developmental experience.[54] Both USMA and WCAP invest highly sought-after resources toward a small cohort of high-performance athletes, though USMA lacks WCAP's purposeful focus on returning its alumni and promulgating those skills developed through sports to the rest of the Army.

Recruiting versus Retention: A Battle of Purpose

MWR and WCAP's core purpose is support of the warfighter and the Army's mission. Have USMA's sports lost sight of their intended purpose? Football happens to be the most prominent example illustrating the aberrant culture of athletics that starkly contrasts with the original goals of Academy athletics set forth by Koehler. When USMA's Army Athletic Association formed in 1903, they deliberately aimed to "encourage athletic sports throughout the Army," a position later advocated by MacArthur.[55] Yet by 2009, USMA's initial strategic vision for intercollegiate athletics mentioned nothing of supporting the greater Army.[56]

Retention trends for USMA's intercollegiate athletes after graduation expose a startling contradiction to West Point's mission that endeavors to transform cadets into commissioned leaders of character "prepared for a career of professional excellence and service to the Nation as an officer in the United States Army."[57] The Army categorizes officer career success as the attainment of the grade of lieutenant colonel, yet recruited athletes graduating from USMA have "less longevity and professional success than their nonathlete classmates."[58] Like WCAP, USMA's intercollegiate sports deliver invaluable but often intangible contributions to the Army such as national exposure, strategic messaging, or alternatively as an avenue to increase access to the Army for historically disadvantaged demographic groups.[59] USMA's main challenge is not athletics itself but rather the return on recruited athletes.

The Army qualifies itself as a profession like that of doctors or lawyers, yet few other professions would stand idly in the face of a hand-selected demographic producing a retention calamity.[60] Additionally worrisome, recruiting in NCAA Division I is often more important than development.[61] USMA recognized this facet of top-tier athletics when, in 1978, the superintendent approved a class-composition goal for recruited athletes. This change prevented a higher-quality candidate from another category, like leadership or scholarship, from supplanting an athlete during admissions by creating "blue-chip" recruits, many of whom

Spc. Benard Keter, a track-and-field soldier-athlete assigned to the World Class Athlete Program, competes in the men's 3,000 meter steeplechase at the 2022 USA Track and Field Outdoor Championships, held in Eugene, Oregon, 23–26 June 2022. Keter, a 2020 Olympian, qualified for the 2022 World Athletic Championships by placing third in the final race. (Photo by Sgt. Michael Hunnisett, U.S. Army)

attend the USMA Preparatory School to remediate their academic shortcomings.[62] Whereas MWR and WCAP sports recruit internally from the Army, meaning their athletes must be soldiers first and athletes second, USMA's sports teams recruit eligible civilians for their athletic talents with the caveat of military service. As a result, recruited athletes displaced superior-quality leader, scholar, and soldier applicants to West Point for several decades.[63] The figure (on page 140) illustrates an important ramification to retention linked to this class-composition change, which first took effect with the class of 1981.[64] This shift in recruitment priorities supports a general trend of shorter career service among USMA's athlete alumni, especially amongst the most talented and athletically accomplished. Just over half of the Army Athletic Hall of Fame USMA alumni inducted prior to 1981 served a full career, with multiple former exceptional athletes achieving the rank of general officer. However, since 1981, the number of Army Athletic Hall of Fame inductees serving a full career by attaining at least the rank of lieutenant colonel dropped to approximately one-fifth, with only one reaching general officer.

USMA's former superintendents justify admitting recruited athletes with lower demonstrated aptitude due to perceived institutional gains in strategic communications, admissions, and fundraising.[65] The role of Academy football in institutional objectives cannot be understated since its disproportionately large revenue makes it the linchpin of the USMA's athletic programs. Like most other schools in NCAA Division I, USMA football subsidizes a sizable portion of the expenses of the other sports teams.[66] Without football's profits, USMA's leader and character development through athletics would wither since low-revenue sports like wrestling or swimming would likely cease operations.[67] USMA football's pivotal institutional role and outsized emphasis neither

guarantee success as a cadet nor as an officer. Internal studies proved that "recruited football players are more than twice as likely to fail courses, more likely to leave the Army early and less likely to be promoted to higher ranks in the Army compared with their non-recruited counterparts."[68] Such low retention rates raise uncomfortable questions of the wellspring of Army sports, both in its investment into these future commissioned officers and to their commitment to a career of Army service. Operating a profitable athletic program in the short-term at the expense of leader development or long-term contributions to the larger Army mission threatens to undermine the considerable value sports brings to the Armed Forces.[69] The Army must find a way to exploit its leader-athletes' full capability and change the Army's sports culture.

