

A full-page photograph of a soldier in camouflage uniform reaching up with his right hand towards a drone hovering above him. The soldier is looking up at the drone with a focused expression. The drone is illuminated from below, casting a glow on the soldier's hand and face. The background is dark and indistinct.

JFQ

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From Data to Victory

Thinking Beyond the Battlefield

Mission Over Bureaucracy

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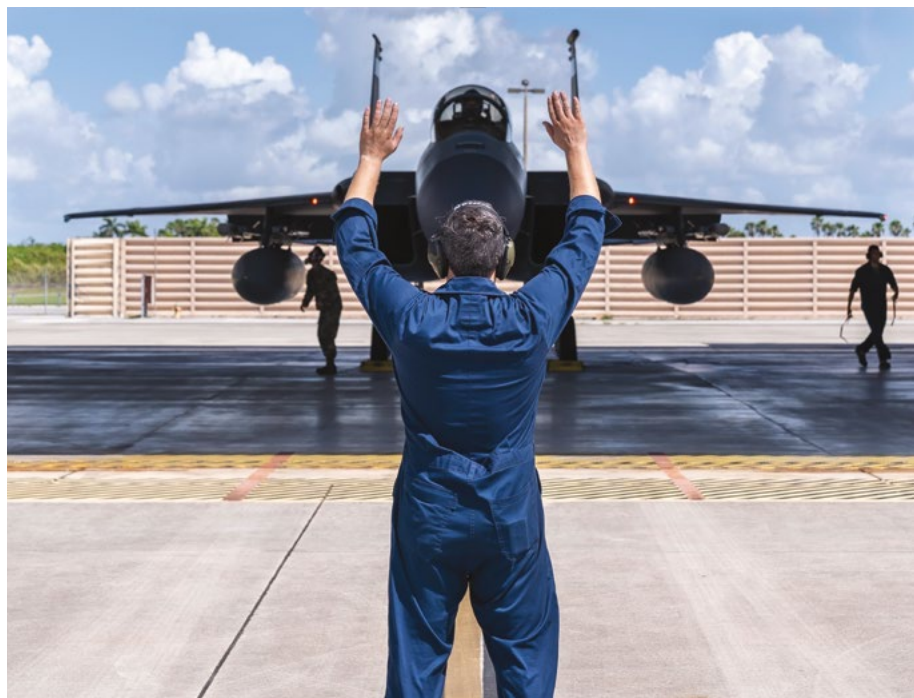
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Cover 2 images (top to bottom): U.S. East Coast-based Naval Special Warfare Operators (SEALs) conduct Maritime Interdiction Operation training aboard the *Blue Ridge*-class command and control ship *USS Mount Whitney* (LCC 20) in the Atlantic Ocean, May 20, 2026 (U.S. Navy/Chad M. Butler); Staff Sergeant Andrew Doane, Florida Air National Guard's 125th Fighter Wing, Detachment 1, Weapons Loader, communicates with hand signals to a pilot while crew chiefs perform a pre-flight checklist on an F-15C before taking off at Homestead Air Reserve Base, Florida, in support of North American Aerospace Defense Command's (NORAD) Operation *Noble Defender* (OND), June 30, 2022 (U.S. Air Force/Lionel Castellano); the U.S. Air Force Air Demonstration Squadron Thunderbirds perform a Delta maneuver during the 2011 Aviation Nation November 12, at Nellis Air Force Base, Nevada (Kevin Gruenwald)



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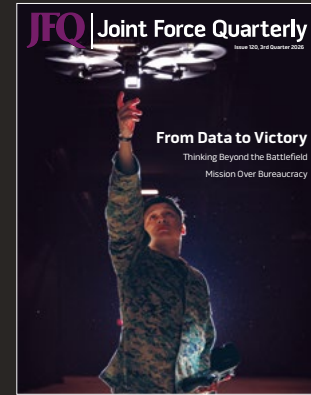
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About the Cover

Cover 1 image: Lance Corporal Giancarlos Maldonado, a native of Pennsylvania, and a drone operator with Headquarters Company, 6th Marine Regiment, 2nd Marine Division, poses for a portrait with a Skydio X2D on Marine Corps Base Camp Lejeune, North Carolina, Nov. 21, 2025. Drone operators showcased Small Unmanned Aircraft Systems capabilities to 6th Regiment leadership and staff to provide an understanding for first person view operations and tactics.

(U.S. Marine Corps/Armando Elizalde and Judith Ann Lazaro)

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The Logic of America's Defense Strategy

By Elbridge A. Colby

Secretary Hegseth has rightly tasked the nation's military to refocus on its core and most essential function—fighting and winning our nation's wars. This is the heart of his direction for restoring the warfighting ethos, and it carries important implications for institutions like the National War College.

In these halls, America's military officers and civilian officials have an opportunity—and indeed an obligation—to step back and think seriously about how we apply military power in defense of Americans' concrete, practical interests. Put another way: to think in rigorous and realistic terms about how to prepare for and fight our nation's wars in ways that make sense for ordinary Americans.

That responsibility has always been important. But it is probably more pressing now than at any point since the height of the Cold War, because we once again find ourselves grappling with major power rivalry under the nuclear shadow.

This has been some time coming, of course.

The Strategic Context for America's Defense Strategy

As President Trump's 2018 National Defense Strategy recognized, "Today, we are emerging from a period of strategic atrophy. . . . Interstate strategic competition, not terrorism, is now the primary concern in U.S. national security." That assessment reflected underlying structural trends in the international system that

were already apparent then and have only become clearer since.

For roughly a generation after the Cold War, the United States enjoyed a level of geopolitical and military predominance unprecedented in modern history. Americans became accustomed to thinking of military power as effectively unconstrained. We assumed escalation dominance and outright military superiority, and many believed achieving desired political outcomes was simply a matter of applying sufficient resolve to exercise our overwhelming military strength.

The era in which such assumptions possessed credibility has, however, passed.

The United States remains the world's strongest state. But it is also true that we now inhabit a world characterized once again by major power rivalry, real military competition, and genuine strategic constraints.

For those of you in this audience, these are not merely theoretical considerations. They are practical questions with which uniformed and civilian leaders in the Department of War must seriously grapple. Of course, it is our elected leaders who ultimately decide whether and how to apply force in defense of our nation's interests. Yet it is our collective responsibility within the Department of War to provide them with the best strategic and military counsel as they make those decisions.

That is why institutions like the National War College are so important. It is here that those entrusted with defending our nation are able to work through these problems in a rigorous fashion. As you do, it is essential to think realistically, to draw carefully on history, to dispense with shibboleths that

no longer make sense, and above all to ensure that our military strategy—the way in which our nation prepares for and determines whether to wage war—keeps the costs and risks we ask Americans to bear in rational correlation to their concrete interests.

The Defining Military-Strategic Challenge

This is not as straightforward as it may have seemed 20 years ago, when the United States possessed unchallenged military predominance. Today, the defining military-strategic challenge of our era is far more difficult: How to defend important—indeed, potentially very important—but nevertheless not existential interests against nuclear-armed major powers.

Addressing this problem is core to the 2026 National Defense Strategy. Within the broader defense strategy it sets out, the NDS establishes the framework for America's military strategy—the specific way the joint force is expected to fight a war—that the Department should adopt. But, while it defines the problem and provides a framework for that military strategy, it leaves substantial scope for the Department—and especially uniformed officers like you here—to develop and realize what exactly that entails. This is the great task I would like to inspire you and your colleagues to work on.

And solving this is no simple matter.

Under the conditions we face, our military strategy cannot sensibly be based on aspirations for total victory, unconditional surrender, or the comprehensive destruction of the opposing state.

Nor can it rest on the assumption that the balance of resolve will necessarily favor the United States. Indeed, in many

Elbridge A. Colby is Under Secretary of War for Policy. He delivered this speech at the National Defense University's National War College on May 19, 2026.

plausible contingencies, the opposite may be true.

This is because, especially in conflicts fought close to the adversary's territory and far from our own, the opponent may perceive the stakes as more immediate, more proximate, and more directly connected to prestige, legitimacy, security, and political survival than Americans do.

This creates the central strategic problem our military strategy must solve: How can the United States effectively defend critical interests against strong and resolute major power adversaries while maintaining the costs and risks for Americans at levels rationally proportionate to their interests at stake?

This criterion must be our lodestar in approaching the problem.

That is, the military strategy our nation adopts and prepares to employ must always remain correlated to the American people's interests in the issue at hand. To put it in straightforward terms, the conduct of war must not become detached from the concrete interests of the American people.

Rather, it is our obligation to ensure that the military strategy we prepare for our armed forces to put into action keeps the costs and risks of conflict in rational correlation to what Americans actually have at stake.

This is a fundamental deduction of republican government itself, reflected in the Preamble to the Constitution: that the activities of the state must fundamentally serve the common good. Asking Americans to bear costs and risks grossly disproportionate to their interests at stake in a war would violate the very logic of our republic.

To put it in another way, common sense and America First must apply not only in broad political terms, but also in the specific way our military prepares to fight and the costs and risks that way of war entails.

As President Trump's 2025 National Security Strategy puts it, "A strategy must evaluate, sort, and prioritize. . . . The purpose of foreign policy is the protection of core national interests; that is the sole focus of this strategy."

Accordingly, as the 2026 National Defense Strategy states, "this Strategy is defined by a realistic, practical approach to clearly understanding the threats Americans face and how realistically and pragmatically those threats can be addressed in ways consistent with American interests."

The Centrality of the Political for Ends, Ways, and Means

This approach reflects an essential strategic truth expressed succinctly by Clausewitz. He not only famously argued that war must serve political purposes, but even more importantly that "the political view must be the object, war the means, and the means must always include the object in their conception."

This insight must remain foundational for us.

Consequently, strategy cannot rationally be an abstract exercise in maximizing destruction. Nor can it be a test of national will detached from compelling political purpose.

Instead, the right strategy for our country requires the disciplined alignment of military ends, ways, and means—always retaining the political object firmly in view, not merely in terms of overall goals, but also in how the war is actually fought. In other words, strategy is not only about defining ends, but about ensuring the political object—the rational advancement of Americans' interests—is reflected also through the ways and means used by our armed forces to achieve those ends.

These considerations have always mattered. But in an era defined by major powers equipped with survivable nuclear arsenals, they become absolutely central.

In any context, if the costs and risks imposed by a strategy are grossly disproportionate to the interests at stake, that strategy is unlikely to succeed. Not only will it be unlikely to sustain Americans' support, but in any case it will not live up to the Constitution's admonition. Moreover, in the nuclear age, such an ill-suited strategy will court genuine catastrophe for our nation.

Aligning Military Strategy with the Political Goal and Tolerances

Yet let me stress that this is not an argument for passivity.

Nor can it be, if we are to defend Americans' interests properly.

This is because the United States possesses very important interests beyond mere survival. Most fundamentally, as the National Security Strategy and National Defense Strategy make clear, we have a compelling interest in preventing the emergence of concentrations of power so great that they could undermine the American way of life. As the National Security Strategy states, "The United States cannot allow any nation to become so dominant that it could threaten our interests. We will work with allies and partners to maintain global and regional balances of power to prevent the emergence of dominant adversaries."

Accordingly, we have a profound interest in maintaining favorable balances of power in the world's key regions, a point George Kennan made here at the National Defense University during his landmark lecture series at the dawn of the Cold War. And maintaining favorable balances of power requires coalitions of states sharing a common interest in preventing regional and by extension global domination.

By the same token, if the United States proves unable or unwilling to defend interests essential to sustaining such balances, then the geopolitical position upon which Americans' security, liberty, and prosperity depend will deteriorate, if not collapse.

The task of our military strategy, therefore, is to defend those interests by charting a course between passivity and recklessness. It is to calibrate the application of force, the acceptance of costs and risks, and the pursuit of compelling political objectives in a rational and proportionate way.

This may require restraint in some circumstances.

In others, however, it may require intense and sustained military action.

I stress this because I want to underline that the centrality of the political

object does not mean simply a brake on military force. To the contrary, in some circumstances it may require aggressiveness and an acceptance of great risk. The point is, however, that the military approach should follow from a clear and logical conception of the political goals and tolerances.

In all circumstances, your advice—as well as your expertise and your excellence in your profession of arms—will be essential to counseling senior civilian decisionmakers as they consider these most weighty of decisions.

The essential point is to apply our disciplined and rigorous judgment in the development of a coherent military strategy aligning the use of force with the level of cost and risk Americans can reasonably sustain.

Grappling with the Nuclear Shadow

This challenge of defining such a military strategy is especially difficult because conflict between nuclear-armed powers presents a fundamentally novel problem in human history.

In earlier eras, states could aspire to total military victory because defeated powers lacked the ability to impose catastrophic consequences upon the victor.

Today, however, survivable nuclear arsenals impose profound limits on what rational states can seek to achieve through military force.

This is because even a defeated nuclear-armed major power retains the capacity to inflict devastation on the putative winner. As President Kennedy memorably warned, such a war would leave ashes in the mouth of the victor.

But let there be no misunderstanding: nuclear weapons do not eliminate war, nor the need to wage it.

They do, however, make unlimited war among major powers extraordinarily dangerous and almost inherently irrational. Very few conceivable interests justify the costs of nuclear holocaust.

As was observed early in the nuclear age, the purpose of military power increasingly became to deter and thus avert major war among nuclear-armed states rather than solely preparing to win

it. Yet, at the same time, avoiding such a war requires a plausible and credible theory for how it would be fought if deterrence failed.

As President Kennedy observed, the paradox of the nuclear age is that we must guard against major war even as we manifestly and credibly prepare to fight one. As he put it in the context of the Cuban Missile Crisis, “We will not prematurely or unnecessarily risk the costs of a worldwide nuclear war in which even the fruits of victory would be ashes in our mouth—but neither shall we shrink from that risk any time it must be faced.”

Accordingly, the United States must retain the ability to use force—including force at very large scale—to defend Americans’ interests in the world. But we require a way to do so, including against the most formidable opponents, that limits the costs and risks to levels Americans can reasonably bear.

To borrow Henry Kissinger’s formulation, our task therefore is to find a rational military strategy somewhere between surrender and suicide.

As a result, the central military-strategic question in such a context becomes not how to destroy or subjugate a nuclear-armed major power opponent, but rather how to achieve Americans’ practical political objectives while maintaining costs and risks within acceptable bounds. This is the challenge of preparing for limited war under the nuclear shadow.

And our highest purpose is to deter such conflict from occurring in the first place by demonstrating both evident strength and a credible theory for employing it.

The Strategy’s Three-Part Framework

The 2026 National Defense Strategy provides a military-strategic framework for addressing this difficult problem. This framework is composed of three core elements.

The first element is denial defense—specifically, denying an opponent the ability to seize and hold the key territory of a U.S. ally or partner, thereby preventing them from acquiring the leverage necessary to subordinate that state and

overturn a favorable regional balance of power, in line with the National Security Strategy’s geopolitical guidance.

The second element is favorable escalation management—placing the burden of escalation, or the costs and risks of initiating escalation, on the opponent, keeping it there, and making it progressively heavier through sustained denial and selective, strategically rigorous cost imposition.

The third element is a binding strategy—structuring the conflict so that the opponent’s attempts to escalate out of frustration or failure strengthen coalition cohesion, deepen allied resolve, and reinforce the balancing coalition opposing aggression.

Together, these concepts form the framework for a military strategy with which the United States can preserve favorable balances of power even under the nuclear shadow—precisely in order to prevent having to employ this strategy at all because deterrence has worked.

I will address each component in turn.

Denial Defense

First: denial defense.

The purpose of denial is not conquest nor occupation nor the destruction of an opposing society.

It is something much more scoped, practical, and achievable: to make aggression fail.

As the National Defense Strategy states, “we will make clear that any attempt at aggression against U.S. interests will fail and is therefore not worth attempting in the first place. That is the essence of deterrence by denial.”

That formulation is critically important because it focuses attention not on abstract military supremacy but on the practical frustration of aggression. As Secretary Hegseth stated in his recent posture statement, our task is “ensuring none of our allies are vulnerable to sustained, successful military aggression. . . . This approach requires focus, prioritization, and clarity of purpose.”

To be clear, this approach differs fundamentally from its principal alternatives.

On the one hand, any attempt to conquer, dominate, or subjugate a nuclear-armed major power is unlikely to

succeed and would carry enormous catastrophic risks. A nuclear-armed adversary may well perceive such efforts as existential threats, and wreak the most grievous harm on Americans—for interests that are not existential for them.

On the other hand, strategies relying primarily on punishment or cost-imposition are also deeply problematic.

Such approaches often appear attractive because they promise asymmetric leverage at relatively low cost. But this is usually an illusion. In the first place, an imposition of cost does not prevent a resolute opponent from seizing territory, nor plausibly reverse it. But it can anger him, and nuclear-armed major powers possess substantial capacity to inflict pain on us as well. Thus our imposition of cost on the adversary invites him to respond by applying pain to Americans—and the more painful our application is, the more painful it is likely to be for our citizens. Moreover, even leaving aside the grievous costs such strategies are likely to entail, they are not likely to work, as competitions in pain tolerance frequently advantage the side perceiving the conflict as more vital, which is likely to be our opponent in such a struggle.

Thus a strategy relying primarily upon punishment risks imposing very high costs on Americans without providing a credible way to achieve our political objectives.

Denial defense provides a superior and credible alternative.

A denial defense focuses specifically on the military objectives necessary to achieve our political goals—no more and no less.

Operationally, this means frustrating the adversary's theory of victory, above all by denying the opponent the ability to seize and hold the key territory of a U.S. ally or partner, especially that which is material to upholding favorable regional balances of power.

This builds on the verity that most states do not willingly submit to conquest. Accordingly, partial coercive measures alone are unlikely to suffice to bring them to heel. Instead, to subordinate another state, an aggressor will generally need to seize and hold its key

territory. If the attacker can seize and hold that critical land, he is likely to be capable of generating sufficiently decisive leverage over the targeted state to get it to submit.

The purpose of denial is to prevent this outcome.

I would like to stress to this audience that, importantly, denial can operationally take many forms. Invading forces may be prevented from arriving. Lodgments may be contained and reduced. Logistics and sustainment may be disrupted until any remaining foothold collapses. There is wide and ample scope for different military approaches.

What matters for the overall strategy is the effect: that aggression fails to seize and hold the targeted state's key territory, and thus fails to secure the attacker decisive political leverage.

This is no easy feat, however. While a major power adversary is unlikely to seek unlimited war, given the risks and consequences, he is more likely to pursue a rapid and limited fait accompli strategy designed to achieve gains quickly while deterring effective response by implicitly or explicitly threatening escalation.

Such strategies seek to exploit asymmetries of time, geography, and resolve. Their objective is to present the United States and its coalition with a painful dilemma: escalate at great cost and risk to reverse the aggression, or acquiesce to a changed political reality.

A denial defense is specifically designed to defeat this logic.

Moreover, if a denial defense is successful and aggression fails, the political environment itself should increasingly shift against the aggressor. States that previously hesitated to balance become more willing to do so. Allies become more resolute. And the aggressor increasingly confronts not an isolated opponent but a broadening coalition. At the same time, he can accept defeat without compromising his own genuinely core and existential interests, such as national survival.

This is why denial is so strategically powerful.

If the aggressor fails to secure his objectives, then he confronts a very

difficult choice with a palatable alternative: accept tolerable failure, perhaps framed internally as some sort of success, or attempt to escalate his way out of frustration.

The burden of escalation now rests on his shoulders.

Favorable Escalation Management

This leads directly to the second core element of the strategy: favorable escalation management.

As Thomas Schelling famously argued, strategy under the nuclear shadow involves bargaining in war—violent bargaining, certainly, but bargaining nonetheless.

In practice, of course, escalation among nuclear powers is unlikely to unfold through neat or mechanical ladders. Rather, the limits of a conflict between two such states are likely to be changeable and actually subject to direct adaptation and influence. In other words, how a war is limited is itself subject to shaping. We saw this ourselves in Korea and Vietnam, and we now see it happening in Ukraine.

Thus the material question is whether those limits and the escalation dynamics they enable improve or worsen one's political position over the course of a conflict.

Accordingly, the objective of American military strategy in the case of a conflict with a nuclear-armed major power should not be some abstract escalation dominance, which is not realistically attainable at a credible level of cost and risk in such circumstances.

Rather, our goal should be favorable escalation management: in other words, structuring the limits and dynamics of the conflict so that our efforts are enabled and advantaged, while it is the opponent who bears the heavy and unpalatable burden of deciding whether and how to escalate out of that situation.

To be clear, this must practically begin with sustained and effective denial. So long as the aggressor cannot achieve his political objectives, it is he who must choose whether to accept failure or escalate further. It is he who will bear the burden of escalation.

Conversely, if denial fails, the burden of escalation shifts onto us. We would then confront the far more dangerous position of deciding whether to accept defeat or dangerously and unfavorably escalate to reverse it. That is a position we must strive never to place American leaders in.

Yet we must also reckon with the fact that even effective denial may not by itself compel conflict termination.

This is because a strong nuclear-armed opponent may continue fighting despite lacking any plausible path to succeeding in his military aggression. He will almost certainly have the ability to do so. The question is whether he will elect to.

In such circumstances, our political leaders may decide to let the conflict simply play out, without seeking to force an end to the war. But they also may look to us to provide military options to coerce the opponent to settle or terminate the conflict—coupled, of course, with diplomatic outreach and other instruments of national power.

In this context, selective and strategically disciplined cost-imposition becomes increasingly salient.

Here Schelling's insight that "the power to hurt is bargaining power" is very relevant.

Selective cost imposition, however, must reinforce, not undermine, denial of the original objective of the aggressor. It also must remain ever-conscious of the need to avoid catastrophic escalation, especially involving nuclear weapons at scale.

Thus its purpose is not settling scores or destruction for its own sake.

Its purpose, rather, must be coercive diplomacy: persuading the opponent that continued escalation will progressively worsen his strategic position while improving neither his military prospects nor his political leverage.

This requires strategic discipline. It is here that Clausewitz's admonition to keep the political object in mind is so important: The military options in this context must advance the political goal within the plausible constraints our political leaders will set. These

may be aggressive and painful or more restrained—but the options should be tailored to those political parameters.

If we can do this, even a major power nuclear-armed opponent will face the strongest set of incentives not only to conclude the conflict, but also do so in ways that limit the costs to regular Americans. This is the acme of success for our military strategy.

A Binding Strategy

Finally: a binding strategy.

As Secretary Hegseth wrote in his memorandum introducing the 2026 National Defense Strategy, the era of "cloud-castle abstraction" in American foreign and defense policy has passed. Accordingly, as the National Security Strategy sets out, American strategy must instead derive from a concrete, flexible realism characterized by strategic clarity and a focus on Americans' practical interests.

This logic applies directly and materially to our alliances and coalitions.

In line with those documents, the United States is not pursuing alliances as abstractions, ends in themselves, or moral ornaments. We are sustaining, adapting, and forming them because maintaining favorable balances of power in key regions is not feasible, sustainable, or fair for Americans to shoulder alone.

Fortunately, many of our allies and partners share our same interest in favorable balances of power for their own reasons. They too seek to prevent domination of the world's key regions by nuclear-armed major powers—an interest which is, naturally, usually far more direct and concrete for them.

This alignment of interest is sturdy ground for our own geopolitical and military efforts.

Potential conflicts will largely occur near allied territory, not our own. Allies and partners possess substantial capabilities, geographic advantages, access, basing, logistic support, and increasingly capable military forces of their own. Moreover, they have an exceptionally potent interest in building up their own defense capabilities to contribute to denial defense. It is this common sense

but neglected insight that has enabled so much progress over the last year with allies and partners dramatically increasing their efforts and spending on defense. The fact is that our allies can, should, and will do more for their own defense—we just had to act like it.

American strategy is accordingly focused on incentivizing, enabling, and leveraging these contributions. This is what the National Security Strategy and National Defense Strategy call for in encouraging much more effective burden-sharing with our allies and partners. This is all to the good.

At the military level, allied contributions can significantly strengthen denial while reducing the burdens placed upon our military forces, including in the context of potential simultaneity.

Moreover, our military strategy can and should specifically seek to strengthen our coalitions and their military efficacy. This is feasible because attempts at escalation by a nuclear-armed major power adversary can strengthen rather than fracture our coalition's will and cohesion.

This is the essence of a binding strategy.

The objective is to structure conditions such that aggression itself or an opponent's efforts to escalate out of frustration or failure bring additional states into closer alignment against him and deepen the resolve of those already committed.

In this way, the opponent's own escalation reinforces the balancing coalition necessary to sustain favorable regional balances of power.

A Decent Peace

Let me close by observing that the National Defense Strategy speaks of achieving a "decent peace."