Gen. George Patton represents the epitome of the lifetime soldier-athlete. He was a record-breaking track hurdler at USMA before the era of athletic recruitment, a 1912 Olympic pentathlete, a lifelong competitive polo player, and an extraordinarily successful Army field commander in World War II.[70] Other notable high-profile exceptions to USMA's poor retention trend among athletes attest to the promise of cadet-athletes, such as Brig. Gen. Pete Dawkins, PhD, the 1958 football team captain, Heisman Trophy winner, Cadet First Captain, and Rhodes Scholar; or Lt. Gen. Theodore Martin, the 1983 swim team captain and former Combined Arms Center commanding general; or Col. Ryan Worthan, the 1997 club rugby team captain and inaugural recipient of West Point's Nininger Award for valor.[71] Despite outstanding outliers, the problem remains that scholars and leaders are the USMA cohort most likely to serve long-term as a commissioned officers, not recruited athletes.[72] This implores urgent reevaluation of the Army's long-term plan to capitalize on the immense leader potential inherent within these high-performance athletes.

Inspired by Abrams: An Army Athletic Charter

Athletics are a proven approach to leader development, yet the Army's current system of athletics obfuscates its purpose and potential. Army MWR amply invests in sporting infrastructure, resourcing, and event scheduling yet the greatest value of Army sports requires maximum participation, starting with leader involvement. Given the abundance of resources devoted to USMA athletics, its officer-athlete graduates fall short of expectations as lifetime leader-athletes. Compared to West Point, ROTC's ability to develop leader talents through sports remains unexploited. If the Army wishes to retain high-performance athletics that consume precious resources for the benefits of an elite few, then the Army deserves more of a return on investment. An athletic charter could fulfill the responsibility expected of its athletes.

The Abrams Charter as it is typically understood is a posthumous synthesis of Abrams's 1974 order establishing the first modern Ranger battalion, together with the subsequent Wickham and Sullivan Charters. Each of these Army chiefs of staff articulated Abrams's vision that highly trained, elite, special operations Rangers would return to the rest of the Army to promulgate their stringent standards and values.[73] In the context of Army sports, the Abrams Charter readily serves as an effective template for leveraging the benefits from hyperspecialized training and resource intensive programs. His charter sought to ensure the professional stewardship of the Army by creating a positive feedback loop to progressively improve the quality of soldiers. In the spirit of Abrams's vision and in homage to the founder of Army sports, Koehler, the Army should adapt Abrams's vision to create the *Koehler Athletic Charter*:

> The Army's specially trained and elite athletes return their service as the preeminent leaders of the Army's operational forces. As coaches, captains, and leaders of garrison sports teams throughout the conventional Army, USMA's lifetime athletes, former intercollegiate athletes, All-Army Sports competitors, and WCAP high-performance athletes form the soldier, scholar, statesman, sportsman who is uniquely qualified to use competitive sports to impart their ethos and character to cultivate better leaders and build stronger teams.

Recommendations

Immediate implementation of the Koehler Athletic Charter is imperative considering the

implications of emerging trends in youth athletics involvement. New recruits may no longer be inclined toward unit athletics, as high school sport participation registered its first decline in thirty years.[74] Despite sports' social and health benefits throughout adulthood, intercollegiate athletics tends to be the culmination of an adult's competitive career.[75] Army MWR can bridge the benefits of elite athletes already serving in the Army while introducing sports to the uninitiated, but leader involvement predicates success to change the Army's athletic culture. Without command emphasis and leader involvement, soldiers will continue to perceive sports merely as a recreational pursuit. The following ten systemic solutions could readily support the Koehler Athletic Charter.

1. Active-duty service obligations. To systemically address the retention issue of USMA's intercollegiate athletes, the Army could amend Army Regulation 350-100, *Officer Active Duty Service Obligations* (ADSO), to require an extended service commitment for cadets delaying active-duty service to play professionally.[76] Though additional ADSOs invariably impact recruiting efforts, a more amenable alternative could be to require matriculating cadets earning a varsity letter to register as coaches with their first post MWR or local youth sports program to ensure a return on investment and reinforce the value of selfless service. WCAP requires one year of ADSO for every year of competition; however, both USMA and WCAP could increase the ADSO for recruited athletes to a duration commensurate with the DOD's expected long-term service goals.[77]

2. Regimental system of athletics. Army companies or battalions could reinstitutionalize sports teams within divisions or brigades to create a measurable and comparable competition structure. By adopting the British army's regimental system of athletics, units forge a deeper sense of unit loyalty and pride that encourages leaders to directly involve themselves in their command's sports teams.[78] MWR should support, not lead, unit sports.

3. Command-directed additional duties. Formalized additional duties for competitive athletics among regular Army units, in addition to those supporting H2F or MACP, could invigorate unit planning for and leader integration into MWR sports.

4. Military-specific sports training. Given the time constraints facing many operational units, commanders can use military-specific sports to reap the benefits of competitive athletics while simultaneously developing military skills. Operationally relevant sports include combat sports (boxing, judo, taekwondo, wrestling, etc.), military pentathlon, orienteering, parachuting, or shooting sports (biathlon, pistol, rifle, etc.).

5. Officer professional development. To reflect the importance of athletics, Department of Army Pamphlet 600-3, *Officer Professional Development and Career Management*, should also identify WCAP service as a developmental or broadening experience to support positive career progression.

6. Expanded TSET. USMA's intercollegiate athletes could develop outreach programs to emulate WCAP's TSET program to methodically spread the values and skills developed through high-performance athletics.

7. USMA reforms. West Point's strategic vision for intercollegiate athletics should specify a long-term goal of generating career officers from its athlete alumni to better realign with the Academy's mission. Similarly, USMA's office of admissions must ensure that recruitment and retention of athletes share a common long-term vision.

8. ROTC. Senior military colleges and ROTC programs with robust intercollegiate athletic programs should mirror USMA's "every cadet an athlete" approach to the greatest extent possible to complement leadership and fitness development.

9. All-Army Sports and WCAP. MWR should apply the GAO recommendations for the DOD's Armed Forces Sports Program to develop and implement performance measures "that, at a minimum, demonstrate linkage to the program's goals or mission, have a measurable target, and include a baseline that can be used to demonstrate program performance."[79] This can systemically and quantifiably ensure that the purpose and outcomes of Army sports programs align.

10. Scholar-Athlete Intelligence and Leadership Program. Senior Pentagon officials are considering adopting Scholar-Athlete Intelligence and Leadership Program (SAIL-P), a recruitment and retention initiative to fund college athletic scholarships in exchange for mandatory

active-duty service after graduation.[80] By providing an avenue for non-ROTC intercollegiate athletes to nurture their innate talents to the benefit of the Armed Forces, the Army can absorb higher educated, high-performance soldiers. SAIL-P would increase prospective WCAP and All-Army applicants, contribute more non-Academy intercollegiate athletes to regular Army units, and potentially offset the deleterious effects of declining athletic participation among high school students.

Conclusion

Fundamentally, sports in the Army serve to improve the warfighter, whether through morale, fitness, the warrior ethos, esprit de corps, or most usefully, leadership. Harnessing the full potential of competitive athletics will develop better Army leaders and build stronger teams. Yet the Army's current culture of athletics is awry. Change needs to begin at the wellspring of Army sports, USMA, which must reevaluate the direction of its intercollegiate athletics program to realign with the foresight of Koehler and MacArthur to cement character and leader development of the future career Army officer as athletics' core purpose. The Army can then leverage its existing MWR structure to prioritize leader involvement in unit athletics and capitalize on the high-performance athletes abundant in the Army's ranks.