That phrase is very important. It emphasizes that the purpose of American strategy is not confrontation for its own sake, nor military maximalism detached from political purpose. Our purpose is to preserve a favorable, reasonable peace in which Americans can live in security, liberty, and prosperity.

But such a decent peace does not generate itself.

It rests, rather, upon favorable balances of power, military strength, political resolve, and the credible capacity to fight and win the nation's wars. And that creates the central paradox of strategy in the nuclear age: preserving peace requires being prepared for war—but prepared for it in ways that are disciplined, proportionate, and strategically sound.

If we fail to prepare seriously, we invite aggression by convincing opponents that they might be able to use force successfully against our important interests at acceptable cost.

But if we prepare unwisely—if we adopt strategies detached from Americans' interests or that impose costs and risks on them that are grossly disproportionate to what is at stake—then we risk catastrophe.

The task, therefore, is to develop and be prepared to successfully and credibly apply a military strategy that navigates between passivity and recklessness, between suicide and surrender—a strategy of the greatest but also of disciplined strength.

Ensuring our nation is ready for this falls upon those entrusted with defending our nation. Preparing our armed forces to meet this standard will therefore depend on the expertise, judgment, and creativity of the rising generation of military and Department leaders—in other words, it depends on you and your colleagues.

Strategy is very important, but it is a framework, not a how-to guide. It will therefore fall to you to determine how to make denial work in practice; how to prepare to manage escalation under extraordinarily dangerous conditions; how to strengthen coalitions under severe pressure; and how to ensure that American military power remains firmly connected to the concrete interests of the American people.

That is a profound and grave responsibility. But it is also a noble one, in keeping with the highest traditions of our great and storied armed forces. JFQ



Col William T. Eliason, USAF (Ret.), PhD, editor in chief, NDU Press.

Executive Summary

This October marks the 40th anniversary of what is easily the most important reform of the U.S. military in modern times: the Goldwater–Nichols Department of Defense Reorganization Act of 1986. Signed into law by President Ronald Reagan, it “made the most sweeping changes to the United States Department of Defense since the department was established in the National Security Act of 1947 by reworking the command structure of the United States military. It increased the powers of the Chairman of the Joint Chiefs of Staff and implemented some of the suggestions from the

Packard Commission, commissioned by President Reagan in 1985.”¹ This law set in place the concept of jointness and a truly joint force, and it “streamlined the military chain of command” from the President through the Secretary of Defense—now the Secretary of War—“directly to the combatant commanders . . . , bypassing the [S]ervice chiefs.”² The solid bipartisan support for this law was the result of several years of debate both within the Department of Defense and on Capitol Hill.

As I mentioned in *Joint Force Quarterly* (JFQ) 72 after his passing,³ former Chairman of the Joint Chiefs of Staff General David C. Jones, U.S. Air

Force, became the champion for this change, particularly after he retired in 1982. A 1960 graduate of the National War College, which later became part of National Defense University (NDU), General Jones was hardly the obvious candidate for wanting the Services to work together operationally and leading the charge for jointness, as he would do at the end of his distinguished military career. Rising without a completed college degree, he had served as General Curtis LeMay’s chief of staff during the heyday of the Strategic Air Command. His National War College paper discussed the value of nuclear deterrence against the Soviet threat, but interestingly, about

a third of his essay focused on joint and combined warfighting.

Less than 2 years after General Jones became Chairman of the Joint Chiefs of Staff in June 1978, the United States failed in its April 1980 attempt to rescue U.S. hostages from Iran. This failure prompted many critiques of how the military was performing, especially when different Service formations were working in joint operations. Jones became most vocal for the need to reform in the months leading up to the end of his term in 1982. In an article in the commercial publication *Armed Forces Journal*, he offered several reforms that were opposed by several Service Chiefs as well as many leading defense voices at the time.⁴ Jones also gave an interview to the *New York Times* that further emphasized these arguments.⁵ He would continue his efforts working the Hill after he retired. These efforts led to Goldwater-Nichols in 1986, and the law would likely not have succeeded without him.

Goldwater-Nichols changed the command structure of the U.S. military—especially relationships among the Secretary, the Service Chiefs, the combatant commands, and the Joint Staff—and the way that processes like the development of major weapons systems are carried out. Multiple joint and combined operations and combat experiences over the last 40 years have been reviewed with this law as the background. Examples of both success and failure have occurred and remain hot topics for discussion in our war college classrooms, as well as in the defense establishment by proponents and critics alike. *JFQ* has always offered a place for these ideas to appear, including those of General Jones himself.⁶

The debate on the success or failure of the Goldwater-Nichols reforms continues. In the pages of this journal alone, these reforms have been a constant source of discussion and evaluation. During my tenure as editor in chief of *JFQ*, I have seen both sides of the debate and several valuable contributions that propose how the law might be improved.⁷ Recent discussions in the Pentagon have returned to familiar themes of previous reforms—reductions

in the number of generals and admirals (as the United States had proportionally fewer in World War II), fewer combatant commands to achieve more centralized control over larger portions of the globe, and fewer joint agencies to streamline the bureaucracy that proponents of these reductions believe is the source of lengthy timelines for everything from weapons procurement to deployments. A 2025 policy paper⁸ from the Mitchell Institute at the Air and Space Forces Association suggests a rebalancing of authorities back to favoring the Service Chiefs; the authors believe Goldwater-Nichols has proved detrimental to the Service Chiefs' ability to effectively organize, train, and equip their formations for deployment in joint operations as well as administer the acquisition arena. Recent moves by the Pentagon, particularly in the dismantling of the Joint Capabilities Integration and Development System, indicate movement in this direction. Reform discussions also center on joint personnel management.

But what matters most should be how well the joint force executes its missions in furtherance of U.S. national interests. The push for the original Act was clearly to address perceived inter-Service rivalry that led to operational failures and continual maneuvering of the Services to gain prominence in their respective mission sets. Recent combat experience must be viewed through the jointness lens to assess the wisdom of 1986 and what reforms might be needed. I would offer that you—the readers of *JFQ*—are best positioned to do some of the intellectual lifting needed, just as Colin Powell suggested in the first edition back in 1993.⁹ Effective reform needs champions and experts from the tactical line to the E-ring of the Pentagon and on Capitol Hill. Where do you see the future of jointness headed? When you believe you have a good sight picture, send us your best shot. All we can offer is a thorough and lively debate in these pages, as Powell suggested.

This issue's Forum offers you three valuable and weighty articles on cyber, ethics in warfighting, and operational art that I am sure you will find interesting

and useful. *JFQ* alumna Emily Goldman and Robert Grossman make the case for the effective use of data analysis to achieve superiority in joint warfighting. Adding to his tremendous contributions to the study of the operational level of war, U.S. Naval War College Professor Milan Vego brings us his latest thoughts on how to develop operational warfighting objectives. Updating his National War College monograph that NDU Press published a decade ago,¹⁰ Professor Emeritus Mark Clodfelter writes about a clash of personalities at the highest levels during the Vietnam War. His research shows that this clash improperly resulted in the demotion and retirement of a four-star general, which many of a certain age will remember as a case study in ethical conduct at Air University's colleges. History rarely stands still, it seems, with a requirement for constant reevaluation of facts that come to light even decades after the events.

JPME Today has two excellent pieces that focus on how we think about the issues of joint warfighting, strategy development, and the role that joint professional military education (JPME) plays in each. From NDU's Eisenhower School, James Davitch writes about how we can best prepare our warriors for defending in the battlespace of the mind. A team of current and former U.S. Naval War College faculty—Joseph Gagliano, Derek Reveron, Nikolas Gvosdev, Rebecca Russo, and Dana Struckman—discusses how JPME helps develop strategists who can best meet the threats of the future.

Our authors in this issue's Commentary focus on innovations needed to improve our Nation's operational effectiveness at war by changing how we sustain the warfight and how we command and control our forces as they fight. Starting with the warrior, Robert D. Seader—a recent graduate of NDU's Eisenhower School—discusses U.S. Special Operations Command's system of agile acquisition for the battlefield as a model with applications for the Services. With a case study focused on defending the Arctic airspace, Jeffrey Kempff suggests the best way to consolidate

several operations under a single joint commander. To close, Alexis Johnson—another recent Eisenhower School graduate—offers her views on how best to reform defense industry mobilization and sustain the support portion of our weapon systems through a Civil Reserve Sustainment Readiness Program.

In the Features section, you will find two interesting articles on medical issues. A growing number of authors from the medical community have been submitting manuscripts to *JFQ* and having substantial success, and this issue is no exception. First, Michael Ackman and Jon Fowler offer their recommendations on how to improve medical logistics in support of joint warfighting. In what has to be a first anywhere, Andrew Hall, Michael Carrillo, Garrison Jackson, Jennifer H. Hall, and Ryan Comes discuss how to leverage artificial intelligence for optimizing blood acquisition and distribution in combat environments.

Along with three important book reviews, our Recall section closes out this issue with a very interesting look by Justin Blanton on how the USS *Kitty Hawk* was used as a forward staging base in the opening of the war in Afghanistan.

As this will be my last edition of *JFQ* after nearly 16 years as its editor in chief, I wanted to thank everyone involved with the production of the Chairman's journal over the last 60 issues. First, to former NDU President Vice Admiral (Ret.) Ann Rondeau and my first civilian boss, Dr. Hans Binnendijk, thank you for giving me this great job and convincing me I was the right person for it. The admiral would have six successors who supported our mission. Hans would have seven successors—including Dr. Denise Natali, who holds the record for being my civilian supervisor (twice!)—all of whom continued his faith in my leadership and judgment; thank you all. To the writers and reviewers of the nearly 2,000 submissions we have received since fall 2010 when I signed in, thank you for your contributions to the Chairman's journal. To NDU Press's publishing partner, the Creative Services Division of the U.S. Government Publishing Office,

thank you for the artistic wonder you have given us over the years.

Finally, I cannot overstate my gratitude and love for my teammates at NDU in all of its schools and components and among headquarters staff. As I complete more than 20 years here with NDU—first at the Joint Forces Staff College in Norfolk in my final military assignment and then here in DC—I have been honored to meet the top leaders of our military, to serve with the great people who make JPME the wonder it is, and to teach and mentor many of NDU's students who have taken or will take the reins of senior leadership while carrying the best of the tools we tried to give them for their careers ahead. What a gift these two decades have been.

To my NDU Press crewmates of the past—in order of service time with me, Jeff Smotherman, John Church, Joanna (Joey) Seich, Jim Peters, George Maerz, Cal Kelley, Lisa Yambrick, Andrea Connell, Tara Parekh, Frank Hoffman, Sarah Frank, Erin Sindle, Jack Godwin, Patricia Strait, and Tom Lynch—you all set me up for success in this effort and sustained me through good times and bad. Finally, to my current crew—Christine Moritz, Latosha Adams, Laurie Morrissey, and Jaime Gosnell—thank you for listening to all my stories and for your continued service to the best journal of its kind in the world. Good luck, success in all you do, and keep thinking joint! **JFQ**

— William T. Eliason, *Editor in Chief*

Notes

¹ GovTrack.us, "H.R. 3622 (99th): Goldwater–Nichols Department of Defense Reorganization Act of 1986," GovTrack.us, last updated November 11, 2018, <https://www.govtrack.us/congress/bills/99/hr3622/summary>.

² GovTrack.us, "H.R. 3622 (99th)."

³ William T. Eliason, "In Memoriam: David C. Jones," *Joint Force Quarterly* 72 (1st Quarter 2024), <https://ndupress.ndu.edu/Joint-Force-Quarterly/Joint-Force-Quarterly-72/Article/577471/in-memoriam/>.

⁴ David C. Jones, "Why the Joint Chiefs of Staff Must Change," *Armed Forces Journal*, March 1982. This *Armed Forces Journal* article was republished from *Directors and Boards*,

February 1982; see David C. Jones, interview by Alfred Goldberg and Maurice Matloff, October 21, 1987, 25, https://history.defense.gov/Portals/70/Documents/oral_history/OH_Trans_JONESDavid%2010-21-87.pdf; David C. Jones, "Why the Joint Chiefs of Staff Must Change," *Presidential Studies Quarterly* 12, no. 2 (Spring 1982): 138 (editorial note), <https://www.jstor.org/stable/27547798>. The article in *Presidential Studies Quarterly* is an expanded version of the one published in *Directors and Boards* and *Armed Forces Journal*.

⁵ David C. Jones, interview by David Halloran, "Q&A—Gen. David C. Jones: The Joint Chiefs Need a Stronger Chairman," *New York Times*, February 24, 1982, <https://www.nytimes.com/1982/02/24/us/q-a-gen-david-c-jones-the-joint-chiefs-need-a-stronger-chairman.html>.

⁶ David C. Jones, "Past Organizational Problems," *Joint Force Quarterly* 13 (Autumn 1996), <https://ndupress.ndu.edu/portals/68/Documents/jfq/jfq-13.pdf>.

⁷ For example, see Christopher G. Marquis et al., "The Advent of Jointness During the Gulf War: A 25-Year Retrospective," *Joint Force Quarterly* 85 (2nd Quarter 2017), <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/1130670/the-advent-of-jointness-during-the-gulf-war-a-25-year-retrospective/>.

⁸ Richard B. Andres with T. Michael Moseley and Larry Stutzriem, *A Call for a New NSC-68 and Goldwater–Nichols Reform* (Arlington, VA: Mitchell Institute for Aerospace Studies, 2025), https://www.mitchellaerospacepower.org/app/uploads/2025/01/GNA_Reform_Policy_Paper_57-FINAL.pdf.

⁹ Colin L. Powell, "A Word From the Chairman," *Joint Force Quarterly* 1 (Summer 1993), <https://ndupress.ndu.edu/portals/68/Documents/jfq/jfq-1.pdf>.

¹⁰ Mark Clodfelter, *Violating Reality: The Lavelle Affair, Nixon, and the Parsing of the Truth*, Case Study, National War College, NDU (Washington, DC: NDU Press, 2016), <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/718055/violating-reality-the-lavelle-affair-nixon-and-the-parsing-of-the-truth/>.



At the U.S. Air Force and U.S. Space Force's Officer Training School, civilians and prior enlisted Servicemembers with college degrees undergo a rigorous 60-day training program, culminating in their commissioning as officers (U.S. Air Force/Damien Thomas)

From Data to Victory

The Race for Analytic Superiority in Warfare

By Emily O. Goldman and Robert L. Grossman

Artificial intelligence (AI) technologies have reached a tipping point after decades of development. They are diffusing widely and finding new military and intelligence applications. As more powerful models built on ever larger data sets become ubiquitous,

militaries are racing to deploy AI. But that is the wrong race. They should be racing to achieve analytic superiority. By *analytic superiority* we mean the advantage obtained from the ability to collect and process data, build powerful analytic models, and deploy the models into military systems to achieve operational and information advantage while degrading or denying an adversary's ability to do the same.¹ Military systems include both information and physical systems.

Analytics is the systematic analysis of data through computational methods to produce models for use across a spectrum of applications, from improving performance of physical systems for operational superiority to improving performance in information systems for decision superiority. The volume, velocity, and variety of data, combined with ever more powerful models, has made analytic superiority the critical element for both operational and information superiority.

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The competition for military superiority has always been an intellectual and technological endeavor, as Andrew Marshall, director of the Office of Net Assessment, argued in the mid-1990s. Marshall predicted “information superiority” would occupy operational art because connectivity was essential for precision strike.² Military strategy must now embrace analytic superiority. To assist the warfighter in this, we describe the enduring importance of analytics in warfare and offer a roadmap to achieve analytic superiority.

Algorithms and Analytics in Warfare

Twenty-first century warfighters rely on analytic models, whether they know it or not, at all levels of systems and subsystems they use, at all echelons, and in all domains. Yet warfighting, in fact, has always used algorithms and analytics, even before the age of computers and digitization. An *algorithm* is a precise set of instructions that takes inputs and produces outputs. *Analytics* is a relatively recent term for a broad range of approaches that analyze data to produce

models for tasks like prediction, summarization, and optimization.

Data analysis was first done by hand, and then with simple mechanical devices like slide rules. In the American Civil War, range firing tables increased targeting accuracy with numerical integration algorithms and statistical models based on data collected and processed from experimental firings of the canon.³ In World War II, British air defense benefited immensely from the use of radar, but just as important were algorithms, heuristics, information flows, and command and



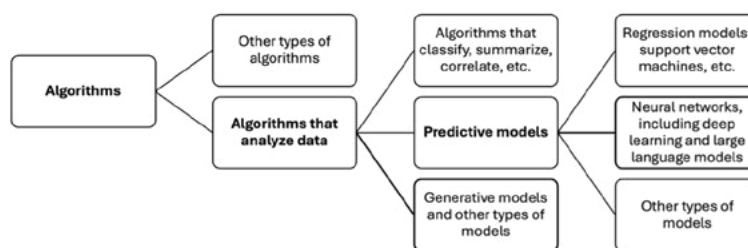
Corporal Joseph McNutt, USMC, an intelligence specialist with 3rd Reconnaissance Battalion, 3rd Marine Division, flies a Neros Archer first-person view drone on Camp Schwab, Okinawa, Japan, May 22, 2026 (U.S. Marine Corps/Haley Munoz)

control that developed around radar. The Tizzy angle, a simple heuristic algorithm used to plot the course of British fighters intercepting German bombers during World War II, increased the interception rate to approximately 90 percent (when the altitude of the bomber was known) and reduced the time to set the interception course by several minutes.⁴

Fast forward to today and the Russia-Ukraine War, where Ukraine reportedly applied AI image models to overcome remotely piloted drones' vulnerability to jamming. While outside the range of Russian jamming, a Ukrainian remote operator transfers control of the drone to a computer vision model that locks onto pixels ("pixel-lock") in an image of the target captured by the drone's camera.⁵ AI image models are the basis for pixel-lock technology, which has been available since the 1970s in more expensive systems. The U.S. startup Auterion partnered with the Ukrainian company Vyriy Drone to mass-produce drones with Skynode software that uses pixel-lock techniques.⁶ By employing new analytic models and changing analytic operations to pixel-locking instead of remote guidance by radio signal, Ukraine's drones defeated Russia's electronic warfare jamming. This is but one example of analytics employed by both Ukraine and Russia in drone warfare.

With the ubiquity of analytics in digital systems and services, *analytic competition*—the race to deploy analytics in operations to achieve mission effects and degrade and defeat adversary analytics—has become a critical dimension of strategic competition. The changing character of war is a story of competitive innovation—in strategy, operations, tactics, weapons, and analytics. Although less familiar to the warfighter, the competition to deploy analytics in operations to achieve mission effects and degrade and defeat adversary analytics is ongoing and accelerating. Yet there is no single way to achieve analytic superiority, just as there is no one way to achieve military superiority. Competitors will employ analytic models in different ways. This is a key lesson of the People's Republic of China's DeepSeek generative AI model,

Figure 1. Types of algorithms



Source: Authors.

which caught the world by surprise and disrupted the AI industry in 2025. On the other hand, from the vantage point of analytic superiority, it should not have been a surprise that one of our adversaries would make an advance in AI that would catch us off-guard.

An Overview of the Evolution of Analytics

The purpose of this overview is to illustrate that many analytic approaches for processing data are available, they are continually evolving, their scale is growing, and the pace of innovation is accelerating. Expanding upon the definition above, an *algorithm* is a general concept that refers to a sequence of instructions to perform computations, process data, or solve problems that are precise enough for a computer to implement. Examples include computing the Tizzy angle and the numerical integration methods that compute firing tables. With the amount of data and computing power growing, the subclass of algorithms that process data is of special importance (see figure 1). In the examples above, firing tables and pixel-lock algorithms process data to produce models (paper models in the firing tables example and an AI model in the pixel-lock example).

More powerful digital computers dramatically increased the scale of data analysis and led to new analytic approaches like *machine learning* (ML).⁷ The machine learning process collects data to build a model; uses the data to estimate a model (model training); uses the model to process inputs and produce outputs (model inferencing); and deploys the model in a system to derive

operational value (model deployment) (see figure 2). Machine learning models, unlike traditional statistical models, can scale to very large datasets and build models that, for example, can accurately predict, classify, summarize, and correlate complex patterns and behavior.⁸

One example of a machine learning algorithm is a predictive model for threat detection. It can be built by analyzing user behavior in a computer network (training) and applied in real time (inference) to give a score that predicts the likelihood the user is an insider threat. Another example is a classification model. It takes an image as input and identifies whether the image contains a jeep, truck, tank, another pre-specified type of vehicle (the label), or a label that indicates none are present. A *neural network* is a specific type of machine learning predictive model that processes data in layers, with each layer a very simplified mathematical model of a neuron. *Deep learning* is a type of neural network that uses many sequential layers to process data.

A *large language model* (LLM) is a machine learning predictive model built from a large amount of text, such as the text arising from crawling the internet. With enough data and compute to estimate models with billions of parameters, these models have a wide array of applications. Based on empirical "scaling laws,"⁹ LLMs improve as the number of parameters grows, assuming enough data and computing capacity. Given their size, machine learning models often use a multistage training process. A pre-training stage builds general purpose models. A supervised fine-tuning stage

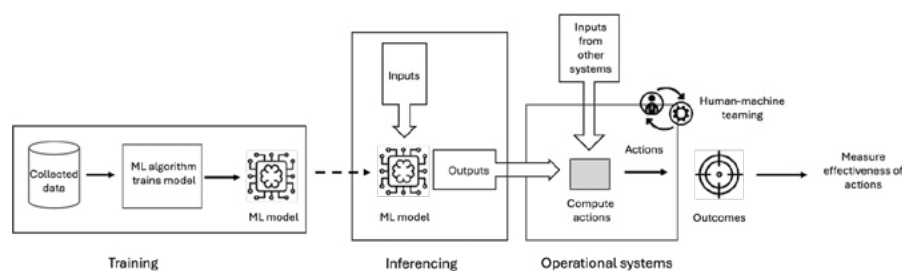
hones pretrained models to perform well on a selected task. Although pre-training of models with hundreds of billions of parameters requires very large-scale computational infrastructure, supervised fine-tuning can be done with much more modest resources. A generative model is yet another type of machine learning model that takes a dataset as input and produces a statistical model of the data as the output, which can be used to generate new, similar examples of the data, for example produce images and videos from text prompts.

Agentic AI is another evolution of analytics.¹⁰ These systems autonomously pursue goals, make decisions without human input, interact with and respond to their environment, and adapt based on new information or changing circumstances.¹¹ Agentic AI is sometimes likened to human reasoning, but it really represents the confluence of ever larger AI models, of new algorithms such as chain of thought, and of orchestration frameworks that interoperate AI models with other systems like websites, databases, and planning applications. Rarely does an ML/AI model replace a human, but rather particular human tasks are automated or augmented using an AI model.¹² The human may be part of the process (human in the loop), supervise the process (human on the loop), or be able to intervene in the process depending upon certain conditions (human near the loop).¹³

A further advance involves two or more AI systems interacting, or *collective AI*. For some time, the outputs of one AI system have been used as inputs for another AI system.¹⁴ More recently, AI systems are being developed that interact with multiple other agentic AI systems, each interacting with their environment and pursuing independent goals, while communicating to pursue collective goals. For example, a drone swarm powered by agentic AI systems could exchange information across the swarm.

To achieve military advantage from machine learning and AI, models must be deployed into systems that take actions. The effects of the actions are then quantified and measured (see figure 2).¹⁵ Models typically produce

Figure 2. Machine learning process steps: training, inferencing, and deploying models into operational systems



Source: Authors.

scores, which are inputs to a system that takes an action when the score crosses a threshold. For example, an AI model embedded in a first-person view drone locks onto a pixel patch in an image and autonomously steers the drone to hit the object identified in the marked pixel patch.¹⁶ The model takes an initial frame that is locked in the video stream, a later frame from the video stream, and pixel patch in the initial frame associated with an object, such as a tank. It produces a score for each pixel patch in later frames,¹⁷ which is the likelihood that the pixel patch in the later frames is the updated position of the marked pixel patch in the original locked frame. A system module in the drone processes these scores to select the updated position of the tank and provide the data required to steer the drone (the actions) until the process repeats with a later frame. The measure is whether the tank is hit.

From an analytic superiority perspective, it is not necessary to have the latest or most advanced model. It is more important to have a deep understanding of the data to build a good enough model that can be deployed into an operational system or process to achieve an outcome. As an example, smaller specialized AI models were able to find some of the same long-standing and critical cybersecurity vulnerabilities that Anthropic’s Mythos AI Model found in the spring of 2026.¹⁸

Large language and foundation models are generating remarkable innovations, but they have limitations. First, like any predictive model, LLMs can be wrong, but their incorrect responses retain the nuance and

grammatical flow of language. These “hallucinations” are a natural consequence of how LLMs are built.