To further develop superior leadership skills and return invaluable warrior standards and ideals to the Army, the Army ought to combine MacArthur's Academy vision for sports with Abrams's strategic vision for elite Ranger formations. MacArthur sought universal cadet participation in competitive athletics to develop character, fitness, and grit. Abrams created world-class fighting units through high-performance training that would promulgate its benefits throughout the rest of the Army when Rangers returned to serve amongst their conventional counterparts. Merging these two generals' ideas creates the Koehler Athletic Charter, which will reform the Army's sports culture to ensure the fields of friendly strife continue to build better leaders ready to support the Army's mission to fight and win our Nation's wars. ■

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59. Kamarck and Kaileh, "Defense Primer: Military Service Academies."

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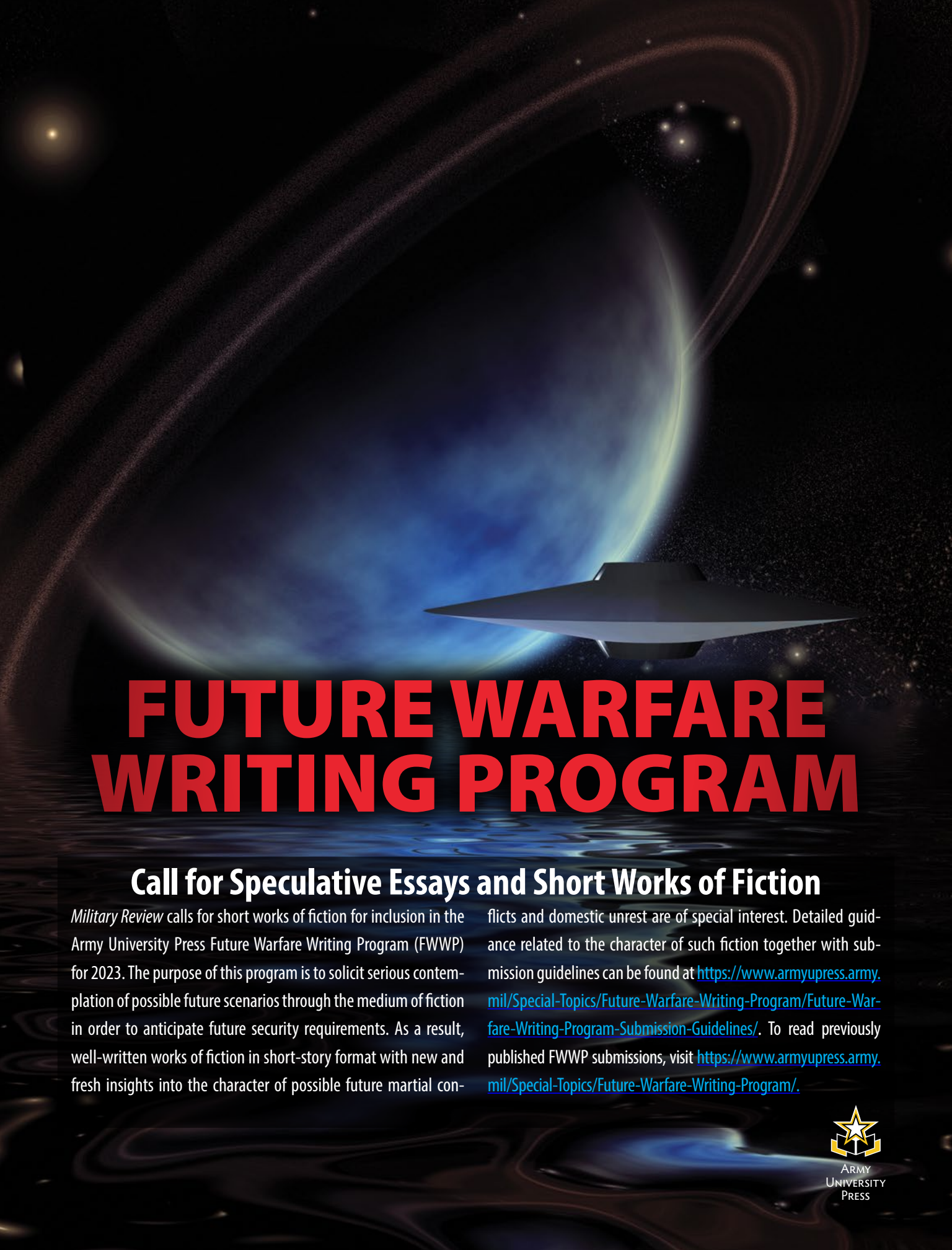