What are known as scaling laws quantify how the accuracy of LLMs improves as the size of the models grows, as the amount of data they are trained on grows, and as the quality of the data grows.¹⁹ Larger models require large-scale computing infrastructure, and this is widely appreciated. Less well known is that many LLMs are data-starved; that is, they lack sufficient high-quality data, even though today’s LLMs are trained on a wide array of data sources in addition to crawling the internet (for example, publicly available government data, open access technical publications, licensed sources of data such as books, purchased data, and text extracted from audio and video). Since the amount of data can be reduced by increasing the quality of data, by putting effort into increasing data quality, smaller more specialized models can be built for specific domains and applications that often perform as well or better than the large frontier models.²⁰

Training LLMs also takes months, so many are out of date, leading to simple errors on ongoing events. Other factors that reduce accuracy are the various simplifications and shortcuts used to produce answers while keeping operating costs low.

Finally, evaluation and verification frameworks are essential to building high-quality LLMs. One reason LLMs that produce computer code have become so powerful is because of the large amount of training data available online and the relative ease of checking

whether answers are correct. In specialized domains such as warfighting, the lack of large amounts of high-quality data is a fundamental limitation.

Analytic Superiority for the Warfighter

How should the warfighter incorporate analytics into doctrine and practice? First, the defense enterprise needs a framework to help avert common sources of failure. Second, leaders must decide where to employ an organization's limited analytic capabilities. This requires an analytic

strategy that prioritizes which analytic opportunities will provide the most value to the organization. Third, new AI-based capabilities must be integrated into combat functions. We address each of these in turn.

The Analytic Diamond Enterprise-Level Framework for Achieving Analytic Superiority

Analytic models are one element of analytic superiority. Building and deploying a successful model is like climbing a ladder. The first step is a successful software

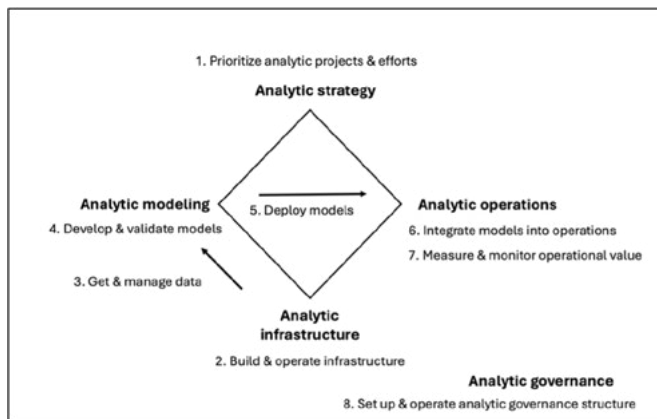
project; the second is a successful data management project; the third is a successful machine learning project. Any step can fail, and they often do²¹ for some common reasons:

- The data collected to build the model is of low quality, insufficient quantity, or unavailable when inferencing.
- The information technology (IT) infrastructure to manage the data, build the model, and deploy the model is not available or lacks the scalability required for the application.



U.S. Marine Corps Lance Corporal Gabriel Demopoulos (left) and Corporal Humberto Castro both with 3rd Battalion, 7th Marine Regiment, forward deployed with 4th Marine Regiment, 3rd Marine Division as a part of the Unit Deployment Program, fly Neros Archer first-person view drones on Camp Schwab, Okinawa, Japan, May 22, 2026. This training sharpened their ability to operate advanced FPV drones that provide reconnaissance and precision strike capabilities. (Photo by U.S. Marine Corps Lance Cpl. Haley Munoz)

Figure 3. Analytic diamond framework



Source: Authors.

- The model lacks accuracy, specificity, or other performance parameters.
- The model is never transitioned from the lab to the application or service that requires it.
- The model is not integrated effectively into operational systems.
- The human-machine teaming is not effective, or the training provided is not sufficient to use the systems as planned.

In addition, each step in the machine learning process (as well as other steps in the analytic framework that we describe below) can be attacked by an adversary.

Averting failure is easier if one adopts an enterprise-level framework, such as the *analytic diamond* (figure 3) that captures all the required tasks for analytic superiority.²² These include developing an analytic strategy that aligns with the organization's goals and prioritizes analytic efforts; setting up the computing infrastructure to manage the data, build the models, and support the inferencing; getting the data required for the models; cleaning and preparing the data and building the models; and deploying the models into operational systems or processes. This last step usually involves a hand off from the analytic modeling team that builds the model to the analytic operations team to integrate model inferences into processes or operational systems; develop tactics, techniques, and procedures for operationalizing

the model; and devise an appropriate human-machine teaming/autonomy framework. An analytic governance structure manages and coordinates all these steps.²³

Google's most important advances demonstrate the analytic diamond framework. In 2003, the company unveiled the Google File System, a new analytic infrastructure to analyze data at a scale not previously possible, which gave Google a significant competitive advantage.²⁴ In 2008, the company introduced the MapReduce algorithm,²⁵ which leveraged the Google File System and significantly sped up algorithms like Google's PageRank algorithm²⁶ (an example of an analytic model), which is the basis of its web search system (an example of analytic operations). The MapReduce algorithm also enabled Google to efficiently implement other analytic operations such as Google News, Google Translate, and processing data for viewing satellite images. Google's competitors did not have access to these technologies until the open-source Hadoop system²⁷ was introduced. By that time, Google had advanced to next generation versions of its core technology.

The analytic diamond applies to commercial and military organizations alike, with an important difference. Each step in the analytic diamond typically occurs in different organizational units: an IT organization builds the infrastructure; a modeling organization builds the models;

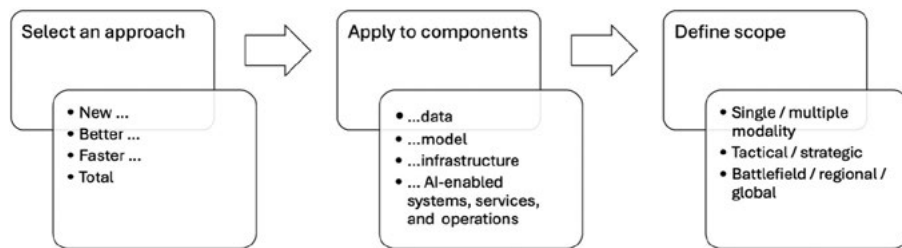
and an operations organization deploys the models. In military organizations, those units are likely to be stovepiped. Senior military leaders need to not only understand and resource each of these interrelated steps; they must develop and implement an analytic strategy to guide and integrate across stovepipes.

Winning with Analytics Requires a Strategy

Analytic strategy sits atop the analytic diamond to emphasize its central importance for prioritizing which analytic opportunities will provide the most value to the organization. Analytic opportunities include investments in higher capacity or performance computing infrastructure, higher volumes or quality of data, higher accuracy models, a novel operational application of an analytic capability, or some combination that achieves a level of speed, scale, and performance to tackle a national-level priority. In a national security context, prioritizing analytic opportunities for investment should factor in threats, vulnerabilities, national goals, organizational missions, and how the military organization plans to fight (warfighting strategy). An analytic strategy can be applied at any echelon (Department of War, military Service, combatant command). It is an essential substrategy of any modern military organization.

The analytic diamond can help leaders construct analytic strategies whether for a narrow task, a broad function, or an operational challenge. For each of the four corners of the diamond, one could pursue an approach that is novel, better, faster, or any combination of these. For example, "novel" strategies could introduce new sources of data like using Wi-Fi-based location services in dense urban environments where global navigation satellite systems may not be reliable; new sensor data, including light detection and ranging (LIDAR), radar, and electrical-optical images for AI models supporting autonomous vehicles; new algorithms (like MapReduce); or new analytic infrastructures (like the Google File System). "Better" strategies can take advantage of higher quality,

Figure 4. Different strategies for achieving analytic superiority



Source: Authors.

more complete, or more timely data; more accurate models; or more compute power in analytic infrastructure. “Faster” strategies could entail moving data more quickly (for example, custom fiber networks in high-frequency trading)²⁸ or updating models more rapidly (for example, updating cyber threat models daily or hourly).

Figure 4 offers a guide for combining different elements into a tailored strategy. An approach (novel, better, faster) is applied to a component (data, model, infrastructure, operations) and scoped to a scale that aligns to mission. For example, one could introduce a novel model that provides an advantage in battle, or a novel type of data integrated with a current data modality to provide an advantage at the regional level. Multiple combinations can be developed and integrated.

Some strategies try to capture *all relevant data*. One exemplar was Real Time Regional Gateway capability, deployed by the National Security Agency in Iraq in 2007 in response to the increased threat of improvised explosive devices.²⁹ The program collected, integrated, and analyzed as much data as possible from all relevant available sources in as close to real time as possible. Real Time Regional Gateway combined traditional streams of signals intelligence with new sources of information from raids, satellite images, and on-the-ground reports of enemy movements and operations. Processing the data in theater reduced the time it took to get information to the war fighter from days and weeks to hours or even minutes.

Other “total data” strategies include China’s social credit system, which tries to capture all relevant data on China’s

citizens and residents, and Google’s global data platform, which tries to collect and organize “the world’s information and make it universally accessible and useful.”³⁰ A more targeted, narrowly scoped strategy is Ukraine’s pixel-lock drone approach, which focused on employing better models and better deployment. An even more targeted approach is the use of novel microwave infrastructure for high-frequency trading. Larger is not necessarily better; rather, it depends on what is achieved from the perspective of analytic superiority.

Alternatively, or in addition, one can attack the analytic tasks performed by the adversary, individually or in different combinations. The analytic diamond framework identifies ways to counter an adversary’s analytics. For example, if both Blue Force (friendly forces) and Red Force (opposing forces) have AI models for writing intelligence assessments, Blue can build a more powerful model that integrates a new type of data and does

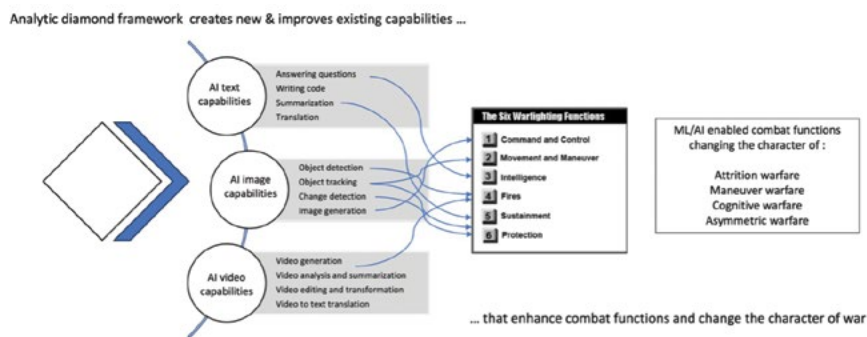
it faster than Red, while Red can poison the data that Blue uses and pre-position exploits in Blue’s analytic infrastructure that can be activated in times of conflict. Offensive strategies include infiltrating an adversary’s analytic infrastructure, poisoning its data, weakening its analytic models, and degrading its analytic systems and services.

Integrating Analytics Into Combat Functions

Figure 5 illustrates how ML/AI can be leveraged to improve combat functions. New AI-based capabilities create more advanced, more powerful, or more adaptive combat functions, which are changing the character of war. Analytic superiority can deliver operational advantage by improving command and control, fires, logistics, movement, maneuver, evasion, cybersecurity, and force protection.

The U.S. defense and military communities are developing, experimenting, piloting, and deploying ML/AI into business and operational processes. Department of War AI projects include Project Maven³¹ and the AI Rapid Capability Cell.³² Automated intelligence-processing software, based on machine-learning algorithms developed under Project Maven, has supported counterterrorism operations.³³ ML/AI are being employed to improve a range of combat functions to include fires;³⁴ military decisionmaking;³⁵ distributed command and control in contested

Figure 5. AI-enabled combat functions and the changing character of war



Source: Authors.



U.S. Marines with 3rd Light Armored Reconnaissance, 1st Marine Division, Light Attack Helicopter Squadron 169 and Marine Special Operations Command conduct an in-aircraft system integration of a first-person view unmanned aircraft with a UH-1Y Venom helicopter at Marine Corps Base Camp Pendleton, June 16, 2026. (U.S. Marine Corps/Carlo SouzaDeluca)

environments;³⁶ supply chain, logistics, and sustainment for multidomain operations;³⁷ and protecting the cybersecurity kill chain.³⁸ For intelligence, ML/AI is being applied to improve intelligence summaries, situational awareness reports, strategic assessments, threat assessments, indicators and warnings, alerts, and operational intelligence reports. On December 9, 2025, Secretary of War Pete Hegseth announced the launch of GenAI.mil, a military-focused generative AI platform with initial capabilities from Google's AI application, Gemini, and directed all personnel to immediately incorporate it into all workflows to outpace adversaries.³⁹ Amid all the forward momentum, no overarching concept like analytic superiority guides resourcing and weight of effort. Without such a construct, militaries risk focusing in the wrong areas and falling victim to surprise.

Surprise

As warfighters employ ML/AI to enhance combat functions, they must anticipate and prepare for surprise. DeepSeek offers a cautionary lesson. Leading U.S. AI vendors were developing models based on scaling laws; they built ever larger models using ever larger clusters of graphics processing units (GPUs) with the price of developing an AI model rising to more than \$100 million.⁴⁰ Meanwhile, the Chinese company DeepSeek—which itself is owned by a Chinese hedge fund, High-Flyer—took a different approach, developing new algorithms and methods that produced roughly competitive AI models at a much lower cost. DeepSeek's claim that its model cost \$5 million to train accounted for only the last run that produced the model and so underestimates total cost. However, it is still likely a fraction of the investment that large

U.S. AI frontier vendors were spending. The company presumably relied on U.S. frontier models to help train its models but still developed novel algorithms to make up for lack of access to the highest power GPUs at the scale typically required to build AI models. DeepSeek's model caused significant drops in share prices for some leading U.S. AI vendors. Nvidia's stock dropped 17 percent on January 27, 2025, one of the largest single-day dollar losses in U.S. history for any company. The fact that DeepSeek's model was open source immediately changed the competitive environment.

Given the many steps involved in moving from data to operational value, the increasing power of models, and the many ways to automate tasks and to augment humans with ML/AI (augmented intelligence), there are many paths to achieving analytic superiority and it is easy to be surprised. Your adversary may be more facile than you, more

willing to change existing priorities and processes than you, and more competent at diffusing ML/AI than you. The rapid pace of innovation in AI—what might be called “analytic tempo”—has caught even AI experts off guard. It can be seen in the rapid introduction of new capabilities by the frontier AI companies, in the innovation of small and emerging AI vendors, and in the extremely fast-paced development of drone and counter-drone technology in the Russia-Ukraine War.

Mitigating surprise is an important component of achieving analytic superiority. This likely requires a paradigm shift focused on human-machine teaming to discover entirely new approaches to solving operational challenges, which is more than piloting and rapid prototyping. It is about rethinking how missions are executed, how decisions are made, how to build new capabilities that scale, and how AI systems collaborate with humans to create asymmetric advantages.⁴¹

Artificial General Intelligence and Analytic Superiority

Military professionals should not confuse analytic superiority with *artificial general intelligence* (AGI).⁴² AGI, simply defined, is the ability of an AI model to understand or learn any intellectual task that a human can. Algorithms and models have been outperforming humans for decades. For 50 to 60 years, calculators have outperformed humans in arithmetic. For the past 40 years, software applications have performed better than humans at mathematical computations, including evaluating complex derivatives, integrals, and series. AI models are getting much better at doing mathematical proofs, but this is a continuation of a decades-long process.

AGI is not a simple milestone,⁴³ like developing the atom bomb. Instead, it is satisfying one of several definitions that involve passing multiple tests with certain scores, where the models are often designed to pass the specific tests. Many evaluation frameworks and leaderboards assess and track the progress of AI models. So-called frontier models perform 80 percent to 100 percent as well as humans on common tasks like

handwriting, speech, and image recognition; reading comprehension; language understanding; common sense completion; grade school mathematics; and code generation. Models already perform most of these tasks at the college level or higher and will soon perform significantly better. In this simple sense, we are quite close to AGI. However, in terms of reasoning and creating like humans, significant gaps remain. It is not clear when, or even if, these gaps will be closed. Mathematicians are still in demand, and they use AI applications to create mathematics—a simple example of human-machine teaming.

From the viewpoint of efficiency and productivity, every job is a bundle of tasks⁴⁴ and the questions are which tasks are most important to automate and how AI can automate them. From the viewpoint of analytic superiority, what counts is the quality of models, how rapidly they improve, the efficiency of the infrastructure that computes them, and whether your models outperform your adversary's. Reaching some benchmark on an abstract evaluation framework does not matter. AGI does not provide advantage in warfare; analytic superiority does. A working deployed model always beats or provides more operational value than a better model still in the lab or not yet integrated into systems supporting operational art.

Autonomy frameworks can also be viewed in terms of analytic superiority.⁴⁵ Department of Defense (DOD) Directive 3000.09 provides safeguards for autonomous systems, including those using AI,⁴⁶ but as National Security Presidential Memorandum/NSPM-11—issued in June 2026—directs, these must be reviewed and updated annually to account for rapidly evolving AI capabilities.⁴⁷

Conclusion

There is no substitute for battle to test and employ new technologies and capabilities. Innovations typically appear first in precursor wars between asymmetric powers and come to fruition in combat between peer competitors.⁴⁸ The Russia-Ukraine War represents a precursor war for the application of ML/AI. Ukraine used AI-enabled object tracking models

in its first-person view drones in 2024 to circumvent Russian jamming of operator-drone communication.⁴⁹ In 2025, Russia regained an advantage by using a better analytic infrastructure of fiberoptic cables to provide communications to drones that could not be jammed.⁵⁰ By the time this article is published, the analytic competition in drone warfare will likely have evolved further. The war between Israel and Hamas provided another laboratory that hints at the value of ML/AI for military advantage. Israel's Unit 8200 seemingly increased the autonomy of AI-enabled fires by reducing the level of human confirmation required.⁵¹

For the warfighter, military planner, and commander, integrating analytic superiority into operational art is essential. The force that has the advantage from ML/AI is not the one with the most advanced models but the force that builds better and more capable models (analytic modeling); deploys them into applications, systems, and processes for desired outcomes (analytic operations); acquires, updates, and innovates the computing infrastructure (analytic infrastructure) to support these tasks; and adopts a strategy to prioritize among analytic opportunities (analytic strategy).

A useful exercise is to apply the analytic diamond methodology to the Secretary of War's January 9, 2026, memorandum, which outlines the Artificial Intelligence Strategy for the Department of War.⁵² The strategy draws attention to two of the four corners of the analytic diamond—compute infrastructure and model development—and to the supporting processes of data access, deployment, and governance. The importance of robust experimentation to achieve AI-native warfighting is also highlighted, but without a framework that includes processes, best practices, and infrastructure for moving models into operations (a third corner of the diamond), experiments often do not end up in production systems or changing tactics, techniques, and procedures. Most importantly, the memo is silent on analytic strategy; it focuses on the “latest and greatest” frontier AI models, and it frames the endeavor as a race for AI dominance through using the most powerful model

rather than achieving analytic superiority relative to an adversary. As we have argued, it is not about having the latest model available, but rather having a “good enough” model deployed in the right systems and processes in support of an analytic strategy. Without the North Star of analytic superiority, the Department runs the risk of racing toward AGI while our adversaries drive toward victory through analytic superiority.

We leave readers with a final thought experiment. Imagine Blue applying the latest frontier AI models to provide the best support to commanders and breakthrough next-generation logistics for a distant conflict, and Red applying the most recent advances in “small” large language models to put “good enough” models into mobile phones, using ad hoc networking to connect nearby mobile phones, and leveraging emerging collective AI to create an overwhelming analytic superiority in the first 24 hours of a conflict. Both sides have good analytic superiority strategies, but who would have the advantage in a military conflict? That is what the joint force should be anticipating, analyzing, and wargaming. JFQ

Notes

¹ Robert L. Grossman and Emily O. Goldman, “The Importance of Analytic Superiority in a World of Big Data and AI,” *Cyber Defense Review* (Summer 2024): 1–49, https://cyberdefensereview.army.mil/Portals/6/Documents/2024_Summer/Grossman_Goldman_CDRV9N2-SE-Summer-2024.pdf.

² Andrew W. Marshall, “Memorandum for the Record: Some Thoughts on Military Revolutions,” Office of the Secretary of Defense, August 23, 1993, <https://stacks.stanford.edu/file/druid:yx275qm3713/yx275qm3713.pdf>.

³ Alan Gluchoff, “Artillerymen and Mathematicians: Forest Ray Moulton and Changes in American Exterior Ballistics, 1885–1934,” *Historia Mathematica* 38, no. 4 (2011), <https://doi.org/10.1016/j.hm.2011.04.001>; Earl MacFarland, *Textbook of Ordnance and Gunnery* (New York: John Wiley and Sons, 1929).

⁴ David Zimmerman, “Information and the Air Defence Revolution, 1917–40,” *Journal of Strategic Studies* 27, no. 2 (June 2004): 370–94, <https://doi.org/10.1080/0140239042000255968>.

⁵ James Marson and Daniel Michaels, “Killer Robots Are About to Fill Ukrainian Skies,” *Wall Street Journal*, November 16, 2024, <https://www.wsj.com/world/europe/ukraine-russia-war-ai-drones-9337f405>.

⁶ Marson and Michaels, “Killer Robots Are About to Fill Ukrainian Skies.”

⁷ For simplicity, we use the term “machine learning model,” or if the meaning is clear from the context, simply the term “model.”

⁸ More technically, it is useful to distinguish two types of machine learning models: discriminative models and generative models. A *discriminative model* is a model that learns the probability of the output given the input. In contrast, a *generative machine learning model* learns the probability of the data distribution, enabling it to create similar data through sampling. See, for example, Andrew Ng and Michael Jordan, “On Discriminative vs. Generative Classifiers: A Comparison of Logistic Regression and Naive Bayes,” *Advances in Neural Information Processing Systems*, no. 14 (2001), <https://ai.stanford.edu/~ang/papers/nips01-discriminativegenerative.pdf>. Both discriminative and generative models are widely used in today’s AI models and systems.

⁹ Jared Kaplan et al., “Scaling Laws for Neural Language Models,” arXiv, 2020, <https://doi.org/10.48550/arXiv.2001.08361>; Jordan Hoffmann et al., “Training Compute-Optimal Large Language Models,” arXiv, 2022, <https://doi.org/10.48550/arXiv.2203.15556>.

¹⁰ The name is derived from the term *agency*, the ability for a system to act independently. Craig S. Smith, “China’s Autonomous Agent, Manus, Changes Everything,” *Forbes*, March 8, 2025, <https://www.forbes.com/sites/craigsmith/2025/03/08/chinas-autonomous-agent-manus-changes-everything/>.

¹¹ There are several different approaches to pursuing agentic AI. An LLM or GenAI model may interact with other systems and applications, which are sometimes called agents. This may be done through an orchestration framework in which an LLM or GenAI model can communicate through application programming interface calls to other systems such as databases, knowledgebases, planning systems, simulation systems, the internet, and so on. Another approach is for the LLM or GenAI prompt to be broken up into a sequence of prompts and subprompts that can be processed using different algorithms, such as chain of thought. Jason Wei et al., “Chain-of-Thought Prompting Elicits Reasoning in Large Language Models,” *Advances in Neural Information Processing Systems*, no. 35 (2022), <https://doi.org/10.48550/arXiv.2201.11903>.

¹² Ben Shneiderman, “Human-Centered Artificial Intelligence: Reliable, Safe and Trustworthy,” arXiv.org, February 23, 2020, <https://doi.org/10.48550/arXiv.2002.04087>.

¹³ Ruth A. David and Paul Nielsen, *Defense Science Board Summer Study on Autonomy* (Washington DC: Defense Science Board, 2016), <https://apps.dtic.mil/sti/citations/AD1017790>.

¹⁴ Ian Goodfellow et al., “Generative

Adversarial Networks,” *Communications of the ACM* 63, no. 11 (2020): 139–44, <https://doi.org/10.48550/arXiv.1406.2661>.

¹⁵ Models produce *Scores*, systems use scores to take *Actions*, and *Measures* are used to assess the effectiveness of the actions. This is sometimes called the SAM Framework. Robert L. Grossman, *Developing an AI Strategy: A Primer* (Open Data Press, 2020).

¹⁶ Marson and Michaels, “Killer Robots Are About to Fill Ukrainian Skies.”

¹⁷ To reduce the computational burden and speed up the computation, not all subsequent frames are scored in this way, but just enough frames to be able to track the object during the flight of the drone.

¹⁸ Stanislav Fort, “AI Cybersecurity After Mythos: The Jagged Frontier,” *Aisle* (blog), April 7, 2026, <https://aisle.com/blog/ai-cybersecurity-after-mythos-the-jagged-frontier>.

¹⁹ Kaplan et al., “Scaling Laws for Neural Language Models”; Hoffmann et al., “Training Compute-optimal Large Language Models”; Anirudh Subramanyam et al., “Scaling Laws Revisited: Modeling the Role of Data Quality in Language Model Pretraining” (Fourteenth International Conference on Learning Representations [ICLR-26], April 23–27, 2026, Rio de Janeiro, Brazil), <https://openreview.net/forum?id=x54wvB6QvL>.

²⁰ Subramanyam et al., “Scaling Laws Revisited.”

²¹ For some common reasons, see Narcisco Cerpa and June M. Verner, “Why Did Your Project Fail?,” *Communications of the ACM* 52, no. 12 (2009): 130–34, <https://doi.org/10.1145/1610252.1610286>; Robert N. Charette, “Why Software Fails,” *IEEE Spectrum* 42, no. 9 (2005): 42–49, <https://doi.org/10.1109/MSPEC.2005.1502528>.

²² Robert L. Grossman, “A Framework for Evaluating the Analytic Maturity of an Organization,” *International Journal of Information Management* 38, no. 1 (2018): 45–51, <https://doi.org/10.1016/j.ijinfomgt.2017.08.005>.

²³ In figure 3, although the analytic governance is identified as step 8 in the flow, the earlier it is set up and effective, the more likely the other steps will succeed.

²⁴ Sanjay Ghemawat et al., “The Google File System,” *Proceedings of the Nineteenth ACM Symposium on Operating Systems Principles* (Association for Computing Machinery, 2003), 29–43, <https://doi.org/10.1145/945445.945450>.

²⁵ Jeffrey Dean and Sanjay Ghemawat, “MapReduce: Simplified Data Processing on Large Clusters,” *Communications of the ACM* 51, no. 1 (2008): 107–13, <https://doi.org/10.1145/1327452.1327492>.

²⁶ Sergey Brin and Lawrence Page, “The Anatomy of a Large-Scale Hypertextual Web Search Engine,” *Computer Networks and ISDN Systems* 30, nos. 1–7 (1998): 107–17, [https://doi.org/10.1016/S0169-7552\(98\)00110-X](https://doi.org/10.1016/S0169-7552(98)00110-X).

²⁷ Konstantin Shvachko et al., “The Hadoop

Distributed File System,” in *Proceedings of the 2010 IEEE 26th Symposium on Mass Storage Systems and Technologies* (New York: IEEE, May 2010), 1–10, <https://doi.org/10.1109/MSST.2010.5496972>.

²⁸ Michael Lewis, *Flash Boys: A Wall Street Revolt* (New York: W.W. Norton & Company, 2014).

²⁹ “National Security Agency/Central Security Service, National Cryptologic Museum Debuts Service and Sacrifice, Real Time Regional Gateway Exhibits,” National Security Agency/Central Security Service, July 12, 2017, <https://www.nsa.gov/Press-Room/News-Highlights/Article/Article/1670296/national-cryptologic-museum-debuts-service-sacrifice-real-time-regional-gateway/>.

³⁰ “How Our Business Works,” Google, accessed June 23, 2026, <https://about.google/company-info/how-our-business-works>.

³¹ Katrina Manson, “AI Warfare Is Already Here,” Bloomberg, February 28, 2024, <https://www.bloomberg.com/features/2024-ai-warfare-project-maven/>.

³² “AI Rapid Capabilities Cell,” Chief Digital and Artificial Intelligence Office, U.S. Department of War, <https://www.ai.mil/Initiatives/AI-Rapid-Capabilities-Cell/LINK>.

³³ Mariella Moon, “The Pentagon Used Project Maven-Developed AI to Identify Air Strike Targets,” *engadget*, February 27, 2024, <https://www.engadget.com/the-pentagon-used-project-maven-developed-ai-to-identify-air-strike-targets-103940709.html>.

³⁴ “Datalink-Enabled AI for Fires Optimization,” U.S. Army Small Business Innovation Research and Small Business Technology Transfer Program, October 12, 2021, <https://armysbir.army.mil/topics/datalink-enabled-ai-for-fires-optimization/>; “How Artificial Intelligence Is Revolutionizing Aegis Combat System for Modern Naval Defense,” *Global Defense News*, January 28, 2025, <https://armyrecognition.com/news/navy-news/2025/how-artificial-intelligence-is-revolutionizing-aegis-combat-system-for-modern-naval-defense>. Modern long-range air- and missile-defense systems, including the latest variants of the U.S.-made Aegis combat system, are using rudimentary machine-learning algorithms to defend against incoming ballistic- and cruise-missile threats.

³⁵ Emelia S. Probasco et al., *AI for Military Decisionmaking: Harnessing the Advantages and Avoiding the Risks* (Washington, DC: Georgetown University, Center for Security and Emerging Technology, 2025), <https://cset.georgetown.edu/publication/ai-for-military-decision-making/>. The authors found a surge in military adoption of AI to assist in decisionmaking.

³⁶ “Artificial Intelligence and Machine Learning Aim to Boost Tempo of Military Operations,” *Military and Aerospace Electronics*, August 19, 2024, <https://www.militaryaerospace.com/computers/article/55126930/artificial-intelligence-ai->

machine-learning-military-operations. Air Force researchers are trying to apply AI to command and control and to consider enemy AI use in mission planning by pursuing a switch from monolithic command and control node to distributed command and control.

³⁷ Sharlene Tilley, “Smart Logistics: Navigating the AI Frontier in Sustainment Operations,” U.S. Army, October 17, 2024, https://www.army.mil/article/280377/smart_logistics_navigating_the_ai_frontier_in_sustainment_operations. The Russia-Ukraine War proves that the U.S. Army can no longer depend on uncontested sustainment. Army sustainment capabilities lack the tactical mobility and tactical distribution of fuel and Army pre-positioned stocks in a contested environment. AI gives units down to the battalion level the ability to leverage the capabilities needed to improve supply chain management, resource distribution, mobility, and planning and preparation.

³⁸ Bonnie Johnson et al., “Mapping Artificial Intelligence to the Naval Tactical Kill Chain,” *Naval Engineers Journal*, no. 135-1 (March 2023): 155–67, https://nps.edu/documents/10180/142489929/NEJ+Hybrid+Force+Issue_Mapping+AI+to+The+Naval+Kill+Chain.pdf.

³⁹ Secretary of War, “Harness Artificial Intelligence Now with GenAI,” memorandum, December 9, 2025, <https://www.documentcloud.org/documents/26367576-memo-on-integrating-genai-mil/>.

⁴⁰ Ben Cottier et al., “The Rising Costs of Training Frontier AI Models,” *arXiv*, accessed June 23, 2026, <https://arxiv.org/abs/2405.21015>.

⁴¹ Defense Science Board Task Force on Balancing Security, Reliability, and Technological Advantage in Generative Artificial Intelligence, “Final Briefing,” AD1321622, February 2025.

⁴² Leopold Aschenbrenner, “Situational Awareness: The Decade Ahead,” *situationalawareness.ai*, June 2024, <https://situational-awareness.ai/>; Michael C. Horowitz and Lauren Kahn, “The Cost of the AGI Delusion,” *Foreign Affairs*, September 26, 2025, <https://www.foreignaffairs.com/united-states/cost-delusion-artificial-general-intelligence>. Horowitz and Kahn make this same case, but they offer no alternative conceptual framework, like analytic superiority, to prevail in analytic competition.

⁴³ Sayash Kapoor and Arvind Narayanan, “AGI Is Not a Milestone,” *normaltech.ai*, May 1, 2025, <https://www.aisnakeoil.com/p/agi-is-not-a-milestone>.

⁴⁴ Erik Brynjolfsson et al., *What Can Machines Learn and What Does It Mean for Occupations and the Economy* (Pittsburgh, PA: American Economic Association, 2014), 43–47, <https://doi.org/10.1257/pandp.20181019>.

⁴⁵ Grossman and Goldman, “The Importance of Analytic Superiority in a World of Big Data and AI,” 36–37.

⁴⁶ DOD Directive 3000.09, *Autonomy in*

Weapon Systems (Washington, DC: Department of Defense, 2023), <https://www.esd.whs.mil/portals/54/documents/dd/issuances/dodd/300009p.pdf>.

⁴⁷ National Security Presidential Memorandum/NSPM-11 (Washington, DC, 2026), <https://www.whitehouse.gov/presidential-actions/2026/06/national-security-presidential-memorandum-nspm-11/>.

⁴⁸ Emily O. Goldman and Richard Andres, “Systemic Effects of Military Innovation and Diffusion,” *Security Studies* 8, no. 4 (Summer 1999): 79–125, <https://doi.org/10.1080/09636419908429387>.

⁴⁹ David Kirichenko, “The Rush for AI-Enabled Drones on Ukrainian Battlefields,” *Lawfare*, December 5, 2024, <https://www.lawfaremedia.org/article/the-rush-for-ai-enabled-drones-on-ukrainian-battlefields>.

⁵⁰ Siobhan O’Grady et al., “Ukraine Scrambles to Overcome Russia’s Edge in Fiber-Optic Drones,” *Washington Post*, May 23, 2025, <https://www.washingtonpost.com/world/2025/05/23/ukraine-russia-drones-fiberoptic-jamming/>.

⁵¹ Elizabeth Dwoskin, “Israel Built an ‘AI Factory’ for War. It Unleashed It in Gaza,” *Washington Post*, December 29, 2024, <https://www.washingtonpost.com/technology/2024/12/29/ai-israel-war-gaza-idf/>.

⁵² Secretary of War, “Artificial Intelligence Strategy for the Department of War,” memorandum, January 9, 2026, <https://media.defense.gov/2026/Jan/12/2003855671/-1/-1/0/artificial-intelligence-strategy-for-the-department-of-war.pdf>.



The USS Arizona (BB-39) burning after the Japanese attack on Pearl Harbor, December 7, 1941. (National Archives)

Determining Operational Objectives

By Milan Vego

Full knowledge and understanding of the true meaning of operational objectives are the main prerequisites for sound planning and execution of major operations. A major operation (on land, at sea, and/or in the air) is aimed at accomplishing a *single operational objective*. Such an operation can be conducted predominantly by a single service or two or more services. A campaign in a high-intensity conventional

war consists of a series of related major operations plus numerous tactical actions aimed at achieving a *single military- or theater-strategic objective*. Yet despite the importance of operational objectives, theorists and doctrinal documents have given relatively little attention to what constitutes one. In recent decades, there has been a tendency in the U.S. military to consider some elements of a major operation, and even purely political activities, to be operational objectives. For instance, it is a stretch to consider actions not involving use of lethal force, such as “alerting,” “posturing,” or “deploying forces,” or purely political actions, such

as “securing regional and international support,” to be operational objectives.¹

A military- or theater-strategic objective cannot be accomplished by a single act. It must be divided into several intermediate—*operational*—objectives (see figure 1). The accomplishment of any operational objective requires the use of *lethal force* and should result in a *drastic (radical) change* of the situation in a given theater of operations. For example, the Allied capture of Guadalcanal in the Lower Solomon Islands on February 9, 1943, was an operational objective that drastically changed the situation in the South Pacific Ocean Area.

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Figure 1. Operational Objectives



Source: Author.

The main prerequisites for determining operational objectives are good operational intelligence and sound operational assumptions. Major flaws in tactical and/or strategic intelligence will have an adverse effect on the quality of operational intelligence. The forces assigned to the accomplishment of an operational objective should be based not on their availability but on the objective and on the enemy's expected resistance and will. Considerations that are purely political, geographic, or economic should play a role secondary to that of destroying or neutralizing the enemy's forces. For example, in the invasion of both Sicily in July 1943 and Italy's mainland in September 1943, the Allies focused primarily on seizing terrain and major cities rather than on defeating the German forces.² To block the Axis escape from Sicily, the Allies had to capture the port city of Messina (near mainland Italy) before the Axis forces could do so. The Allies had two options: either land as close to Messina as possible, or land on the eastern and northern shores of the island and drive on converging lines to Messina. Instead, they chose to come ashore with two armies massed around Sicily's southeastern tip,

as far away from Messina as possible. After some 38 days of heavy fighting, the Allies overran the island but failed to trap significant numbers of Axis troops.³ By the time the Allies reached Messina, some 60,000 Germans and 70,000 Italians had escaped to the mainland with most of their heavy equipment.⁴

Ideally, an operational commander should be solely responsible for determining operational objectives. Except in very rare cases, political leaders should not interfere in selecting operational

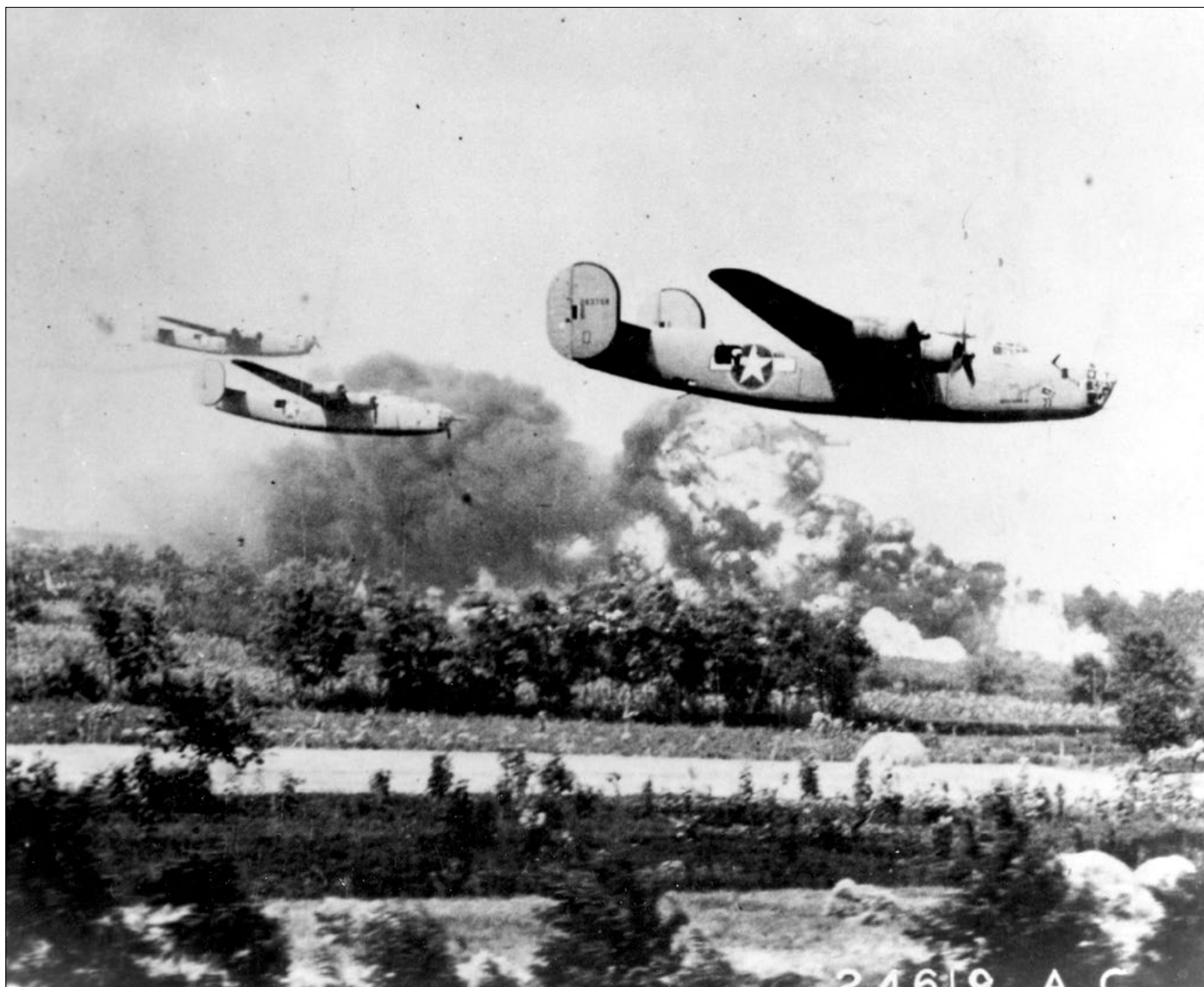
objectives, as the British prime minister Winston Churchill did on many occasions during World War II. Churchill was the biggest advocate for an amphibious landing in the rear of the German army fighting on the Gustav Line (some 60 miles south of Rome). Because of Churchill's personal interference in the theater planning process, the Allies selected the port of Anzio-Nettuno for an amphibious landing on January 22, 1944 (Operation *Shingle*).⁵ General Dwight D. Eisenhower, commander of the European theater of operations, disagreed but was overruled.⁶ Churchill and his advisors mistakenly believed that a two-division landing force plus some paratroop units would, by cutting off the German 10th Army's lines of communication, force the Germans to withdraw their troops from the front or to immediately retreat.⁷

Types. Operational objectives can be physically located on land, at sea, and in the air. In a *war on land*, an operational objective could be a strongly defended geographic area or position, the enemy's capital, a large city or urban area, or a critically important economic area (see figure 2). In each case, the accomplishment of a given operational objective would require the destruction or annihilation of a major part of the enemy army. In the past, all successful commanders intuitively understood that if an enemy's main source of power were destroyed, all other objectives in a war

Figure 2. Samples of Operational Objectives Physical Medium

Land	Sea	Air
• Capturing/defending: ➢ Country's capital ➢ Large city/urban area ➢ Geographic position ➢ Geographic area ➢ Major naval base ➢ Major port ➢ An airfield cluster/major air base • Destroying military-economic area: ➢ Heavy industries ➢ Nuclear weapons research/production plants ➢ Sources of energy (oil fields/refineries' gas; hydroelectric dams, etc.) ➢ Sources/processing plants for ores/minerals ➢ Major land transportation hub ➢ Others	• Obtaining sea control of a major part of a theater • Denying sea control in a major part of a theater • Capturing/defending: ➢ Large island ➢ Large archipelago ➢ Major naval base/port • Obtaining/denying control of an international strait ("choke point")/artificial canal • Destroying/defending elements of maritime trade: ➢ Large convoys ➢ Shipping in a large area ➢ Major port ➢ Shipbuilding/repair area • Securing/denying control of a basing/deployment area • Others	• Obtaining air superiority in a large part of a theater • Denying the enemy's air superiority over a major part of a theater • Suppression of the enemy's air defenses in a major part of a theater • Destroying an airfield cluster/major air base • Destroying enemy military-economic important areas: ➢ Heavy industrial area ➢ Nuclear weapons research/plants ➢ Sources of energy ➢ Sources/processing plants for ores/minerals ➢ Major land transportation hub ➢ Others

Source: Author.



B-24s at treetop level as they pass through the target area during the Ploesti Raid. (U.S. Air Force)

would be accomplished. This helps to explain why Napoleon's way of warfare was characterized by his unwavering focus on destroying the enemy army.⁸ Field Marshal Helmuth von Moltke the Elder insisted the *object* of an operation is the hostile army, insofar as it defends the object of the war (landmass and the enemy's capital, and—along with them—the resources and political power of the state).⁹

Very often the principal objective in war on land has been to *capture or defend an important geographic position or area*. The fastest and the most effective way to achieve such an objective was to destroy a major part of the enemy army. However, in some cases,

the operational commanders focused primarily on capturing territory and avoiding engaging enemy forces. The Allies in the European theater in World War II repeatedly focused the majority of their efforts on capturing enemy-controlled territory as quickly as possible.¹⁰

In purely military terms, *capturing or defending the enemy's capital* is an operational objective. Capital cities are usually large in terms of physical extent and population. They are the centers of the country's political, economic, and cultural life. Many capitals and their suburbs are sources of the country's economic strength. They are often a large hub of the country's transportation system. Capitals also exert significant

psychological and symbolic influence on both the country's population and the enemy's leadership. Generally, the importance of a capital is much higher for countries that are traditionally highly centralized, such as France or Russia, than for countries that are relatively new national states, such as Germany. Attacking the enemy's capital would usually force the defender to commit large forces in its defense. In their attack on Budapest (beginning October 29, 1944) and the subsequent siege (December 29, 1944, to February 13, 1945)—which led to some of the bloodiest fighting of World War II—the Soviets used more than a million men. The Germans and the Hungarians defended the city with only

about 70,000 men. The Soviets massed some 2.5 million men, 6,250 tanks, 7,500 aircraft, and 41,600 artillery pieces for their final assault on the German capital of Berlin (April 16 to May 2, 1945). The Germans defended the city with about 1 million men, 1,500 tanks, and 3,300 aircraft.¹¹

The importance of the capital city in a country that is already occupied by enemy forces is usually much lower than at the outset of hostilities. In addition, the fall of an enemy capital might have a less dramatic effect if coinciding with a much larger and more important event. The Allies entered the Italian capital of Rome on June 6, 1944—the same day the Allied forces landed in Normandy. Liberating Rome allowed the Italian government to be established there and become a co-belligerent. The Allies also gained control of several nearby airfields. Yet this event did not have a major impact on the German efforts to defend the remaining parts of Italy.¹²

In the modern era, strongly defended *large cities or urban areas* have often been selected as operational objectives. Large urban areas generally contain sizable parts of the country's industry and services and large populations. Urban terrain greatly favors the defender.¹³ An attack on a large urban center usually requires disproportionately larger forces, special equipment, and more time than operations on open terrain. Attacks on cities tend to result in large losses of personnel and materiel on both sides. For example, in the siege of Leningrad (September 8, 1941, to January 27, 1944), the Soviets claimed to have lost 670,000 people. Some independent historians estimate their losses as between 700,000 and 1.5 million. This includes 300,000 military casualties.¹⁴

The need to control areas that are economically important for the war effort is often a part of land campaigns or major land/joint operations. Such areas include those with large heavy industry, nuclear weapons research or production, energy sources (such as oil fields and oil refineries, oil and gas pipelines, and nuclear plants), sources of important ores or minerals (such as iron, copper, and nickel), rare metals, major ports, facilities

for building or repairing ships, and microchip production plants. These can be considered as operational objectives if their destruction or defense has a major effect on the combat employment and sustainment of enemy or friendly ground and/or air forces.

The final version of the German plan for the invasion of the Soviet Union (Operation *Barbarossa*), Instruction (*Weisung*) no. 21, issued on December 18, 1940, directed German forces in the southern part of the theater to capture “the military economic important Donets Basin” (the Dnepr–Donets area, or Donbas) early on.¹⁵ Before the start of the invasion of the Soviet Union, Hitler and the Supreme Command of the Wehrmacht (*Oberkommando der Wehrmacht*) agreed with the Army General Staff (*Oberkommando des Heeres*) that the main operational objective should be the destruction of the enemy forces and the capture of Moscow. However, after the start of the invasion in June 1941, Hitler put less emphasis on this objective. For him, the most urgent problem became getting control of the Baltic ports, the grain-producing areas of Ukraine, and the Caucasian oil fields.¹⁶ On August 12, 1941, Hitler stated that the most important objective before the onset of winter was not Moscow but the Crimea, the Donets Basin's industrial areas, and Leningrad.¹⁷ The Donets Basin in Ukraine was important for Germany's economy on account of its heavy industries and ores.¹⁸ Hitler wanted to capture the Caucasus oil fields and destroy Soviet naval/air bases on the Black Sea, which posed a threat to the German oil supplies from Romania.¹⁹ In 1938, the Soviet Union produced 27 million tons of oil.²⁰ The British Ministry of Economic Warfare estimated that the Soviet oilfields of Maykop and Grozny were each producing 2.71 million metric tons a year and that Baku produced 23.7 million metric tons a year. Germany produced only about 500,000 tons of oil annually. The Germans calculated that during the war, they needed 24 million tons of oil.²¹

An important source of oil for Nazi Germany was its ally Romania. In

1939, Romania produced 6.2 million tons of oil, or 2.2 percent of global production.²² The largest oilfields and refineries were in the city of Ploesti (Ploiești in Romanian)—35 miles north of Bucharest—and its vicinity. The biggest user of Romanian oil was the Wehrmacht, and Romania provided some 60 percent of the German crude oil supply. Ploesti's refineries produced 10 million tons of oil per year, including 90-octane aviation fuel.²³ They provided one-third of the high-octane gasoline, Panzer fuel benzene, and lubricants for the Wehrmacht.²⁴

In World War II, ball-bearing plants were considered critical for production of military items such as airframe controls, guidance systems, artillery, armored vehicles, U-boats, and other weapons and equipment. The German industry consumed 2.4 million ball bearings annually. Five ball-bearing plants in Schweinfurt alone produced some 52.2 percent of Germany's total output of ball bearings. In contrast to other German ball-bearing plants, the Schweinfurt ones produced the whole range of ball bearings.²⁵

Operational objectives in a *war at sea* are an integral part of obtaining, exercising, and denying sea control. These objectives are usually accomplished by destruction or neutralization of a large part of the enemy fleet at sea and their bases, destroying an amphibious task force, destroying or defending a major convoy, capturing or defending an operationally significant position ashore, and securing or denying control of the basing or deployment area. The U.S. Navy achieved an operational objective in the Battle of Midway (June 4 to 7, 1942) by denying the Japanese combined fleet control of the eastern part of the Pacific. The Japanese lost 4 frontline carriers, 253 aircraft with the most highly skilled pilots, and 1 heavy cruiser. In addition, one heavy cruiser had been heavily damaged, and one destroyer suffered moderate damage; one battleship, one destroyer, and one oiler had each suffered slight damage.²⁶ The Japanese losses were about 3,500 men. In contrast, the U.S. Navy lost 1 fast carrier, 92 officers, and 215 men; 3 carrier air groups had been mostly



Allied troops disembarking onto a beach near Licata, Sicily, from a barge after being ferried from an outlying LST (landing ship, tank), July 10, 1943. (U.S. Signal Corps/National Archives, Washington, DC)

destroyed.²⁷ American losses in aircraft had been heavy; 147 were shot down.²⁸ This victory was a turning point in the Pacific War because it allowed the Allies to go strategically on offensive in the summer of 1942.