FUTURE WARFARE WRITING PROGRAM

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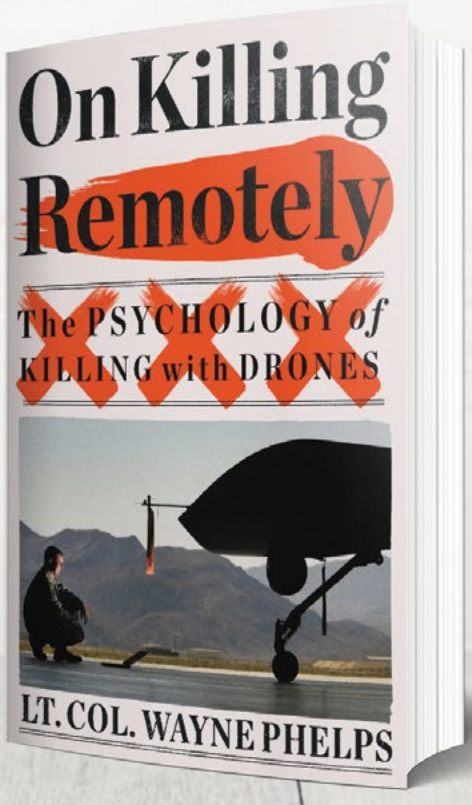
Army University Press

On Killing Remotely

The Psychology of Killing with Drones

Wayne Phelps, Little, Brown, New York, 2021, 368 pages



Chaplain (Capt.) Caleb J. Miller, U.S. Army,
Joint Expeditionary Base Little Creek–Fort Story, Virginia

The strength of *On Killing Remotely: The Psychology of Killing with Drones*, evident from the first few pages onward, is its accessibility. Lt. Col. Wayne Phelps, a retired Marine squadron commander, draws on his experience and research to offer a wealth of background information, analysis, and best practices concerning remotely piloted aircraft (RPAs). Phelps provides an overview that is sufficiently detailed to hold the attention of those who already know the ins and outs of remote warfare without overwhelming a nonexpert reader. Any pilot, sensor operator, or analyst can read *On Killing Remotely* to make better sense of his or her own experience or the experiences of others in the field, but any novice can pick the book up to fill in gaps in their understanding.

The author does not merely rehash data or feign neutrality, nor does he shy away from the difficult subjects. He regularly and seamlessly weaves testimony from personal interviews into analysis and does not promise more than he can deliver. Most importantly, he challenges those at the joint and strategic levels to reassess the cost of remote warfare beyond dollars and cents or the risk of error.

Phelps presents findings from surveys and interviews identifying how and why killing remotely affects pilots, sensor operators, and intelligence analysts across the U.S. military. The result is a melding and expansion of themes from Dave Grossman's *On Killing* (2009), David Sanger's *Confront and Conceal* (2012), and Thomas Waldman's *Vicarious Warfare* (2021): the utilization of RPAs has skyrocketed, yet the emotional and psychological toll on those tasked with carrying out the missions has been weighty.[1] *On Killing Remotely* is divided into four sections, corresponding to Phelps's stated intention to raise awareness by dispelling myths, identifying specific physiological and psychological effects of killing remotely on a team, exploring moral considerations of utilizing remote technology in wartime, and offering recommendations to mitigate damage to RPA crews of the future.

Section I is devoted to understanding remotely piloted aircraft and the crews who operate them. Here Phelps helpfully distinguishes between five groups of unmanned aircraft systems, noting that the physiology and psychology at play will change based on proximity

to targets, nature of the mission, and the ability of operators to effectively debrief.[2] Phelps underscores that the work of an RPA crew is often voyeuristic, dull, and at times harrowing, and not at all like playing a video game.[3] The book highlights ways RPA crews have felt marginalized or misunderstood not only in media portrayals but also in the context of joint operations. Ambivalence toward RPA crews materializes in pejorative language ("drones," "chair force," "not a real pilot," etc.), general ignorance of what RPA crews do, and in the heat of joint missions, frustration and anger.[4] There is a fine line between friendly rivalry and backhanded or overt hostility, as service members in one branch or on one team may perceive that life for others is not as difficult or that sacrifices are not evenly distributed.