Japan's objective in its surprise attack on the naval base of Pearl Harbor on December 7, 1941, was to destroy a major part of the U.S. Pacific Fleet and thereby prevent it from interfering with the Japanese invasion of the Philippines. The Japanese attack force consisted of six fast carriers screened by one battleship division, one cruiser, and one destroyer squadron.²⁹ The Japanese executed a two-wave attack with some 360 aircraft. In these attacks, three U.S. battleships were sunk, one capsized, and one was heavily damaged, with three others lightly damaged. In addition, two U.S. heavy cruisers were heavily damaged and another cruiser was lightly damaged.³⁰ The U.S. losses were more than 2,000 men killed and 710 wounded.³¹ The Japanese lost only 30 aircraft in the attack.³² The Japanese attackers temporarily crippled the U.S. Pacific Fleet's battle line. However, they did not destroy the fast carriers, which were by fortunate coincidence at sea and not in Pearl Harbor, nor did they destroy the exception critically important shore installations.³³

A stronger side at sea would project its power ashore by *capturing operationally important positions ashore*, such as large islands, straits, and major naval bases or ports. Such positions are usually geographically large and are heavily defended by the enemy's forces. By capturing an operationally important position, one's forces would greatly extend *operational reach*—the distance over which one's combat potential can be concentrated and employed *decisively*. Capturing several successive operationally important positions would significantly shorten the war. Such operational objectives could be accomplished by planning and executing major amphibious landings, and such operations are inherently joint and often multinational. During World War II, the Allies conducted a number of amphibious landings in the Pacific and the European theaters, all of them successful. In the Pacific, perhaps the best known are those on Guadalcanal (August 7, 1942), Saipan (June 15, 1944), Leyte (October 17, 1944), Luzon (January 9, 1945), Iwo Jima (February 19, 1945), and Okinawa (April 1, 1945). In the European theater, the Allies accomplished several operational objectives in each of their major landing operations: Sicily (July 9, 1943), Salerno (September 9, 1943), Normandy (June 6, 1944), and southern France (August 15, 1944).

Capturing one or both shores of a strongly defended *international strait* (or "choke point") is usually an operational objective for a stronger side at sea and a defensive operational objective for a weaker side. Control of an international strait is the main prerequisite for obtaining or denying strategic control of an enclosed sea, such as the Persian (Arabian) Gulf. Strategic control of a semi-enclosed sea, such as the Red Sea or the North Sea, is obtained by controlling all the exits; otherwise, an attacker or defender would have only operational control of a given exit. In World War I, the allies had strategic control of the North Sea because they controlled both of its exits. The German navy, with the exception of U-boats, was unable to operate beyond the confines of the North Sea. It is necessary to control both the Bab-el-Mandeb and the Suez Canal to have strategic control of the Red Sea. Germany's control of the approaches to the Danish Straits in 1914–18 effectively prevented Great Britain from sending reinforcements to its Russian ally. The occupation of Denmark in April 1940 gave the Germans strategic control of the Baltic, cutting the Royal Navy off from the Baltic and allowing the Germans to use the economic resources of the Scandinavian countries—especially Sweden's ores—and establish bases in Finland.

Obtaining full control of the Strait of Hormuz and its approaches is the first and most important offensive operational objective for the attacker. It is a defensive and the most important operational objective for a defender. By obtaining this control, the attacker would then effectively possess strategic control of the Persian Gulf. Yet gaining full control of the Gulf would require capturing several critically important positions within its confines, such as Kharg Island and Bahrain Island.

Experience shows that obtaining or denying control of an international strait cannot be accomplished by naval forces or air forces alone. It would need participation of strong ground forces to capture a lodgment on one or both sides of a strait. The method of accomplishing such an operational objective would

require planning and execution of a major joint operation.

Capturing control of a strongly defended *major port* by an attack across the sea is usually an operational objective. During the Korean War, General Douglas MacArthur organized the U.S. Army's X Corps—formed around the 1st Marine Division and the 7th Infantry Division, plus Republic of Korea (ROK) Marine units—to capture the port of Inchon and then drive inland and capture Seoul and eventually cut off the enemy's main supply lines to the south.³⁴ The amphibious objective area was an arc extending some 30 miles inland. By September 17, 1950, Kimp'o airfield was secured, and Seoul was captured on September 27.³⁵

Destruction of a *major convoy* or its defense is often an operational objective in a war at sea. In July 1942, the German Luftwaffe in cooperation with U-boats achieved an operational objective by destroying a major part of the Allied Convoy PQ 17 in the Barents Sea. Out of 33 ships, 22 (or 66 percent) sank.³⁶ These ships carried 430 tanks, 210 aircraft, and 3,350 motor vehicles, plus 99,316 tons of other cargo.³⁷ In many cases, the U-boats sank heavily damaged ships that had been hit initially by the Luftwaffe.³⁸ In the aftermath, all Allied convoys to Russia via the Arctic route were suspended for almost 2 months. The next convoy did not sail until September 2, 1942.³⁹

The Allies were more successful in defending a major resupply convoy to Malta from August 10 to 15, 1942 (Operation *Pedestal*). Despite rather high losses (one carrier, two light cruisers, one destroyer, and nine freighters were sunk, and one carrier, two light cruisers, and three destroyers were damaged) five merchant ships (four freighters and one oiler) reached Malta, bringing 32,000 tons of supplies (flour and ammunition) and 15,000 tons of fuel. This was sufficient to keep Malta operational as an air/naval base until the Allied victory in the battle of El Alamein in November 1942, which turned the tide of the war in North Africa.⁴⁰

Operational objectives in the air can range from obtaining or denying control of the air over major parts of the land or

maritime theater, destroying or suppressing enemy air defenses in a major part of the theater, destroying a large airfield cluster, or destroying a large part of the ground-based air-related infrastructure. In the German invasion of France in May 1940, the Luftwaffe initially obtained *air superiority* over Belgium and the northwestern part of France. At dawn on May 10, some 300 German bombers attacked 22 airfields in the Netherlands, Belgium, and northern France. The attacks focused on the aircraft on the ground and air installations. By the evening that same day, three-fifths of the Dutch air force had been either destroyed or rendered ineffective.⁴¹ The Luftwaffe destroyed a major part of the Belgian and French aircraft on the ground.⁴² The Germans claimed to have destroyed about 2,000 Allied aircraft between May 10 and May 21. After a week of hostilities, the Dutch, Belgian, and French air forces had been eliminated as fighting forces, and even the British lost half of their frontline aircraft.⁴³ Yet the Luftwaffe suffered high losses too—some 1,130 aircraft of all types, or roughly 25 percent of its total strength. Of these 1,130 aircraft, some 540 were lost during the first 6 days of the campaign.⁴⁴

In the Six-Day War of 1967 (Operation *Focus*), the Israeli air force obtained air supremacy over the southern front by destroying a major part of the Egyptian air force on the war's first day (June 5). The Israeli air force's order of battle on that day consisted of about 250 aircraft. The Israeli plan envisaged joining a dozen squadrons over 11 targets located between 20 and 45 minutes' flying time away.⁴⁵ The results were catastrophic for the Egyptian air force. Out of 420 combat aircraft, 286 were destroyed. Thirteen air bases, 23 radar stations, and 10 antiaircraft sites were made inoperative.⁴⁶ Out of about 350 qualified Egyptian pilots, some 100 were killed.⁴⁷ In effect, the Egyptian air force ceased to exist.⁴⁸

The Battle of Britain (July 10 to October 31, 1940) is an example of a weaker side successfully *denying control of the air* to a stronger side. The Luftwaffe was in 1940 the most combat-experienced

air force in world. On July 16, Hitler ordered preparations for the invasion of England (Operation *Sea Lion*). The main prerequisite for a successful landing was to establish control of the air over the English Channel and southeastern England. The German objectives as stated in July 1940 were to eliminate the Royal Air Force (RAF) both as a fighting force and as a ground organization and to strangle Great Britain by destroying its ports and shipping.⁴⁹ Reichsmarschall Hermann Göring, Commander-in-Chief of the Luftwaffe, believed that it would take only 4 days to destroy the fighter defenses of southern England and then another 4 weeks to defeat the rest of the RAF.⁵⁰ On July 17, 1940, the Luftwaffe's 2nd and 3rd Air Fleets had a total strength of 2,600 aircraft. This included 1,200 long-range bombers, 280 dive bombers, 760 single-engine fighters, and 220 twin-engine fighters.⁵¹ Based in Norway, the 5th Air Fleet had 95 bombers. On July 1, 1940, the RAF's Fighter Command had in service 754 single-engined fighters and 149 twin-engined fighters and bomber destroyers.⁵²

On September 17, Hitler ordered indefinite postponement of Operation *Sea Lion*.⁵³ He ordered the dispersal of the invasion fleet and settled for continuing the night raids against England. In the Battle of Britain, both sides suffered high losses. The RAF's Fighter Command lost 1,004 fighters and 81 other planes. The Luftwaffe lost 636 single-engine fighters, 243 bomber destroyers, 80 dive bombers, 881 bombers, and 82 other aircraft.⁵⁴ Among the reasons for the Luftwaffe's failure was its overestimation of its own capabilities.⁵⁵

Heavily defended, critically important economic areas can be destroyed or neutralized by mass attacks from the air. They are operational objectives if their destruction would result in major effects on the course and outcome of a campaign. In World War II, the U.S. Eighth Air Force conducted a massive attack on the ball-bearing plants in Schweinfurt and the Messerschmidt works in Regensburg on August 17, 1943 (Operation *Pointblank*).⁵⁶ The attacking force consisted of 376 B-17s

escorted by fighters. After the fighters turned back, the Luftwaffe's fighters and antiaircraft guns shot down 60 B-17s and damaged an additional 11 B-17s beyond repair. Six hundred and five crew members were lost, the majority as prisoners of war. The Luftwaffe lost only 27 fighters.⁵⁷ The B-17s scored 80 hits on the ball-bearing plants, reducing their production to one-third of the pre-raid level.⁵⁸ Although the Messerschmidt factory was out of operation for only several weeks—the building was destroyed, but not the machinery—the attack prevented 1,000 fighters from being built and forced the dispersal of production.⁵⁹

At the Allied Casablanca conference in January 1943, the parties decided to start bombing the oil installations in Ploesti, Romania. This mission was assigned to the U.S. Ninth Air Force, based in North Africa. The plan was to cripple German oil imports and shorten the war by 6 months.⁶⁰ Ploesti's complex consisted of five major and seven minor refineries located in a 3-mile ring around the city. Some refineries were located 18 miles north and 5 miles south of the city. At the Germans' insistence, all refineries were linked with a trunk pipeline to

ensure that the refineries could operate even in cases of heavy damage.

Ploesti was strongly defended. The outer defense ring consisted of German and Bulgarian fighters, with a mission of preventing enemy heavy bombers from penetrating central Romania. The inner defense ring consisted of 52 Me-109 fighters based at Mizil, 17 Me-110 night fighters at Zilistea, and 20 Romanian IAR-80s/-81s at Bucharest, plus some Ju-88 multipurpose fighters.⁶¹ Ground defense consisted of 237 88mm and 105mm antiaircraft guns. Some 80 percent of these guns were manned by the Germans. Additionally, defenses included a large number of barrage balloons, light flak towers, and hundreds of machine guns.⁶² The Germans linked their air and ground defenses. The Allied aircraft flying from North Africa to Romania had to cross six air defense zones. Ploesti was in Zone 24 East with headquarters at Otopeni.⁶³ The Germans also had an effective radar net plus a signal interception unit near Athens. This provided the Germans with the capability of tracking all enemy aircraft.⁶⁴

The first Allied attack on Ploesti was conducted with 178 B-24 heavy bombers by the U.S. Ninth Air Force (based

in North Africa) on August 1, 1943 (Operation *Tidal Wave*).⁶⁵ The initial force of heavy bombers was doubled to account for anticipated attrition. The raid inflicted significant but not crippling damages.⁶⁶ Two out of seven refineries were permanently destroyed; the others were repaired within a few weeks.⁶⁷ During the raid, 54 B-24s were lost (41 in combat) and 55 more were damaged, many of them never to fly again. Out of 1,726 crewmen, 532 were either dead or missing. The next day—August 2—only 33 B-24s were mission capable. For all practical purposes, the Ninth Air Force ceased to exist.⁶⁸

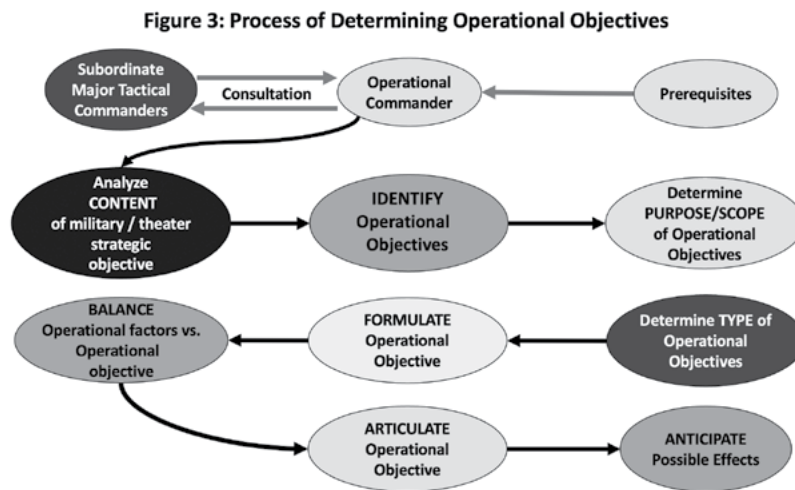
Process. A logical and coherent process for determining operational objectives should be used to ensure that no matter of importance is omitted. (See figure 3.) In the first step, the *content* of the military- or theater-strategic objective should be reviewed. Afterward, the operational commander and the staff should provisionally *identify* several potential operational objectives. For each objective, the *operationally* important elements of the factors of space, time, and force from the *enemy's perspective* should be evaluated. The focus in analyzing the *factor of space* should be on location and the size and characteristics of the operating area, distances to friendly basing areas, the area's oceanography or hydrography, and its weather and climate. In evaluating the *factor of time*, the main considerations should include the time required for the enemy's forces to be deployed, concentrated, and reinforced; warning/reaction time; the time required to commit enemy reserves; and so on. The main considerations in the *factor of force* should include the size and/or composition of enemy forces attacking or defending a given area or position, their mobility, logistic support and sustainment, combat readiness, morale and discipline, skills of the commanders, soundness of doctrine, and the enemy's anticipated resistance and will. This list is not all-inclusive. It is critically important to evaluate not only tangible elements of the factor of force, but often even more important intangible elements.

The commander and the staff must reduce the number of potential



A B-24 Liberator over Ploesti, Romania, during Operation Tidal Wave. (Collection of The National WWII Museum)

Figure 3. Process of Determining Operational Objectives



Source: Author.

operational objectives to those considered essential for the accomplishment of the military- or theater-strategic objective. Obviously, in any joint employment of combat forces, the most important operational objective is on land. It is there where the humans live. The operational commander and the staff must determine the *size of the operating area*, the *tentative timeline*, and the rough estimate of the *forces required* to accomplish a given operational objective.

The commander and the staff must first reevaluate the purpose and scope of a given military- or theater-strategic objective. An operational objective could be either offensive or defensive in its basic *purpose*. Theoretically, it can be limited or unlimited in *scope*. However, in contrast to accomplishing military- or theater-strategic objectives, accomplishing an operational objective would normally require employment of most of the forces available and maximum effort. In other words, operational objectives are inherently *unlimited* in terms of their scope.

In terms of its *importance*, an operational objective could be main or alternate. The *main objective* reflects the best course of action determined during the commander's estimate of the situation. Prudence dictates selecting not only the main objective but also an *alternate objective* in case some unanticipated events preclude accomplishing the main

objective. The alternate objective is based on the second-best course of action.

In a major joint operation, accomplishing a main objective would require accomplishing one or more *supporting objective(s)*, and these supporting objective(s) would be accomplished by other services of the armed forces. In a major operation on land or aimed at capturing lodgment ashore, ground forces would be employed for accomplishing the main objective while other services would accomplish the supporting objective(s) in their respective

physical mediums. For example, in a major amphibious landing, ground forces or marines would accomplish the main objective—establishing the initial lodgment ashore. Naval forces would obtain and maintain local sea control of the approaches to the landing site and control of the air. Air forces would secure local air superiority, provide close air support, and conduct air interdiction.

In case of capturing a large archipelago or an operationally important position ashore, one *initial* and two or more *successive* operational objectives must be accomplished. For example, in the Solomons Campaign of 1942–44, the Allied theater-strategic objective was obtaining control of the Solomons Archipelago and adjacent positions. This required accomplishing one initial and two subsequent operational objectives: capturing Guadalcanal (August 7, 1942–February 9, 1943), New Georgia (June 30–October 7, 1943), and Bougainville (November 1, 1943–April 18, 1944).

In *formulating* an operational objective, the commander should ensure that it is first and foremost in consonance with a given military- or theater-strategic objective. The main purpose and scope of the objective should be clearly stated or implied. For an offensive operational objective, the desired degree of damage to be inflicted on enemy forces should



German soldiers fighting in the Soviet Union as part of Operation Barbarossa, 1941. (NARA/U.S. Department of Defense)

be expressed in terms of destroying, annihilating, neutralizing, suppressing, and so on. In case of a defensive operational objective, one's actions can be described in terms of retaining control, fixed or delaying defense, suppression, hold or slowing down, etc. An operational objective should not be grouped with routine military matters, or even worse, political aspects of a war. This makes it not only too wordy but makes it unnecessarily difficult to differentiate what is more or less important.

After the operational objective is formulated, the commander and the staff should evaluate the validity of their decision. For *balancing operational factors of space, time, and force against an operational objective*, the first step is to determine a framework for the analysis. The size of physical space is an area of operations; for the factor of time is anticipated time required for accomplishing the operational objective (duration of a major operation); and for the factor of force is size/composition of friendly forces (combined arms/branches) required to accomplish a given operational objective. Afterward, the commander must select *operationally significant* elements of each operational factor to be used for analysis. Examples of operationally significant factors of space are central or exterior position, distances, topography, oceanography/hydrography of the operating area, and the weather/climate. Operationally important factors of time are time for deployment/redeployment; time between consecutive major operations, warning and reaction time, time to commit an operational reserve, and time required to regenerate combat potential. Examples of operationally significant factors of force are major service/joint forces, operational mobility, service/joint doctrine, and so on.

Perhaps the most difficult task is to determine a method of balancing each operational factor individually and then in combination (space-force; space-time; force-time) against a given objective. It requires much creative thinking on the part of operational commanders and their respective staffs. Balancing can reveal a rough harmony or a negligible, modest,

or major disconnect between a given operational factor and the objective. Afterward, the operational commander and the staff must devise the best ways to bring operational factors into harmony with a given objective.

Disconnect between the factors of space and force can be resolved by:

- shifting from an offensive to a defensive objective
- increasing the size of combat forces
- dividing the operating area into several segments
- reducing the length of the front line
- reducing the size of forces for rear defense
- operating from an exterior position
- conducting a prepared defense
- achieving operational surprise
- conducting operational deception
- reducing forces in a secondary sector of effort
- increasing the space-to-force ratio
- abandoning currently held positions or areas

The factors of space and time could be balanced by:

- extending the duration of a major operation
- shifting from an offensive to a defensive objective
- operating from a central position
- employing highly mobile forces
- reducing the distance for deployment
- reducing the number of intermediate objectives or the distance separating them
- using faster modes of transportation for deployment
- shortening the time for bringing up supplies
- achieving operational surprise
- conducting operational deception
- conducting a delaying defense
- increasing attrition of the enemy's forces

An operational commander could balance factors of time and forces by:

- shifting from an offensive to a defensive objective
- dividing the operating area into several smaller segments

- assigning forces with higher mobility
- reducing the number of intermediate objectives
- forward prepositioning
- conducting operational deception
- achieving operational surprise
- shortening supply lines
- extending a timeline for accomplishing ultimate or intermediate objectives
- operating from interior lines

The result of balancing operational factors versus a given operational objective would require a change to, modification of, or scaling down of a given objective. In extreme cases, the initially determined operational objective must be abandoned and replaced with a new objective. During combat, any major change in military- or theater-strategic objective or in operational objective would require quick reevaluation of the pertinent operational factors and rebalancing with the respective objective.

Operational objectives should be *articulated* clearly and succinctly. Clarity requires precise wording so that a directive cannot be misunderstood. The objective could be perfectly clear to the operational commander issuing it, but not to subordinate tactical commanders. Brevity calls for omitting superfluous words and unnecessary details. Trivial and meaningless expressions should be avoided. Short sentences are more easily and quickly understood than longer ones. Yet there is a danger in being too concise and thus possibly unclear. This should be avoided. Expressing an operational objective concisely should not be to the detriment of clarity. Needless words should not be used nor words that can be misunderstood. Without a clear operational objective, it is difficult to issue the mission to subordinate commanders. Writing concisely but clearly is an art.

The operational objective should be articulated in *affirmative* and *positive* form. *Authoritative* expression is closely linked to the principle of positivity. The directive should reflect the commander's intent and will—hence the need for the commander to express those ideas in direct and authoritative language.



American paratroopers of the 504th PIR bound for Sicily, July 1943. (U.S. Army Photo)

Positivity of expression suggests the commander's firmness of purpose. The use of indefinite and weak expressions leads to a suspicion of vacillation and indecision. Such expressions also tend to impose upon subordinates' responsibilities that belong to and are fully accepted by a resolute operational commander.

In the last step, the operational commander and the staff should try to *anticipate* physical and cognitive effects after the selected operational objective is accomplished. In some cases, political and psychological consequences might be so adverse that it would require radical change or even abandonment of the selected operational objective. The Japanese surprise attack on the U.S. Pacific Fleet at Pearl Harbor was not a strategic necessity as argued by the Japanese officials. Not all Japanese high officials supported the plan prepared by Admiral Isoroku Yamamoto, commander in chief of Japan's combined fleet. Japan's navy minister, Admiral Shigetaro Shimada, was strongly against the plan to attack Pearl Harbor. He wanted the United States to commit the first act of war and thereby enable Japan to declare war. Shimada wanted Japan to declare war only on Britain and the Netherlands.⁶⁹ In fact, if the United States had adhered to its war plans, the Pacific Fleet would not be employed in the Far East but would have confined its activities in the operations on the Japanese perimeter. The unprovoked Japanese attack brought the Americans solidly into the war as nothing else could have done.⁷⁰

Conclusion

A military- or theater-strategic objective must be divided into two operational objectives. Otherwise, the only solution is to conduct numerous and possibly unrelated tactical actions, resulting in both a waste of one's time and effort and unnecessary losses. Determining an achievable operational objective is the single most important decision by an operational commander. Any major operation is aimed at accomplishing a single operational objective. It is planned and executed in accordance with tenets of operational art. Like any military objective, an operational objective is accomplished by using one's lethal forces and should generate a radical change of the situation in a given theater of operations.

The operational objective must be formulated and then balanced against one's factors of space, time, and force to make sure that it is militarily achievable. Any major disconnect between these factors and a given operational objective must be resolved by modifying, altering, or drastically scaling down the operational objective. The process of balancing will also provide some rudimentary elements of the operational idea.⁷¹

An operational objective must be articulated clearly and succinctly. The operational objectives on land, at sea, and in the air should be stated separately because they each require different methods of combat employment. The operational commander and the staff must give some thoughts on anticipated military and nonmilitary effects of a given operational objective. Undesired effects with possible adverse strategic consequences should be avoided if possible. JFQ

Notes

¹ For the U.S. invasion of Iraq in March 2003 (Operation *Iraqi Freedom*), in the document "Phase I—Preparations," the planners inexplicably listed the following among the operational objectives: "Secure regional and international support," "Alert, deploy, and posture forces for shaping operations," and "Set conditions to neutralize Iraqi forces." In the document "Phase II—Shape the Battlespace," they listed the following among the operational objectives: "Maintain international and regional

support for operations," "Continue to deploy and posture forces for decisive offensive operations," "Deter WMD [weapons of mass destruction] employment, suppress Iraqi TBM [tactical ballistic missiles]/WMD delivery/storage systems," and "Suppress TBM/WMD production processes and deny access to WMD facilities." These documents were U.S. Central Command PowerPoint slides that were briefed to the White House and Secretary of Defense Donald Rumsfeld in 2002. *National Security Archive Electronic Briefing Book No. 214*, ed. Joyce Battle and Thomas Blanton, Tab K, slides 4 and 5 respectively, <https://nsarchive2.gwu.edu/NSAEBB/NSAEBB214/Tab%20K.pdf>. In another example, the initial operational objective was (falsely) considered to be "allow[ing] follow-on forces from the United States, allies, and partners to flow toward Taiwan . . . to regain sea control in the approaches to China." Scott Tait and Anthony LaVopa, "It All Comes Down to Sea Control," U.S. Naval Institute *Proceedings* 149, no. 12 (2023): 33, <https://www.usni.org/magazines/proceedings/2023/december/it-all-comes-down-sea-control>.

² Brian Holden Reid, "The Italian Campaign, 1943–45: A Reappraisal of Allied Generalship," in *Decisive Campaigns of the Second World War*, ed. John Gooch (London: Frank Cass, 1990), 136.

³ Martin Blumenson, "A Deaf Ear to Clausewitz: Allied Operational Objectives in World War II," *Parameters* 23, no. 1 (1993): 19–20, <https://press.armywarcollege.edu/parameters/vol23/iss1/3/>.

⁴ Reid, "The Italian Campaign, 1943–45," 136.

⁵ Martin Blumenson, *United States Army in World War II. The Mediterranean Theater of Operations, Salerno to Cassino* (Washington, DC: Center for Military History, United States Army, 1st printed 1969, CMH Pub 6-3, reprinted 1988), 301, 303, 353, <https://history.army.mil/portals/143/Images/Publications/catalog/6-3.pdf>.

⁶ Samuel Eliot Morison, *History of United States Naval Operations in World War II*, vol. 9, *Sicily-Salerno-Anzio, January 1943–June 1944* (Boston: Little, Brown, 1984), 325.

⁷ Carlo D'Este, *Fatal Decision: Anzio and the Battle for Rome* (New York: Harper Perennial, 1st ed., 1992), 77.

⁸ Hans Delbrück, *History of the Art of War*, vol. 4, *The Dawn of Modern Warfare*, trans. Walter J. Renfro Jr. (Lincoln, NE: University of Nebraska Press, 1985), 422; cited in James N. Wasson, *Innovator or Imitator: Napoleon's Operational Concepts and the Legacies of Bourcet and Guibert* (Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, May 1998), 21, <https://apps.dtic.mil/sti/tr/pdf/ADA357424.pdf>.

⁹ Helmuth von Moltke, *Moltke on the Art of War: Selected Writings*, ed. and trans. Harry Bell and Daniel J. Hughes (Novato, CA: Presidio, 1993), 93.

¹⁰ Blumenson, "A Deaf Ear to Clausewitz," 19–20.

- ¹¹ Williamson Murray and Allan R. Millett, *A War to Be Won: Fighting the Second World War* (Cambridge, MA: Harvard University Press, 2000), 482.
- ¹² Blumenson, "A Deaf Ear to Clausewitz," 22–23.
- ¹³ Blumenson, "A Deaf Ear to Clausewitz," 5.
- ¹⁴ Krisztián Ungváry, *The Siege of Budapest: One Hundred Days in World War II*, trans. Ladislaus Löb (New Haven, CT: Yale University Press, 2005), 374, 378–89.
- ¹⁵ "Weisung Nr. 21 für die Kriegführung (Fall Barbarossa)," December 18, 1940, in Walther Hubatsch, *Hitlers Weisungen für die Kriegführung 1939–1945. Dokumente des Oberkommandos der Wehrmacht*, 2nd rev. and exp. ed. (Koblenz, Germany: Bernard & Graefe Verlag, 1983), 87.
- ¹⁶ Cited in John D. Johnson, *Sequencing Operations: Considerations for the Operational Planner* (Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1991), 16–17, <https://apps.dtic.mil/sti/tr/pdf/ADA243306.pdf>.
- ¹⁷ Alfred Philippi and Ferdinand Heim, *Der Feldzug Gegen Sowjetrußland 1941 bis 1945. Ein operatives Überblick* (Stuttgart, Germany: W. Kohlhammer Verlag, 1962), 69–70.
- ¹⁸ Cited in Jehuda L. Wallach, *The Dogma of the Battle of Annihilation: The Theories of Clausewitz and Schlieffen and Their Impact on the German Conduct of Two World Wars* (Westport, CT: Greenwood, 1986), 269–70.
- ¹⁹ Cited in Bernd Wegner, "The Road to Defeat: The German Campaigns in Russia 1941–43," in *Decisive Campaigns of the Second World War*, ed. John Gooch (London: Frank Cass, 1990), 111–12.
- ²⁰ Chris Helmecke, "Vorstoss in den Kaukasus, 1942, Blut für Öl," *Militär & Geschichte, Extras, Sonderheft Nr. 20* (2025): 33.
- ²¹ Chris Helmecke, "Vorstoss in den Kaukasus, 1942, Blut für Öl," 33.
- ²² Sean Herbert Seyer, "The Plan Put Into Practice: USAAF Bombing Doctrine and the Ploesti Campaign" (master's thesis, University of Missouri, St. Louis, 2009), 59, <https://irl.umsf.edu/cgi/viewcontent.cgi?article=1178&context=thesis>.
- ²³ Cited in Robert J. Modrovsky, *1 August 1943—Today's Target Is Ploesti: A Departure From Doctrine* (Maxwell AFB, AL: Air Command and Staff College, Air University, April 1999), 4, <https://apps.dtic.mil/sti/tr/pdf/ADA395189.pdf>.
- ²⁴ Cited in John G. Bunnell, "Knockout Blow?: The Army Air Force's Operations Against Ploesti and Balikpapan" (thesis, School of Advanced Air and Space Studies, Air University, 2005), 15, <https://apps.dtic.mil/sti/tr/pdf/ADA477018.pdf>.
- ²⁵ Greg A. Grabow, "Schweinfurt Raids and the Pause in Daylight Strategic Bombing" (master's thesis, U.S. Army Command and General Staff College, 2008), 38–39, <https://apps.dtic.mil/sti/pdfs/ADA482986.pdf>.
- ²⁶ Mitsuo Fuchida and Masatake Okumiya, *Midway: The Battle That Doomed Japan—The Japanese Navy's Story* (Annapolis, MD: Naval Institute Press, 1955), 250.
- ²⁷ Ministry of Defence (Navy), *War with Japan*, vol. 2, *Defensive Phase* (London: Her Majesty's Stationery Office, 1995), 164.
- ²⁸ Fuchida and Okumiya, *Midway*, 249.
- ²⁹ "Pearl Harbor Operations: General Outline of Orders and Plans," in Donald M. Goldstein and Katherine V. Dillon, *The Pearl Harbor Papers: Inside the Japanese Plans* (Washington, DC: Brassey's, 1993), 98.
- ³⁰ Ministry of Defence (Navy), *War with Japan*, vol. 2, *Defensive Phase*, 21–22.
- ³¹ Samuel E. Morison, *The Two-Ocean War: A Short History of the United States Navy in the Second World War* (Boston: Little, Brown and Company, 1963), 67.
- ³² Ministry of Defence (Navy), *War with Japan*, vol. 2, *Defensive Phase*, 22.
- ³³ David C. Gompert et al., "Japan's Attack on Pearl Harbor, 1941," in David C. Gompert et al., *Blinders, Blunders, and Wars: What America and China Can Learn* (Santa Monica, CA: RAND, November 26, 2014), 103, https://www.rand.org/pubs/research_reports/RR768.html.
- ³⁴ "Operation Chromite," in *Joint Military Operations Historical Collection* (Washington, DC: The Joint Chiefs of Staff, July 15, 1997), chap. II, II-6, <https://www.jcs.mil/Portals/36/Documents/History/Monographs/JMO.pdf>.
- ³⁵ "Operation Chromite," II-11.
- ³⁶ *The Royal Navy and the Arctic Convoys: A Naval Staff History* (London: The Admiralty, 1957), reprinted with a preface by Malcolm Llewellyn-Jones (London: Routledge, Taylor & Francis Group, 2007), 53.
- ³⁷ Stephen W. Roskill, *The War at Sea, 1939–1945*, vol. 2, *The Period of Balance, History of the Second World War: United Kingdom Military Series*, ed. J.R.M. Butler (London: Her Majesty's Stationery Office, 1956), 143, <https://archive.org/details/war-at-sea-1939-1945-vol-2/page/n9/mode/2up>.
- ³⁸ Bodo Bullwinkel, *Kooperation Luftwaffe-Kriegsmarine dargestellt am Luftkrieg über See im Nordmeer 1942* (Hamburg: Führungsakademie der Bundeswehr, Abteilung Marine, January 5, 1971), 44.
- ³⁹ "Convoys to Russia, 1942," *Supplement to The London Gazette of Friday, 13th October 1950*, 5139, <https://www.ibiblio.org/hyperwar/UN/UK/LondonGazette/39041.pdf>.
- ⁴⁰ Peter C. Smith, *Pedestal: The Malta Convoy of August 1942* (London: William Kimber, 1970), 180; *The Royal Navy and the Mediterranean Convoys: A Naval Staff History* (London: The Admiralty, 1957), reprinted with a preface by Malcolm Llewellyn-Jones (London: Routledge, Taylor & Francis Group, 2008), 131; Roskill, *The War at Sea, 1939–1945*, vol. 2, *The Period of Balance*, 307–8; *The Royal Navy and the Mediterranean Convoys* (2008 reprint), 97.
- ⁴¹ Martin van Creveld et al., *Air Power and Maneuver Warfare* (Maxwell AFB, AL: Air University Press, 1994), 44, https://www.airuniversity.af.edu/Portals/10/AUPress/Books/B_0053_vancreveld_brower_canby_airpower_maneuver_warfare.pdf.
- ⁴² Georg W. Feuchter, *Geschichte des Luftkriegs. Entwicklung und Zukunft* (Bonn, Germany: Athenaeum-Verlag, 1954), 138.
- ⁴³ Van Creveld et al., *Air Power and Maneuver Warfare*, 44.
- ⁴⁴ Van Creveld et al., *Air Power and Maneuver Warfare*, 44.
- ⁴⁵ Michael B. Oren, *Six Days of War: June 1967 and the Making of the Modern Middle East* (Oxford, UK: Oxford University Press, 2002), 171–72.
- ⁴⁶ Oren, *Six Days of War*, 176.
- ⁴⁷ Trevor N. Dupuy, *Elusive Victory: The Arab-Israeli Wars, 1947–1974* (Garden City, NY: Military Book Club, 1978), 246.
- ⁴⁸ Oren, *Six Days of War*, 176.
- ⁴⁹ Air Ministry (UK), *The Rise and Fall of the German Air Force (1933 to 1945)* (London: Air Ministry, A.C.A.S. I, Pamphlet No. 248, 1948), 79.
- ⁵⁰ P.M.H. Bell, *Twelve Turning Points of the Second World War* (New Haven, CT: Yale University Press, 2011), 26.
- ⁵¹ Air Ministry (UK), *The Rise and Fall of the German Air Force*, 76.
- ⁵² Joseph Miranda, "RAF: The Battle of Britain," *Strategy & Tactics/Campaign Analysis*, no. 256 (May–June 2009), 9, <https://gamers-hq.de/media/pdf/a8/39/86/RAF-Campaign-Analysis-WEB.pdf>.
- ⁵³ Bell, *Twelve Turning Points of the Second World War*, 36.
- ⁵⁴ Joseph Miranda, "RAF."
- ⁵⁵ Air Ministry (UK), *The Rise and Fall of the German Air Force*, 87.
- ⁵⁶ Grabow, *Schweinfurt Raids and the Pause in Daylight Strategic Bombing*, 2.
- ⁵⁷ Cited in Grabow, *Schweinfurt Raids and the Pause in Daylight Strategic Bombing*, 3.
- ⁵⁸ Alex Coetzer, "Aiming for Strategic Effect: A Re-Examination of the Allied Assault on Schweinfurt," *Davidson History Journal*, no. 8 (Fall 2021): 5, <https://www.dhj.davidsonlocal.org/wp-content/uploads/2022/03/Coetzer.pdf>.
- ⁵⁹ David F. Crosby, review of *The Schweinfurt-Regensburg Mission: The American Raids on 17 August 1943*, by Martin Middlebrook, *Air Power History* 60, no. 4 (2013): 58, <https://www.jstor.org/stable/26276396>.
- ⁶⁰ Barry J. Dysart, review of *The Great Ground-Air Battle of 1 August 1943* by James Dugan and Carroll Stewart, *Air Power History* 46, no. 1 (1999): 68, <https://www.jstor.org/stable/26288860>.
- ⁶¹ Bunnell, "Knockout Blow?," 17.
- ⁶² Cited in Modrovsky, *1 August 1943—Today's Target Is Ploesti*, 25.
- ⁶³ Cited in Bunnell, "Knockout Blow?," 17.
- ⁶⁴ Cited in Modrovsky, *1 August 1943—Today's Target Is Ploesti*, 25–26.

⁶⁵ Bunnell, “Knockout Blow?,” 26; James Dugan and Carroll Stewart, “German Defenses and Allied Intelligence,” *Air Power Historian* 9, no. 1 (January 1962): 3, <https://www.jstor.org/stable/44512693>.

⁶⁶ Dysart, review of *The Great Ground-Air Battle of 1 August 1943*, 68.

⁶⁷ Dugan and Stewart, “German Defenses and Allied Intelligence,” 15.

⁶⁸ Cited in Bunnell, *Knockout Blow?*, 29.

⁶⁹ Shigeru Fukudome, “Hawaii Operation,” U.S. Naval Institute *Proceedings* 81, no. 12 (1955), <https://www.usni.org/magazines/proceedings/1955/december/hawaii-operation>, reprinted in *The Japanese Navy in World War II. In the Words of Former Japanese Naval Officers*, ed. David C. Evans (Annapolis, MD: Naval Institute Press, 2nd ed., 1986), 6.

⁷⁰ Ministry of Defence (Navy), *War with Japan*, vol. 2, *Defensive Phase*, 25.

⁷¹ This term derives from an old German term pertaining to the heart of a plan for a major operation or campaign. In contrast, the U.S. term “concept of operations” is overly broad because it refers to either tactical action or a major operation/campaign.



Sitting side by side, then-Air Force Chief of Staff Gen. John Ryan and recently fired Maj. Gen. John Lavelle testified before a House Armed Services subcommittee in 1972, as Congress investigated whether Lavelle acted within his authority or not in directing bombings in North Vietnam (Photo courtesy of *Air and Space Forces Magazine*)

Examining the Lavelle Affair 54 Years Later

An Injustice That Needs to Be Rectified Now

By Mark Clodfelter

On December 20, 2010, the Senate Committee on Armed Services denied the Pentagon's request, endorsed by President Barack H. Obama, for the posthumous advance of Air Force Major General John D. Lavelle to the retired list in the rank of general. Thirty-

eight years earlier, Air Force Chief of Staff General John D. Ryan had fired Lavelle as the 7th Air Force commander for allegedly conducting unauthorized airstrikes against North Vietnam and ordering the falsification of mission reports. Senate hearings in September

1972 deemed Lavelle guilty of both offenses, resulting in his demotion to major general following retirement.

Congress reconsidered the Lavelle Affair in 2024, but it did not turn to new information available to do so. Instead, it relied on the findings of former Federal Bureau of Investigation Director William H. Webster and his committee of attorneys and historians, who began investigating the case in 2011 and finally produced a report in May 2015. The

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Three U.S. Navy McDonnell F-4B Phantom II of Fighter Squadron 161 (VF-161) Chargers and three Ling-Temco-Vought A-7C Corsair II of Attack Squadron 86 (VA-86) Sidewinders during a Loran-guided strike mission over Vietnam, March 1973.

fiscal year (FY) 2025 National Defense Authorization Act (NDAA) reflected the conclusions of Webster's committee, advancing Lavelle's retired rank to lieutenant general. Webster's team determined that Lavelle's actions before becoming a four-star general had been honorable, but that the same assessment could not be made regarding his tenure in Vietnam. Yet like the Senate Committee on Armed Services in 2010, Webster's committee never examined documents essential to the case that remained classified until late 2015, and its findings—and those of the 2024 Congress—remain as flawed as that of the Senate Committee on Armed Services in 1972.

A careful reading of documentary and taped evidence now available reveals

that Lavelle neither violated the rules of engagement (ROE) nor falsified mission reports, and further reveals that some four-star testimony at his hearings was deceitful. Accordingly, 54 years after those accusations, Lavelle should now have his retired rank restored to that of full general. In this age of concerns about the validity—and legality—of aerial operations, his tale should serve as a cautionary one for those who question the proper conduct of “civil-military relations” in the complex and often confounding era of modern limited war.

Lavelle's controversial bombing came to light in early March 1972, after General Ryan received a letter that Air Force Sergeant Lonnie Franks, an intelligence specialist at Udorn Air Base, Thailand, had

written to his senator. The letter alleged that Udorn's pilots regularly filed false reports after flying over North Vietnam, claiming that they had received ground fire when they had not. Ryan dispatched the Air Force inspector general (IG) to investigate, and the IG determined that Lavelle had ordered 28 missions consisting of 147 sorties that violated the rules of engagement governing them and led to falsified mission reports.¹

Ryan called Lavelle to Washington, telling him that he would be relieved of command and demoted to his permanent rank of major general should he remain in the Air Force. Lavelle instead chose retirement, and the Senate Committee on Armed Services voted 14-2 to keep him on the retired list as a major general.²

Background

Lavelle's dismissal stemmed from a bombing halt "agreement" supposedly concluded at the 1968 Paris Peace Talks. In the accord, the North Vietnamese seemingly promised not to fire on unarmed American reconnaissance aircraft in exchange for America's not bombing the North. Violations led to escorting reconnaissance aircraft with fighters that could conduct "protective reaction strikes" on enemy air defenses that shot at aircraft. American technicians then perfected a radar homing and warning indicator that triggered a tone in a pilot's headset when the radars guiding surface-to-air missiles (SAMs) or antiaircraft artillery locked onto an aircraft prior to firing.³ This warning gave the pilot several seconds of reaction time, enabling him to attack the threat before it fired. As a result, the following rules of engagement were in effect when Lavelle took command of Seventh Air Force: "Fighter aircraft may strike any SAM or Triple A site below 20 degrees north [latitude] which fires at or *is activated against* U.S. aircraft conducting missions over Laos or North Vietnam."⁴

Lavelle arrived in Saigon in July 1971. He had flown P-47s in World War II and then had assignments in Europe, Asia, and the Pentagon. He was not Ryan's choice for the job, and in fact had clashed with Ryan in previous assignments. But Lavelle had backing from other leaders—in particular, Army General Creighton Abrams, the commander of Military Assistance Command, Vietnam, who became Lavelle's boss. Abrams was focused on thwarting an expected North Vietnamese invasion, and Lavelle began working with him to negate it.

Ominous signs pointed to a massive attack. Along with stockpiling materiel, the North Vietnamese began moving MiG fighters south where they could threaten B-52 bombers. On October 4, 1971, a MiG attempted to shoot down a B-52. Lavelle was responsible for protecting the bombers, as well as for obtaining reconnaissance photographs. Much of that duty fell to the 432nd Wing at Udorn, which sported a squadron of unarmed, camera-equipped

RF-4s plus two squadrons of ordnance-carrying F-4s.

The attempted shooting down of a B-52 troubled Lavelle. MiGs had begun operations from airfields at Dong Hoi and Quang Lang, both in southern North Vietnam. Abrams called for a reconnaissance mission over Dong Hoi. Admiral Thomas Moorer, the Chairman of the Joint Chiefs, was in Saigon, and, according to Lavelle, advised him to conduct a protective reaction strike against Quang Lang. Moorer believed that defensive fire would certainly occur on the mission—and thus, the raid would be in accordance with the rules of engagement.⁵ In his 1972 testimony before the Senate Committee on Armed Services, Moorer denied that he told Lavelle to preplan the Quang Lang mission.⁶

On November 7 and 8, 1971, 7th Air Force aircrews bombed the airfields at Dong Hoi and Quang Lang, receiving ground fire on both missions and cutting the Quang Lang runway. Those raids marked the first of Lavelle's "unauthorized attacks." In Senate testimony 10 months later, General Ryan condemned the attacks as ROE violations because they were preplanned strike missions.⁷ At the time of the raids, though, Ryan's thoughts were very different—he berated Lavelle for poor bombing.⁸

The Dong Hoi and Quang Lang attacks did little to deter the North Vietnamese. On November 20, 1971, a MiG from Dong Hoi fired on a flight of B-52s; the bombers managed to escape harm. The commander of Strategic Air Command then grounded all B-52s in Southeast Asia for 48 hours. As a result, the Joint Chiefs called for a conference to resolve the bomber protection problem. In Honolulu from December 4 to 5, Air Force Lieutenant General John Vogt relayed Admiral Moorer's directives. Vogt's message was blunt: field commanders should be more aggressive in applying the ROE for protective reaction strikes. He recommended raising the number of escorts from 2 to 16 to assure damage. He said the Joint Chiefs would not question aiming points on such attacks, and commanders could expect full backing from the Chiefs.⁹

The conference amplified the impetus to attack North Vietnam that Lavelle had received from Secretary of Defense Melvin Laird. In early November 1971, Laird visited Saigon and Lavelle talked with him privately. Lavelle mentioned the MiG threat and the need for ROE changes to attack them directly. Laird replied that it was a bad time to request ROE changes; Lavelle and Abrams should "make maximum use of the authorities they had and he would support them in Washington."¹⁰ Lavelle recalled that Abrams agreed with Laird's advice.¹¹

Lavelle received still another inducement to intensify bombing. While in Washington for a conference, he received a briefing on how to destroy the radar site at Moc Chau. Moc Chau was a "ground control intercept" (GCI) radar that relayed its view to MiG pilots and had recently enabled MiGs to shoot down three F-4s. Lavelle reflected: "No one mentioned anything to me about doing it, legal, illegal, or what have you. Just how to."¹² On January 5, 1972, Lavelle bombed the facility. He briefed Abrams before the attack, and both men believed the airstrike was a necessity. The Joint Chiefs viewed the raid differently. They told Abrams that they sympathized with the attack's rationale, but it did not adhere to the ROE, and not to do it again.¹³

The Moc Chau mission did not make the IG's list of unauthorized raids, yet the raid is a noteworthy part of the Lavelle Affair. Senate hearings cited it to highlight the Joint Chiefs' displeasure with the perceived ROE violation. In addition, Major General Alton Slay, Lavelle's director of operations, told the Senate Committee on Armed Services that he led mission planning because Lavelle was away in the United States.¹⁴ Abrams stated to the committee that Lavelle was present for the raid and had discussed it with Abrams beforehand; Abrams's taped conversations also revealed Lavelle's presence. Slay's statements about the mission make his further testimony before the Senate Committee on Armed Services questionable.



A U.S. Navy McDonnell F-4B Phantom II of Fighter Squadron VF-111 Sundowners drops 227 kg Mk 82 bombs over Vietnam during 1971. VF-111 was assigned to Attack Carrier Air Wing 15 (CVW-15) aboard the aircraft carrier USS Coral Sea for a deployment to Vietnam, November 25, 1971 (Navy photo/public domain).