Phelps then documents human responses to killing at a remote distance. Though it may seem counterintuitive to novices, he conveys particular concern for those operating at maximum distance.[5] He notes two especially taxing mission sets: providing close air support for troops-in-contact and hunting for high-value individuals.[6] Psychological dynamics depend on proximity to the target and nature of missions, but RPA crews of all types report physiological effects (adrenaline rush, cold or shaky hands, vomiting, sweating, and altered memory) comparable to those associated with face-to-face shooting.[7] These operators make collective decisions rather than acting alone, and transition on a daily basis back and forth from remote combat to home life in what amounts to a "never-ending deployment."[8]

Section III, titled "All Topics Considered," delves into ethical considerations of remote warfare, raising more questions than it answers. Phelps's assertion that operators have been the ones most aggrieved should be adjusted to factor in the price paid by those targeted in error, and their families, as more than "collateral damage."[9] Even so, Phelps argues emphatically that RPA crews are not given license to kill with impunity via remote-controlled assassinations; these pilots, sensor operators, and analysts are at war.[10] Interviews with RPA crews tell the nuanced stories; operators are divided on the question of whether remote technology has changed the nature of war itself, or simply altered its characteristics, though RPAs cannot achieve decisive victory all by themselves.[11]

Another burning issue touched on in this section is the opportunity for moral injury. The crew of an RPA is at all times under intense scrutiny by "customers" and higher headquarters. This scrutiny, heightened by the group dynamic of a crew, makes killing simultaneously more justifiable in the moment yet more complicated in the aftermath. Culpability seems fluid and transferrable. It is not easy to determine who is making the decisions or who might be to blame if things go wrong.

In the final section, Phelps makes straightforward recommendations for improving systems for RPA crews across the Marine Corps, Air Force, and Army—noting the ways each branch might learn from one another. The Army, for instance, stands out as the branch recruiting junior enlisted soldiers and providing very little prior discussion of executing lethal missions in training before the real-world events.[12] Yet the Army also stands out as the branch that makes a practice of forward deploying their operators to mitigate against a feeling of never-ending deployment.[13]

Phelps's work is prescient and clear in the wake of the war in Afghanistan, and haunting in the shadow of Russia's invasion of Ukraine and increased competition with China. Speaking for a moment as a chaplain, Army chaplains and religious affairs specialists or NCOs assigned to aviation, special operations, or military intelligence units now have an invaluable primer available to them in this book. *On Killing Remotely* provides prompting questions, language, and a structure for both informal conversation and formal pre-deployment training or post-deployment debriefing. Unit ministry team members in other units dealing with killing at a distance or its aftermath (artillery, snipers, mortuary affairs) can no doubt glean insights as well, though these insights will require tailoring to another context. In their mission to nurture the living and care for the wounded, command teams and unit ministry teams can leverage Phelps's book to lead the way to meet this challenge.