North Vietnamese Radar Netting

For Lavelle, not only were the GCI radar sites a threat when MiGs were airborne, but they had also become a threat when MiGs failed to fly. In late 1971, the North Vietnamese “netted” their radar systems so that the GCI radars could provide tracking information to SAM sites.¹⁵ As a result, the SAM operators now had to turn their radars on for only an instant, which allowed the firing of missiles at the last possible second and minimized—or negated—the warning tone that pilots received. The North Vietnamese downed an F-105 and an F-4 using this new tactic. Lavelle concluded that the notion of “radar activation” based on receiving a warning was no longer valid,

and that radar netting meant that pilots over the North were now *always* “activated against.”¹⁶

Lavelle first discussed the dangers that the netted radars posed with General Abrams in a December 1971 staff meeting.¹⁷ After several discussions regarding that threat with Lavelle, Abrams emphasized his agreement with Lavelle’s assessment in a detailed message on January 6, 1972, to Admiral John McCain, commander of Pacific Command, that Admiral Moorer and General Ryan also received. The message concluded:

This tactic effectively negates the protection afforded by our radar homing and warning equipment since there is little or no time to evade the missile with such a

*short warning. We believe that this tactic was used in the shootdown of the F-105 and F-4 near Mu Gia pass on 10 and 17 December respectively. This tactic must be countered if we are to continue to operate within the SAM threat area.*¹⁸

Ryan later told the Senate Committee on Armed Services that radar netting “was not a new phenomenon,” and the North Vietnamese had practiced it since 1967. When pressed by senators, Ryan recanted: “Perhaps the internetting was developed to a greater degree in 1971 and early 1972 than it was in 1967. I have no way of knowing this,” a dubious claim for a Chief of Staff who received constant updates to the air war over the North, including Abrams’s January 6, 1972, message.¹⁹

Lavelle's interpretation of the ROE had significant consequences for the missions that followed. On January 23, 1972, he ordered a protective reaction strike against the airfield at Dong Hoi. Intelligence revealed that a MiG had left Hanoi for Dong Hoi and B-52s were to be in the area. Lavelle recalled that he contacted Abrams and received his approval for the strike.²⁰ Despite poor weather, F-4s cut the runway, compelling the MiG to return to Hanoi.

After departing the target, the RF-4 crew radioed that the raid was successful, but that the enemy had not reacted, meaning that the North Vietnamese had not fired. General Lavelle heard the transmission and stated that the aircrew could not report "no reaction." As he recounted to both the House Armed Services Committee and the Senate Committee on Armed Services, he meant by that statement that the North Vietnamese *had* reacted by activating their GCI radars. Lavelle directed General Slay to contact the wing and make sure it did not post "no reaction." Lavelle later told the Senate Committee on Armed Services that he should have directed Slay to convey, "Report hostile reaction radar."²¹ Yet given the tense atmosphere in the command post, with a MiG headed for Dong Hoi, Lavelle's comment lacked clarity.

As a result of Lavelle's guidance, Slay directed Colonel Charles Gabriel, the wing commander, to state that the enemy had shot at the flight. Gabriel and his subordinates never realized Lavelle's intent to categorize the raid as one stemming from the threat posed by netted radars. Because they were told they could not state "no reaction" on the written post-strike mission report, the Operations Report Number 4 (OPREP-4), intelligence analysts selected from one of the four "reaction categories" on the form—SAMs, antiaircraft artillery, small arms, or MiGs—and chose antiaircraft artillery; "radar activation" was not an option listed, and, to complete the form "correctly," one of the four choices had to be selected.

For the remaining "unauthorized" protective reaction strikes, Sergeant

Franks and other analysts repeated the process used on the OPREP-4 for Dong Hoi.²² Gabriel recalled that Slay said to him, "You will report it in that way each time, regardless of whether or not there is a reaction you will report reaction, fighters expended."²³ Yet Slay also told Gabriel to send him a detailed report describing what had actually occurred on each mission and gave that to Lavelle.²⁴

The OPREP-4 was a cumbersome summary read by a computer from punch cards. Slay remarked: "I doubt if there is anyone above the rank of sergeant looks at the OPREP-4. For a usable piece of paper for somebody to read it and say, 'This is what happened' it is terrible."²⁵ General Michael P. C. Carns, a veteran of 200 Vietnam combat missions in F-4s from 1968 to 1969 who then became General Ryan's aide as a major, described the OPREP-4 as "useless."²⁶ Lavelle was unaware that the report even existed and stated the first time he saw it was when the Air Force IG produced a copy. For evaluating missions, Lavelle relied on the reports that he received from Slay and forwarded those to Abrams.

As for the veracity of the OPREP-4s, the difficulty of identifying enemy fire made it uncertain that the reports were actually erroneous. J. Fred Buzhardt, the Defense Department's General Counsel, concluded: "To sustain a criminal charge of falsifying records, it is necessary to prove a specific intent to deceive. Where people are reporting the facts to their superiors correctly, you cannot sustain that element." He added: "As to the question of proof, on either a violation of the Rules of Engagement or falsifying reports, after the most intensive investigation we are even now not in a position to prove with any degree of conclusiveness that there was no enemy fire except on only one of the missions that took place. That was at Dong Hoi on the 23rd of January."²⁷

The Joint Chiefs' reaction to the Dong Hoi attack—the third of Lavelle's "unauthorized" raids—was to praise it. Moorer lauded the strike to President Richard M. Nixon as an example to follow.²⁸ Yet when asked by the Senate

Committee on Armed Services about the mission, Abrams said that he remembered little about it—an odd statement given the serious MiG threat.²⁹ Lavelle told the House Armed Services Committee that for the Dong Hoi mission—and those that followed—SAMs were activated "any time U.S. pilots were over North Vietnam."³⁰ Still, that reasoning did not permit indiscriminate bombing—he refused to attack 60 tanks spotted north of the Demilitarized Zone because he was authorized to attack only air defense targets.³¹ In sum, Lavelle believed that the raids and his logic for them matched what the "higher authority" wanted him to do.

Nixon Secretly Changes the Rules of Engagement

To higher authority Richard Nixon, bombing offered answers to many national security problems. Soon after becoming President, Nixon began a secret air campaign with B-52s against North Vietnamese troops in Cambodia, technically a neutral country.³² The Air Force maintained two sets of mission reports for the raids—similar to the dual sets kept for Lavelle's controversial attacks.³³ The President did not want to trigger protests by revealing an expanded war.

In February 1972, Nixon realized that air power was vital to stymie the expected invasion, plus he feared the loss of a B-52. He endorsed the liberal interpretation of the ROE advocated by Lavelle, telling Moorer and Secretary Laird on February 2: "If you're following your intelligence reports, we're having *correct* protective reaction strikes every damn day right now, so you're hitting things. Incidentally, and I understand, and I just want to be sure, that that's being interpreted very, very broadly."³⁴

In the Oval Office with Henry Kissinger and ambassador to South Vietnam Ellsworth Bunker the next day, Nixon elaborated on how broadly he wanted to interpret the ROE. He did not want to give Abrams "blanket authority" to attack SAM sites because "It'll get out."³⁵ On the eve of visiting China, the President feared that increased airstrikes might affect the trip

or stir protests. Thus, like in Cambodia, he decided to intensify bombing—and keep it secret. Nixon told Bunker that protective reaction now meant preventive reaction regarding SAMs. “Who the hell’s going to say that they didn’t fire?,” the President emphasized to Bunker: “Tell Abrams when you get back not to put out extensive briefings with regard to our military activities from now till we get back from China. Do it, but don’t say it. He can hit SAM sites, period. Okay?”³⁶ The conversation continued:

Nixon: As you know, when we were hitting the [Mu] Gia Pass and the rest, we’d call that protective reaction—and then bomb the hell out of a lot of other stuff.

Bunker: Sure.

Nixon: Okay?

Bunker: Sure.³⁷

Two days later Laird authorized airstrikes in the northern portion of the Demilitarized Zone. Moorer relayed the message, prohibiting a public announcement of it. Moorer also notified Abrams that Nixon wanted a daily update on the war.³⁸

To answer Moorer’s request, Lavelle sent Abrams the accurate mission summaries that Gabriel had forwarded to Slay. Abrams in turn forwarded the summaries until they reached Laird, who sent them to Nixon. For all of those carefully recorded raids, constituting 70 percent of the alleged unauthorized strikes, no complaints came to either Abrams or Lavelle. Indeed, on the February 8 report, Nixon scribbled in the margin for Kissinger: “K—is there *anything* Abrams has asked for that I have *not* approved?”³⁹

Airstrikes continued during Nixon’s China visit, and Nixon received daily updates on them. On March 11, with the arrival in Saigon of the Air Force IG, Lavelle halted protective reaction strikes and OPREP-4 reporting. Once in Washington, Lavelle took blame for failing to articulate clearly his notion of “activated against,” but he remained adamant that he had not ordered falsification of the OPREP-4s. He soon determined that he would receive no high-level backing and



President Richard Nixon and National Security Advisor Dr. Henry Kissinger, February 8, 1972 (White House Photo Office, General Services Administration, National Archives and Records Service, Office of Presidential Libraries)

decided to retire. Ryan advised him to take a medical retirement; Lavelle had a heart murmur following a heart attack as well as other ailments.

On April 7, Ryan announced that Lavelle had retired from the Air Force “for personal and health reasons.”⁴⁰

The *New York Times* soon reported that other factors had likely led to Lavelle’s retirement, spurring investigations by the House and Senate. Those hearings came as a surprise to the President. In a June meeting after the House Armed Services Committee hearing, Nixon asked, “What

the hell is that all about? Who is Lavelle? Is he being made a goat? If he is, it's not good."⁴¹ Later that day, Nixon met privately with Kissinger. Kissinger stated, "What happened with Lavelle was he had reason to believe that we wanted him to take aggressive steps," to which Nixon replied, "Right, that's right. . . . I don't want a man persecuted for doing what he thought was right." "Of course, the military are impossible too," Kissinger rejoined. Nixon responded, "Well, they all turn on each other like rats." Kissinger agreed and offered: "I think this will go away. I think we should just say after all we took corrective steps. We could have easily hidden it. I think you might as well *make a virtue of a necessity*." Nixon replied: "I don't like to have the feeling that the military can get out of control. Well, maybe this censures that. This says we do something when they . . ." and he stopped mid-sentence. Then he said, "It's just a hell of a damn. And it's a bad rap for him, Henry. . . . Laird knows goddamn well, that I told him, I said it's protective reaction. He winks, he says, 'Oh I understand.'"⁴²

Nixon vacillated between sympathy and practicality, but in the end, pragmatism won out. He took Kissinger's advice, telling the press Lavelle's dismissal "was appropriate."⁴³ A week later, Nixon elaborated: "Lavelle did exceed authorization; it was proper for him to be relieved and retired. And I think it will assure that kind of activity may not occur in the future."⁴⁴

Judging the Truth

Since the 1972 ruling by the Senate Committee on Armed Services, the evidence now available makes the failure of the 2010 Senate Committee on Armed Services to restore Lavelle's rank especially confounding, and that is equally true of Congress in the 2025 NDAA. The 2010 Senate Committee on Armed Services and William Webster's 2011 investigating committee both neglected sources providing strong arguments for why Lavelle should get his two stars back—Nixon's pattern of behavior, the results of Buzhardt's investigation, House

and Senate testimony, and documentation that has since been declassified.

Nixon reveled in making key decisions via covert or backchannel means, and he excelled in defying existing policy to suit his own ends. His February 3 direction to Bunker that Abrams "can hit SAM sites period—do it, but don't say it," was just one example of Nixonian decisionmaking. The President had used the same technique when he ordered the 1969 secret bombing of Cambodia without informing the Secretary of the Air Force or General Ryan.⁴⁵

Buzhardt's thorough investigation revealed that antiaircraft artillery fire may well have occurred and gone unnoticed on virtually all airstrikes. Moreover, even if the falsification of OPREP-4s transpired, Lavelle and his subordinates made no effort to hide the true results of the missions, and Lavelle's superiors received accurate mission summaries. The Joint Chiefs, the Air Staff, and the Secretary of Defense encouraged him to broaden the air war, and the loss of two fighters to radar netting caused him to take the advice and redefine "activated against." Indeed, two weeks after the IG arrived in Saigon and Lavelle halted protective reaction strikes, a North Vietnamese SAM downed an Air Force AC-130 gunship, killing all of its 13 crew members.⁴⁶

During the 1972 congressional hearings, several high-ranking officers tended to view Lavelle's interpretation of "activated against" differently, and the analysis of the 2010 Senate Committee on Armed Services, as well as the Webster committee and the 2024 Congress, failed to examine this key part of the Lavelle puzzle—the veracity of the testimony by others wearing four stars. Ryan contended that the North Vietnamese had netted their radar system since 1967, a dubious assertion that he then tried to amend. His description of the ROE to the House Armed Services Committee also rang hollow when he argued it had remained constant since 1968, and 3 months later told the Senate Committee on Armed Services that it had not because of the "radar activation" caveat.⁴⁷

As for Abrams, his remarks to Lavelle during the December 1971 staff meeting after the loss of an F-105 and F-4 to the North's netted radar system show that Abrams understood the dangers that netting posed. He told Lavelle to study the problem—with the implication being to find a solution for it. Abrams's January 6, 1972, message to Admiral McCain, Admiral Moorer, and General Ryan revealed that Abrams had accepted Lavelle's definition of "activated against." Yet he asserted to the Senate Committee on Armed Services that Lavelle had "acted improperly" regarding the ROE but could not remember any violations.⁴⁸ Additionally, he could not recall the strike on Dong Hoi when a MiG threatened B-52s.

The testimony of Joint Chiefs Chairman Moorer also contained dubious remarks. His comments about his role in coordinating the November 8, 1971, raid on the Quang Lang airfield were questionable. Furthermore, in the June 1972 Senate Committee on Armed Services hearing to confirm his reappointment as Chairman, Moorer offered observations regarding the chain of command that contradicted the personal arrangement he had secured with Nixon. Nixon had told Moorer to bypass Secretary of Defense Laird and report to him directly, while Moorer told Senator Margaret Chase Smith that the President would never bypass the Secretary of Defense in giving orders.⁴⁹

Lavelle was not perfect as 7th Air Force Commander. Yet the failure to provide clarity does not equate to an attempt to deceive. Lavelle is not the first, nor the last, commander who has failed to provide precision when issuing orders, but he may well be the first to be sacked and demoted because of his failure to be specific. He had no *intent* to deceive and kept his superiors *fully informed* of his actions.

In the final analysis, the Lavelle Affair stands as a test of American civil-military relations in the modern era of limited war. During the hearings, many editorial writers excoriated Lavelle for conducting his own private air war and trying to hide what he had done. So it must have seemed at the time. In reality, rather than usurping power,

Lavelle grappled with how best to stop an imminent enemy offensive that he could not attack directly—and how to achieve that goal without further endangering his aircrews; no aircraft were lost on any of the “unauthorized missions.” Meanwhile, he received guidance to interpret the rules “liberally,” along with promises of support. Lavelle interpreted the rules as suggested—and was cast adrift by his military chiefs, and ultimately by the President.

Today’s commanders are likely to face the same type of dilemmas, because many situations will demand interpretation. The ROE will likely contain phrases such as “activated against,” and seemingly sound guidance may quickly become lethal because the enemy gets a vote—and a savvy enemy will use the ROE to its own advantage. Moreover, presidential personalities will profoundly affect the use of military power, and air power in particular—the military instrument that seemingly offers the most gains for the least costs. Generals and admirals can possess personality defects as well; high rank is no guarantee of sound strategic thinking—and the integrity and responsibility that should accompany it. In addition, today’s era of 24/7 news cycles and social media will make dealing with such issues more difficult for not just a field commander but for any individual holding a high position.

Lavelle met his challenges with logic, integrity, and dignity, and the injustice that he received should finally be rectified. That acknowledgment can occur in one of two ways: the current Congress can do so through a provision in the fiscal year 2027 National Defense Authorization Act restoring his retired rank to four stars. The Senate Committee on Armed Services also has the power to accomplish the same objective by approving the recommendation from the 2016 Air Force Board for the Correction of Military Records that has now languished for a decade. Some members of the current Senate Committee on Armed Services staff, perhaps thinking that the FY 2025 NDAA resolved the question of Lavelle’s retired rank, have recently voiced objections to having Congress again consider the issue in the FY 2027 NDAA. Yet that should

not deter those who believe that Lavelle has been unfairly treated to take action in the forthcoming NDAA to rectify the previous miscarriage of justice.

Lavelle acted as he was ordered, and his just conduct saved American lives. A half-century after his actions, it is high time that he receives proper recognition for doing his duty. **JFQ**

Notes

¹ Louis L. Wilson Jr., Inspector General of the Air Force, “Report of Investigation Concerning Alleged Falsification of Classified Reports for Missions in North Vietnam” [hereafter “Report of Investigation”], March 20, 1972, 1–5, <https://www.yumpu.com/en/document/view/16595042/inspector-general-report-march-20-1972-with-attachments-pdf/7>.

² Aloysius Casey and Patrick Casey, “Lavelle, Nixon, and the White House Tapes,” *Air Force Magazine*, February 2007, 90, <https://www.airandspaceforces.com/article/0207tapes/>.

³ Wayne Thompson, *To Hanoi and Back: The U.S. Air Force and North Vietnam, 1966–1973* (Washington, DC: Smithsonian Institution Press, 2000), 205, <https://media.defense.gov/2010/Oct/01/2001329749/-1/-1/0/ToHanoiAndBack.pdf>.

⁴ Hearings before the Committee on Armed Services of the United States Senate, 92nd Cong., 2nd sess., “Nomination of John D. Lavelle, General Creighton W. Abrams, and Admiral John S. McCain” [hereinafter “Nomination of Lavelle, Abrams, and McCain”], September 18, 1972, 281. Emphasis added.

⁵ Quoted in John D. Lavelle, interview by John N. Dick Jr., McLean, VA, April 17–24, 1978, K239.0512-1036, Air Force Historical Research Agency (AFHRA), Maxwell AFB, AL, 575–76; “Nomination of Lavelle, Abrams, and McCain,” September 12, 1972, 55, 59–60.

⁶ “Nomination of Lavelle, Abrams, and McCain,” September 28, 1972, 444. Yet Moorer later stated during the hearing, “going to an airfield like Quang Lang, it would be, you know, the ultimate in nonprofessionalism if you just waited until you got there, flying at 500 or 600 knots, to decide what you are going to do in case you do get fired upon. So [air crews] make a very careful study of the antiaircraft sites, the missile sites, and say, if we get attacked, I want you to do this, you to do that. But if we do not get attacked, we just fly right on over and in this case, we had alternate targets in Laos that they would have gone on over and attacked.” See 463–64.

⁷ “Nomination of Lavelle, Abrams, and McCain,” September 18, 1972, 256.

⁸ Lavelle, interview by Dick, 578. See also “Nomination of Lavelle, Abrams, and McCain,”

September 12, 1972, 60, 85; Charles A. Gabriel, “Statement of Witness,” March 14, 1972, in Wilson, “Report of Investigation.”

⁹ “Nomination of Lavelle, Abrams, and McCain,” September 12, 1972, 20, 48, 50; September 19, 1972, 314; Lavelle, interview by Dick, 597–99.

¹⁰ “Nomination of Lavelle, Abrams, and McCain,” September 12, 1972, 50.

¹¹ Lavelle, interview by Dick, 592–93.

¹² Lavelle, interview by Dick, 587; Thompson, 206.

¹³ “Nomination of Lavelle, Abrams, and McCain,” September 12, 1972, 62–63, and September 13, 1972, 107–8; Lavelle, interview by Dick, 589–90.

¹⁴ “Nomination of Lavelle, Abrams, and McCain,” September 19, 1972, 291–92, 304–5; Lavelle, interview by Dick, 589.

¹⁵ For a thorough review of North Vietnamese air defenses, see Bernard C. Nalty, *Electronic Countermeasures in the Air War Against North Vietnam 1965–1973* (Washington, DC: Office of Air Force History, 1977), 1–13, and especially 10 on netting.

¹⁶ Hearing before the Armed Services Investigating Subcommittee on Armed Services, House of Representatives, 92nd Cong., 2nd sess., “Unauthorized Bombing of Military Targets in North Vietnam,” June 12, 1972, 34. See also Lavelle, interview by Dick, 637–39; “Nomination of Lavelle, Abrams, and McCain,” September 12, 1972, 55–56.

¹⁷ Transcript of December 19, 1971, Commanders Weekly Intelligence Estimate Update at MACV Headquarters, in *Vietnam Chronicles: The Abrams Tapes, 1968–1972*, ed. Lewis Sorley (Lubbock: Texas Tech University Press, 2004), 722; “Nomination of Lavelle, Abrams, and McCain,” September 11, 1972, 24, and September 13, 1972, 105.

¹⁸ Message, General Abrams to Admiral McCain, Info Admiral Moorer, General Ryan, General Clay, Admiral Clarey, and General Lavelle, 0405Z, January 6, 1972, Subject: “Iron Hand Expenditure,” Folder: COMUSMACV GENSER MSGS (January 1–14, 1972), Box 62, Admiral Moorer Records, RG 218, National Archives and Records Administration, College Park, MD.

¹⁹ “Nomination of Lavelle, Abrams, and McCain,” September 11, 1972, 24, and September 13, 1972, 105.

²⁰ “Nomination of Lavelle, Abrams, and McCain,” September 11, 1972, 9–11, 37.

²¹ “Nomination of Lavelle, Abrams, and McCain,” September 11, 1972, 31, 46; “Unauthorized Bombing of Military Targets in North Vietnam,” June 12, 1972, 22.

²² Two of those strikes listed as “unauthorized” included attacks on 130mm artillery, approved by President Nixon, on February 16–17, 1972. Those raids did not yield OPREP-4s.

²³ “Nomination of Lavelle, Abrams, and McCain,” September 15, 1972, 201.

²⁴ “Nomination of Lavelle, Abrams, and McCain,” September 15, 1972, 234–35, September 19, 1972, 288, 289, 300–301; IG interview of Charles Gabriel, March 12, 1972, in Wilson, “Report of Investigation,” appendix F.

²⁵ “Nomination of Lavelle, Abrams, and McCain,” September 19, 1972, 313.

²⁶ Interview of USAF General Michael P. C. Carns (Ret.) by the author, Alexandria, VA, September 30, 2016.

²⁷ Hearing before the Committee on Armed Services, United States Senate, 93rd Cong., 1st sess., “Certain Nominations in the Air Force and the Navy,” March 22, 1973, 5.

²⁸ “Meeting of President Nixon and the National Security Council,” in *The Nixon Tapes*, ed. Douglas Brinkley and Luke A. Nichter (Boston: Houghton Mifflin Harcourt, 2014), 367.

²⁹ “Nomination of Lavelle, Abrams, and McCain,” September 13, 1972, 106. Yet Abrams previously told the Senate Committee on Armed Services, “A MiG at Dong Hoi was important to me, because with the GCI that they had, it gave it—it could get properly handled as far south as Da Nang. And this meant then that if that was in fact true it extended the MiG threat for B-52s and other aircraft that much further south.” See p. 105.

³⁰ “Unauthorized Bombing of Military Targets in North Vietnam,” June 12, 1972, 35.

³¹ “Unauthorized Bombing of Military Targets in North Vietnam,” June 12, 1972, 43–44. See also “Nomination of Lavelle, Abrams, and McCain,” September 11, 1972, 21, 49.

³² Richard M. Nixon, *RN: The Memoirs of Richard Nixon* (New York: Grosset and Dunlap, 1978), 380–81.

³³ Hearings before the Committee on Armed Services, United States Senate, 93rd Cong., 1st sess., “Bombing in Cambodia” (Washington, DC: U.S. Government Printing Office, 1973), July 16, 1973, 2–12, and July 20, 1973, 132–33. B-52s dropped 120,578 tons of bombs on Cambodia during the 15-month span. See Carl Berger, ed., *The United States in Southeast Asia, 1961–1973: An Illustrated Account* (Washington, DC: Office of Air Force History, 1984), 141, <https://apps.dtic.mil/sti/citations/ADA045012>.

³⁴ “National Security Council Meeting,” *Foreign Relations of the United States* (hereafter, *FRUS*), 1969–1976, vol. VIII, *Vietnam: January–October 1972* (Washington, DC: U.S. Government Printing Office, 2010), 58, <https://history.state.gov/historicaldocuments/frus1969-76v08>. See also in “Meeting of President Nixon and the National Security Council,” *The Nixon Tapes*, 375. Emphasis added.

³⁵ “Conversation Among President Nixon, the President’s Assistant for National Security Affairs (Kissinger), and the Ambassador to South Vietnam (Bunker),” February 3, 1972, *FRUS, Vietnam: January–October 1972*, 73–74. See also in “Oval Office Meeting with Nixon, Bunker, and Kissinger,” *The Nixon Tapes*, 387–88.

³⁶ “Conversation Among President Nixon, Kissinger, and Bunker,” *FRUS, Vietnam:*

January–October 1972, 74–75. See also in “Oval Office Meeting with Nixon, Bunker, and Kissinger,” *The Nixon Tapes*, 388–89.