Phelps challenges readers—regardless of

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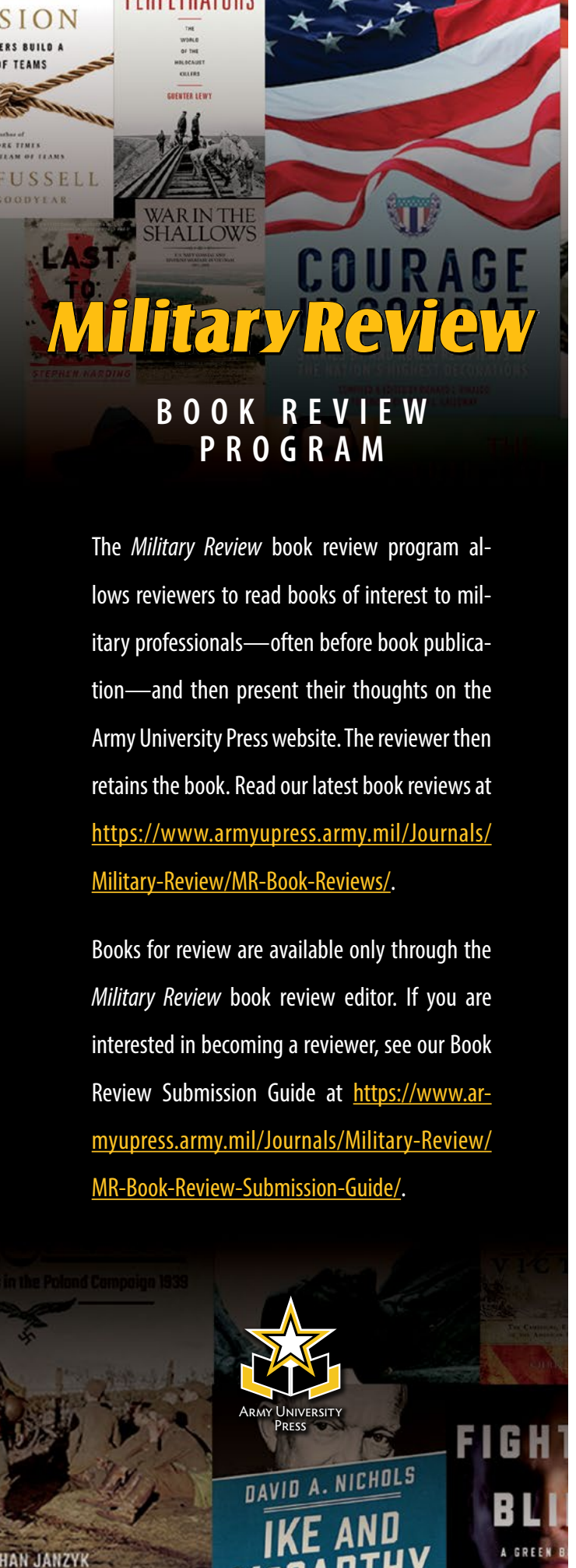

The *Military Review* book review program allows reviewers to read books of interest to military professionals—often before book publication—and then present their thoughts on the Army University Press website. The reviewer then retains the book. Read our latest book reviews at https://www.armyupress.army.mil/Journals/Military-Review/MR-Book-Reviews/.

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branch of service—not to neglect RPA crew members as a growing subset of the veteran population nor to oversimplify their unique experiences, and this challenge will surely endure well into the advent of artificial intelligence, robotics, cyberwarfare, and the domain of space. Pushing buttons half a world away may not be like shooting a rifle, launching a rocket, or firing field artillery. If Phelps is correct, however, technologically assisted warfare on the horizon will still be psychologically costly and may involve smaller and smaller groups tasked with bearing the ever-steeper emotional, relational, moral, legal, psychological, and spiritual burdens of killing at a distance. Are we ready for that? ■

This review essay reflects the author's own views and not necessarily the official position of the U.S. Army Chaplain Corps or the Department of Defense.

Notes

1. Dave Grossman, *On Killing: The Psychological Cost of Learning to Kill in War and Society* (New York: Back Bay Books, 2009); David Sanger, *Confront and Conceal: Obama's Secret Wars and Surprising Use of American Power* (New York: Crown, 2012); Thomas Waldman, *Vicarious Warfare: American Strategy and the Illusion of War on the Cheap* (Bristol, UK: Policy Press, 2021).
2. Wayne Phelps, *On Killing Remotely* (New York: Little, Brown, 2021): 60–67.
3. Wayne Phelps, "The Psychic Toll of Killing with Drones," *Wall Street Journal* (website), 5 June 2021, accessed 7 February 2023, https://www.wsj.com/articles/the-psychic-toll-of-killing-with-drones-11622865660.
4. Phelps describes the tension involved in providing close air support in a joint environment: "As would be expected, when you arrive on the scene in this situation, the friendly forces being shot at by the enemy express a wide array of emotions over the radio such as fear, anger, frustration, and impatience that can be felt and understood on the other end of the radio regardless of which crew position you occupy. Often troops' lives depend on the integration and assistance of the RPA called to help them fight through the dangerous situation they are in. And you can hear the stress in their voice." Phelps, *On Killing Remotely*, 73.
5. Ibid., 36–48.
6. Ibid., 72–75.
7. Ibid., 63, 133–34.
8. Ibid., 102.
9. Ibid., 180.
10. Ibid., 152.
11. Since the publication of Phelps' recommendations in 2021, this is changing through the collaboration of commanders, behavioral health teams, and chaplains.
12. Ibid., 153–55, 161.
13. Ibid., 52, 307.

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I Miss You by Mariana Nieto

Every happy moment is finite,
Protected in amber.
Fleeting, slipping through slender fingers like sand.

I miss you.
Even though you're right in front of me,
I miss you.

I know you're still here,
But in your eyes, I can see how sad you are.
I can see how disturbed you've been.

I miss you.
I miss when your random "I love you" texts don't sound alarms.
I miss you.

All the pill bottles in your house have been purged or locked up.
Every couple months you go on week-long "vacations."
The hospital knows your name.

I miss you.
I miss before your life became a big secret to everyone around you.
I miss you.

I hate to see you cry in my arms,
Your fingers laced in mine.
I hope my comfort is enough for now.

I miss you.
I miss before I had to count you as the reason for my hard week.
I miss you.

And the only pills in the house are your medications.
Every time you try to leave, you throw your friends, family, to the wind.
You leave for a trip to the unknown, but they always return you.
There's a reason.

I miss you.
I miss you before all the cuts were visible through your ripped jeans.
I miss you.

And I love you.
If only you could know how many other people do.
Maybe it would save you one more time.

I miss you.
I miss you before you were taking weekly trips to the school counselor.
I miss you.

And although your life is like a dog without a bone,
And the only thing you can find comfort in is drugs and your own mental illness,
I'm here for you.

I miss you.
I miss you before you told me that you coped by turning your arm into meatloaf.
I miss you.

And I know I should know how to help you,
But you're so far deep that when I reach in to help you,
You slip away from my grasp like a bar of soap.

I miss you.
I missed you before I wrote this poem, when you didn't become another statistic.
I miss you.

And although you're not gone, I must prepare for when you leave.
Your parents don't know what to do.
And all the other kids think you're another sad story.

But your story matters, and when you won't be there to tell it, I will.
I'll always be there for you.
I miss you.

Mariana Nieto is a seventh grade student; she has grown up in a military family spending several years abroad. Her goal is to use her talents and life experiences to help those struggling with depression. She seeks to spread hope through poetry.

Medal of Honor

Col. Paris D. Davis

Col. Paris D. Davis was awarded the Medal of Honor by President Joseph Biden in a 3 March 2023 White House ceremony for his actions in 1965 as a Special Forces captain in Binh Dinh Province, South Vietnam.

In his remarks, Biden said of Davis, "You are everything our nation is at our best: brave and big hearted, determined and devoted, selfless and steadfast. American. American."

On 18 June 1965, Davis and three other Special Forces soldiers led an inexperienced South Vietnamese company on a nighttime raid against a larger force, killing an estimated one hundred Viet Cong. Davis was wounded in the initial assault but continued to fight. The enemy then counterattacked, and he found himself engaged in what was to be a nineteen-hour battle. Davis was wounded several more times by small arms fire and grenade fragments during the fight but continued to engage the enemy directly with small arms and mortar fire, indirectly by calling in air and artillery fire, and at times, even in hand-to-hand combat. He personally rescued two seriously wounded soldiers and directed their medical evacuation. Davis refused medical care for his own wounds until the enemy force was destroyed and all his soldiers were evacuated.

President Joe Biden participates in the Medal of Honor ceremony for retired U.S. Army Col. Paris D. Davis, 3 March 2023, in the East Room of the White House. (Photo by Adam Schultz, White House)

The award was long overdue, presented nearly fifty-eight years later. Davis was originally awarded a Silver Star for his actions, but his commanding officer immediately submitted Davis for the Medal of Honor. However, that paperwork and a subsequent submission were both lost.

Davis was inducted into the Pentagon's Hall of Heroes on 6 March 2023. During that ceremony, Secretary of Defense Kathleen Hicks pointed out the overly long wait for the award. "Appropriate recognition should have come much sooner following the bravery you demonstrated and the sacrifices you made more than half century ago to save your fellow soldiers from certain death during the Vietnam War. Everyone in this auditorium can agree that this award, which you so richly deserve, has, in fact, been a long time coming."

Davis was one of the first African American officers to serve in the U.S. Army Special Forces.

For more on Davis's award, see the U.S. Army's Medal of Honor website at https://www.army.mil/medalofhonor/davis/. ■