³⁷ “Conversation Among President Nixon, Kissinger, and Bunker,” *FRUS, Vietnam: January–October 1972*, 75–76. See also in “Oval Office Meeting with Nixon, Bunker, and Kissinger,” *The Nixon Tapes*, 389.

³⁸ Message, Admiral Moorer to Admiral McCain and General Abrams, 2334 Zulu 5 February 1972, Copies of this message also went to the four Service chiefs. Record Group 218, Records of the Joint Chiefs of Staff—Admiral Thomas H. Moorer, National Archives and Records Administration, Suitland, Maryland.

³⁹ “Memorandum for the President from Henry A. Kissinger, Subject: Secretary Laird’s Daily Report on Southeast Asia Situation,” February 8, 1972; Folder: Vietnam, January–February 1972 (2 of 3); Box 158, National Security Council Files, Nixon Presidential Library, Yorba Linda, CA. Also in *FRUS, Vietnam: January–October 1972*, 84.

⁴⁰ “Unauthorized Bombing of Military Targets in North Vietnam,” December 15, 1972, 1.

⁴¹ Transcript of Oval Office conversation among President Richard Nixon, National Security Advisor Henry Kissinger, and Secretary of State William Rogers, The White House, June 14, 1972, Nixon Tapes Project, Conversation 733-003b (10:04–11:07 a.m., June 14, 1972).

⁴² Transcript of Oval Office conversation among President Richard Nixon, National Security Advisor Henry Kissinger, and Secretary of State William Rogers. Emphasis added.

⁴³ “Transcript of the President’s News Conference Emphasizing Domestic Affairs,” *New York Times*, June 23, 1972, <https://www.nytimes.com/1972/06/23/archives/transcript-of-the-presidents-news-conference-emphasizing-domestic.html>.

⁴⁴ “Transcript of the President’s News Conference Emphasizing Foreign Affairs,” *New York Times*, June 30, 1972, <https://www.nytimes.com/1972/06/30/archives/transcript-of-president-nixons-news-conference-emphasizing-foreign.html>.

⁴⁵ William Shawcross, *Sideshow: Kissinger, Nixon, and the Destruction of Cambodia* (New York: Simon and Schuster, 1979, 1981), 29.

⁴⁶ Lavelle Oral History interview, 673.

⁴⁷ “Nomination of Lavelle, Abrams, and McCain,” September 18, 1972, 245.

⁴⁸ “Nomination of Lavelle, Abrams, and McCain,” September 13, 1972, 108.

⁴⁹ *U.S. Senate Committee on Armed Services hearing, Nomination of Admiral Thomas H. Moorer, USN, for Reappointment as Chairman, Joint Chiefs of Staff, June 22, 23, 29, 1972* (Washington, DC: U.S. Government Printing Office, 1972), 20.



U.S. Marine Corps Sgt. Idris Idris, center, a small unmanned aircraft systems specialist with U.S. Marines with 1st Battalion, 2nd Marine Regiment, 2nd Marine Division, demonstrates the C100 drone capabilities to a Spanish marine during a company live-fire range as a part of Fleet Exercise 250 (FLEETEX) on Marine Corps Base Camp Lejeune, North Carolina, June 19, 2026. FLEETEX 250 represents the United States' commitment to layer defense of the homeland through forward-deployed forces and reinforces interoperability with allies and partners through collective maritime security. (U.S. Marine Corps photo by Cpl. Channah Chilton)

Building the Mental Golden Dome

Arming the Joint Force for Defensive Cognitive Warfare

By James M. Davitch

The decisive ground of tomorrow's wars will not be a hilltop, a seaport, or outer space; it will be within the human mind. Victory will belong to forces that can rapidly discern truth from deception. Adversaries across the world weaponize information to frac-

ture alliances and erode unit cohesion.¹ Yet while offensively focused terms like "information warfare" and "cognitive warfare" have entered popular military discourse, the *defensive* aspect remains doctrinally undefined. This absence is now glaring given that the Joint War-

fighting Concept—the Department of War's North Star for future force design—explicitly states that cognitive advantage is a prerequisite for victory.²

This article fills that gap by defining *defensive cognitive warfare* (DCW) as the protection of friendly forces from adversary attempts to distort perception, disorient judgment, and degrade decisionmaking. Although new terminology can risk creating confusion, this definition

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is intentionally precise and grounded in existing military concepts to facilitate clear communication and avoid unnecessary jargon. The article situates DCW within current academic scholarship and aligns it with joint and Service doctrine; deconstructs the term; recommends updates to doctrine, training, and assessment; and offers a four-phase, 36-month path to implementation.

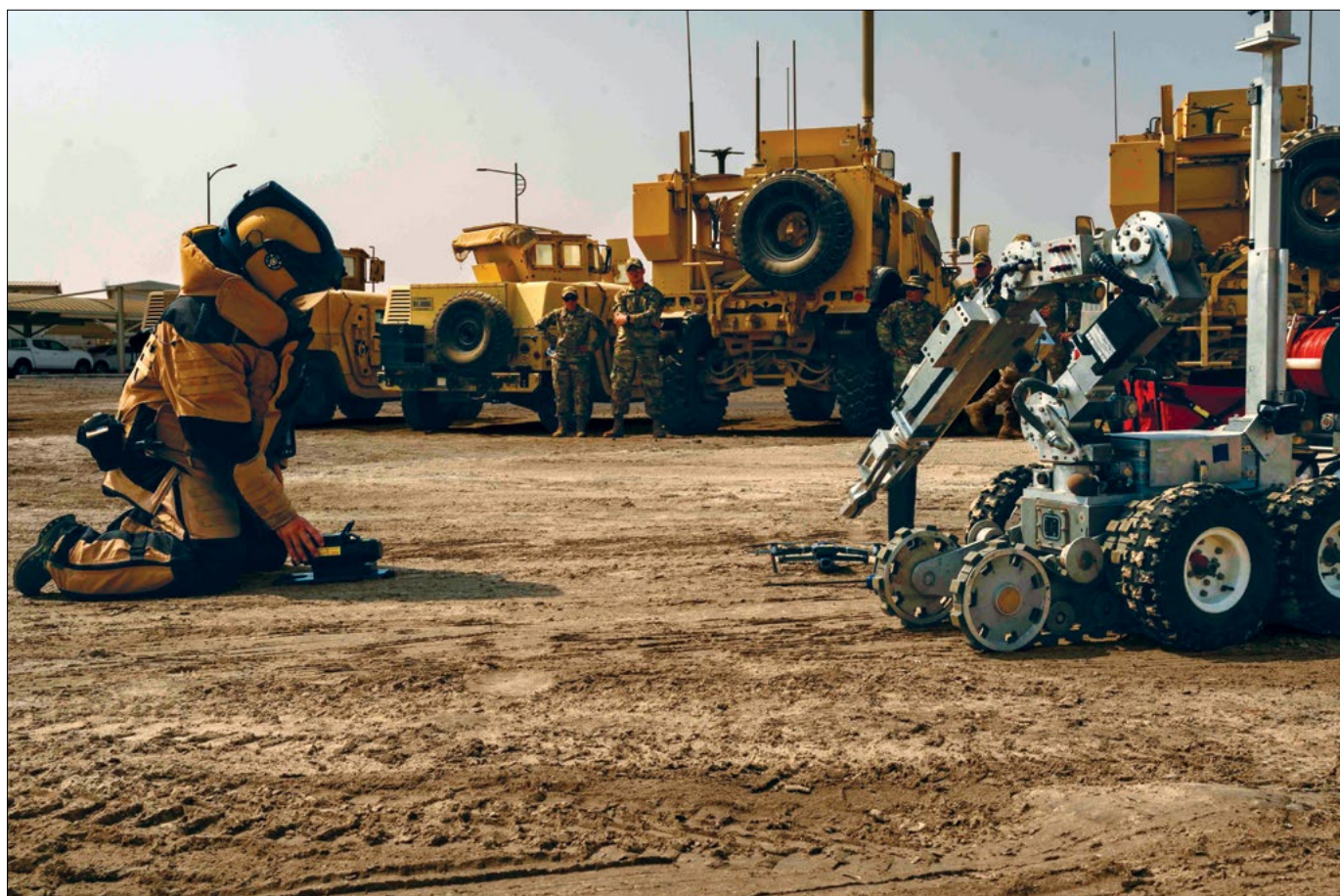
A unit unable to withstand cognitive attacks is unprepared for combat. Absent a shared definition, framework, or doctrine, the joint force remains susceptible to false sensory inputs, mental manipulation, and subconscious bias—conditions that can distort perception, disorient judgment, and ultimately degrade decisionmaking. Therefore, formalizing DCW in joint doctrine and operationalizing it within the joint force is mission-critical.

Defining Defensive Cognitive Warfare

Is Defensive Cognitive Warfare Necessary?

The first and most important step is to determine whether the definition is necessary and not a solution in search of a problem. Russian and Chinese disinformation in the 2020s illustrates the need all too clearly. On March 6, 2022, Moscow fired the first shot in a new information offensive, falsely claiming—via a tweet from Russia’s Ministry of Foreign Affairs—that Ukraine was frantically purging evidence of a secret bioweapons program.³ In doing so, Russia ensured that even its critics would picture the very scenario it invented. Most damning, the tweet stated that the U.S. Department of Defense had financed Kyiv’s biological weapons.

The next day, while reiterating the same accusation against Ukraine, China’s Ministry of Foreign Affairs went a step further, alleging that U.S. research contributed to the COVID-19 pandemic.⁴ While the White House quickly denied the accusations, in some ways Russia and China had already achieved the intent of their disinformation operation. They influenced how their audiences might interpret future information, especially those already skeptical of U.S. foreign policy or its transparency, by suggesting the United States was secretly supplying weapons of mass destruction. This dynamic is captured by Magruder’s Principle, which describes how messages may resonate more strongly when they align with existing viewpoints. DCW seeks to mitigate this effect by equipping personnel with the tools to critically evaluate information from all sources and consider alternative perspectives.



U.S. Air Force Tech. Sgt. Cameron Farrell, explosive ordnance team lead, assigned to the 380th Expeditionary Civil Engineer Squadron, approaches an ANDROS F6A robot during a training exercise at Al Dhafra Air Base, United Arab Emirates, August 6, 2021. The F6A is a highly dependable robot commonly used by the military for explosive ordnance disposal, reconnaissance, and other hazardous missions. (U.S. Air Force photo by Tech. Sgt. Michelle Y. Alvarez)

George Lakoff's elephant metaphor explains *negative framing*, a device that disinformation operations can weaponize by exploiting subconscious thinking.⁵ For example, if one is told, "Don't think of an elephant," it is difficult to avoid immediately doing precisely that because trying *not* to think about something makes one think about it even more. In March 2022, Russian and Chinese forces not only published false information but also executed an early multinational coordinated disinformation operation of the Russia-Ukraine war. By planting the suggestion that the United States was secretly supplying weapons of mass destruction to Ukraine, these U.S. adversaries made the claim seem plausible enough that even firm denials from the White House could not fully dispel the possibility that the stories were true.

The target of this disinformation campaign was the human mind. These tactics were meant to erode popular support for Ukraine, including in the U.S. military. Fake videos spread online, indirectly targeting U.S. Servicemembers, creating the potential for dissension and division within the military, thereby degrading unit cohesion. While leveraging information for advantage is not new, some have sought to label the present style of fighting that targets people's decisionmaking capabilities as *cognitive warfare*.

A brief literature review reveals that the preceding vignette is not an aberration, but indeed ongoing and, in fact, not new. Multiple *Joint Force Quarterly* authors have examined the role of cognition in warfare. Emily Bienvenue and Zachary Rogers describe how cognitive warfare is an "enduring feature of the existing and future operating environment."⁶ They take a societal view of trust, regard it as a strategic vulnerability, and argue that trust-building should be a deliberate military line of effort. More recently, Daniel Hall points to Russian and Chinese manipulation of cognitive terrain as a major factor eroding U.S. willpower.⁷ As such, he frames the protection of perception as an urgent joint requirement and offers compelling solutions to this problem. Both pieces accurately

diagnose the cognitive threat facing the joint force. Hall comes closest to advocating for defensive capabilities; however, it is more of a call for cognitive counteroffensive operations with protection as a secondary effect.

Elsewhere in the scholarly literature, Thomas Rid documents in *Active Measures* how the Soviet Union weaponized disinformation throughout the Cold War and escalated its efforts after the 1950s.⁸ He describes how Russian cognitive warfare techniques date to the 1920s and progressed through four identifiable phases. Rid argues they evolved to today's digital capabilities that use modern methods to attack vulnerabilities present in open societies. Renée DiResta et al. concur with Rid's analysis. They show how Russian mercenaries use social media to prey on predetermined vulnerable audiences.⁹ Their scholarship aligns with that of P. W. Singer and Emerson T. Brooking, who argue that these technologically aided cognitive attacks are not only present, but a battlefield for modern warfare.¹⁰ The current literature on cognitive warfare makes it unmistakably clear: the challenge to the Department of War is real, its vulnerabilities are immediate, and the threat is escalating. Thus, a definition of DCW will allow the joint force to name the threat and begin to create a coherent defense against it. To do so, DCW will have to nest within existing U.S. military doctrine.

Is DCW Consistent with Existing Doctrine?

The joint force has made meaningful progress in addressing cognitive warfare, yet significant gaps persist. In 2022, the joint force released its first information-centric doctrinal volume, Joint Publication, *Information in Joint Operations*. The same year, the Air Force published Air Force Doctrine Publication 3-13, *Information in Air Force Operations*. Existing doctrine, however, concentrates almost exclusively on offensive information-warfare principles, leaving a critical vulnerability in the defensive realm that DCW seeks to address.

While DCW does not exist in joint doctrine, it fits within the

established warfighting "Protection" and "Information" joint functions. Moreover, the Joint Warfighting Concept's tenet of integrated command and agile control presumes that commanders can make sense of real-time data despite adversary deception.¹¹ DCW may provide the protective layer enabling that agility. However, current joint doctrine defines protection primarily in physical terms, not cognitive. As written, it focuses on preserving the joint force's fighting potential through force protection, force health protection, and related activities. This framing is useful, but insufficient for addressing the mental dimension of modern conflict. Therefore, while not explicitly named, DCW conceptually aligns with the protection function as it exists today.

Joint doctrine's approach to cognitive defense is still developing. Joint Publication 3-0 presents the information joint function largely as a means for shaping external audiences and touches on defense primarily in terms of *information protection* as a function of cyber defense.¹² This publication's emphasis on generating, projecting, and denying information provides comparatively less guidance on preserving the cognitive resilience of friendly forces. Joint Publication 3-04 adds a valuable discussion of how emotion and bias filter perception, but that insight is confined to a brief sidebar.¹³ The publication has not yet outlined a detailed framework or procedures for safeguarding troops against hostile influence. It also defines cognition as "the mental process such as thinking, retrieving stored information, and processing of the information . . . by which knowledge and understanding is developed in the mind," a helpful start that could be refined for clarity and practical application.¹⁴ These limitations prevent joint doctrine from being more useful in the fight for cognitive advantage. As such, the joint force acknowledges the vulnerability exists but is unequipped to counter it. However, before proposing solutions, one must clearly and precisely specify what is to be defended.

Deconstruction

As noted earlier, this article defines DCW as the protection of friendly forces from adversary attempts to distort

perception, disorient judgment, and degrade decisionmaking.

To keep this definition actionable, it is broken into three nested layers: core terms, key vulnerabilities, and cognitive attack methods. Examining these layers individually helps to define with doctrinal precision what DCW means: shielding friendly forces against an enemy’s cognitive attacks on key vulnerabilities. Table 1 distills each subterm to one concise description.

With these subdefinitions in hand, the next task in pursuit of a definition of DCW is to further define the cognitive subcomponents. This is because these

subterms (perception, judgment, and decisionmaking) are both critical components and vulnerabilities of effective cognition. As such, they are the key cognitive areas the joint force must defend against adversary attempts to distort, disorient, and degrade.

The Cognitive Chain: Perception, Judgment, and Decisionmaking

The core of DCW centers on defending the cognitive chain, which consists of three key vulnerabilities: perception, judgment, and decisionmaking. Adversaries attack this chain to undermine the joint force’s ability to act effectively.

Perception is the initial sensing of information from one’s environment. This is the starting point for situational awareness. Adversaries target perception by manipulating sensory inputs to create a false picture. For example, in the opening days of the Russia-Ukraine war, Russia’s false claim that Ukraine was running a secret bioweapons program was an attempt to distort perception by planting a false narrative that would stick in people’s minds, even amid later denials. This manipulation of the initial picture can cause subsequent judgment and decisionmaking to inherit the original error. DCW can help protect against these distorting effects to maintain the correct perceptual frame. One technique personnel can use is to seek disconfirming evidence of an existing belief, which is a form of what behavioral psychologists call actively open-minded thinking.¹⁵

Judgment is the deliberate process of weighing evidence to form the basis of a decision. It is vulnerable to attempts to manipulate cognitive biases. An adversary might intentionally flood an operations center with a mix of true, false, and irrelevant data. They could leverage a commander’s preexisting confirmation bias by burying a piece of false information that confirms a previous assumption. The result of this disoriented thinking is that individuals might overlook relevant information in favor of solutions that satisfy the desire for easy solutions. DCW techniques, including structured analytical techniques as described in the CIA’s *Tradecraft Primer* (that is, analysis of competing hypotheses, devil’s advocacy, red-teaming, and so on)¹⁶ can help combat cognitive biases if incorporated into routine training.¹⁷

Decisionmaking translates judgment into action by selecting a course of action to achieve a military goal. It is susceptible to time pressure and conflicting inputs. Adversaries can design the decision environment to paralyze or redirect this process, a technique that behavioral scientists call influencing *choice architecture*.¹⁸ For example, an adversary could disseminate deepfake videos and other emotionally charged disinformation aimed

Table 1. Building blocks of defensive cognitive warfare		
Term	Function	Definition
Defense	Core Term	Operations that preserve friendly combat power by defeating enemy attack
Cognition	Core Term	Mental process that carries information through perception → judgment → decisionmaking
Warfare	Core Term	Organized use of violence to secure political aims across physical, informational, and cognitive realms
Perception	Key Vulnerability	Initial sensing and pattern-recognition that shapes the raw picture of the environment
Judgment	Key Vulnerability	Deliberate evaluation of perceived data to weigh options and assess implications
Decisionmaking	Key Vulnerability	Selection of a course of action and commitment of resources under uncertainty
Distort	Cognitive Attack Method	Alter inputs to warp perception at the source
Disorient	Cognitive Attack Method	Manipulate one’s inherent cognitive bias to scramble analytic judgment
Degrade	Cognitive Attack Method	Techniques that paralyze or redirect decisionmaking

Source: Author.



A Ukrainian Special Forces soldier prepares to land during a military free fall with U.S. Navy SEALs from a CV-22 Osprey assigned to the 352nd Special Operations Wing during exercise Sea Breeze 21 in Ochakiv, Ukraine, July 1, 2021. Exercise Sea Breeze 21 is a U.S. and Ukraine co-hosted multinational maritime exercise held in the Black Sea designed to enhance interoperability of participating nations and strengthen maritime security within the region. (U.S. Army Photo by Sgt. Patrik Orcutt.)

at creating internal dissent within a unit. The flood of conflicting information can create analysis paralysis or pressure a leader into a rash decision, thus degrading the leader's decisionmaking capability.¹⁹ DCW techniques to mitigate adversary degradation effects could include personnel workload management through improved scheduling and rehearsals and wargaming that include adversarial attempts to channel decisionmaking.

The three critical links in the cognitive chain are perception, judgment, and decisionmaking. One link influences the next as joint force members attempt to make sense of their strategic and operational environments (see figure 1).

Adversaries seek to distort perception, disorient judgment, and degrade decisionmaking. DCW counters these attacks by strengthening each link of the cognitive chain, equipping personnel to critically evaluate information and resist manipulation. By shielding the mind from such interference, DCW preserves friendly forces' combat power.

Recommendations

Doctrinal Updates

The first step to rectify this doctrinal gap is to add it to joint publications. A cognitive protection annex would be a helpful addition to JP 3-04, *Information in Joint*

Operations. Next, using the definition above, the Joint Staff J7 (Joint Force Development) should sponsor an update that includes the term as a subfunction under the *protection* joint function in paragraph III in JP 3-0, *Joint Campaigns and Operations*. Additionally, the Joint Staff J7 should coordinate with the appropriate stakeholders to approve amplifying language to the Global Effects Coordination section (chapter IV, section 13, paragraph f) of JP 3-0 that describes how DCW is essential to maintaining information advantage. These doctrinal additions will help enshrine DCW as an enduring doctrinal requirement rather than a footnote.

Inject DCW Into the Joint Warfighting Concept

As Admiral Christopher W. Grady—the then-Vice Chairman of the Joint Chiefs of Staff—stressed in 2023, the Joint Warfighting Concept (JWC) “represents our best thinking on how the United States and its allies can mitigate and defeat military threats from peer adversaries.”²⁰ To support that aim, DCW should be embedded in the JWC. Thomas A. Walsh and Alexandra L. Huber describe the JWC as a “threat-informed, operational concept that provides an overarching approach to how the joint force will fight in the future.”²¹ DCW can integrate into the

JWC via pre-deployment drills and cognitive “go bags.” Pre-deployment²² DCW battle drills (supporting information advantage), cognitive go-bags (resilient logistics for mental supplies), and deception injects (stress tests for pulsed operations) can and should become a part of the joint distributive operations concept.²³ These battle drills can include red teams injecting false information as part of a 48-hour readiness or workup exercise to test commanders' and subordinates' sense-making under pressure. Cognitive go-bags could include structured analytic checklists and digital hygiene standard operating procedures. All of these concepts and tools could be added to Joint All-Domain Command and Control annexes.

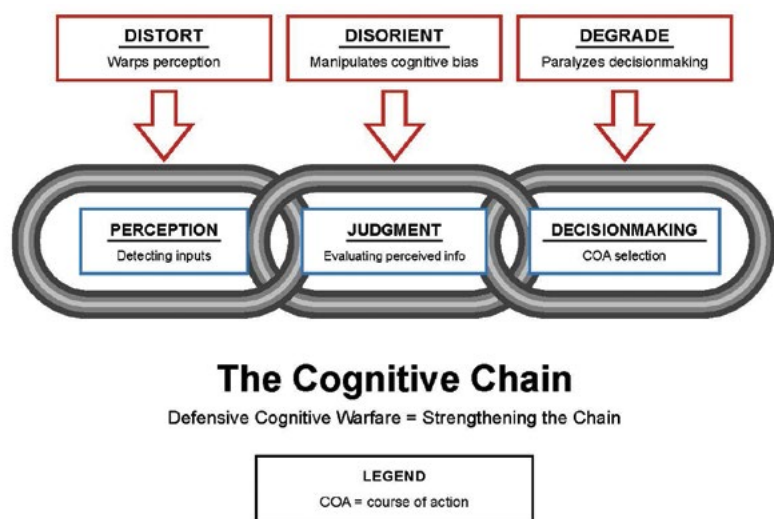
Modify CJCSI 3401.02B, *Force Readiness Reporting*

This Chairman of the Joint Chiefs of Staff Instruction (CJCSI) establishes the policy and procedures for readiness reporting and is a tool for military forces to report their status to the President and Secretary of War. Two updates to the instruction could help articulate cognitive readiness. First, adding a DCW readiness table to the Defense Readiness Reporting System (DRRS) could allow combatant commanders to report their defensive cognitive status quarterly. Second, the Joint Staff could mandate that unit mission-essential task lists capture perception-judgment-decision resilience. Embedding DCW readiness in DRRS would let the Joint Requirements Oversight Council score cognitive resilience as a Concept-Required Capability when it adjudicates JWC portfolio gaps in accordance with guidance from the Vice Chairman of the Joint Chiefs of Staff.²⁴

Joint Education and Training Upgrades

Most joint professional military education (JPME) programs touch on the concept of critical thinking by introducing some of the more common structured analytic techniques. This is essential. Even brief academic training

Figure 1. The Cognitive Chain



Source: Author.



Tennessee Army National Guard Sgt. Kit Young assigned to 3rd Battalion, 278th Cavalry Regiment, pilots a Skydio X10D Short Range Reconnaissance (SRR) unmanned aircraft system during new equipment training at Volunteer Training Site-Tullahoma, June 16, 2026. Following preflight checks and system startup procedures, Soldiers practiced aircraft control, hover operations, and maneuvering techniques while gaining hands-on experience operating the drone platform. The training supports the Tennessee Army National Guard's ongoing modernization efforts as the 278th transforms to a Mobile Brigade Combat Team. (U.S. Army National Guard photo by 1st Lt. Bailey Breving)

can reduce the impact of inherent cognitive shortcuts and biases.²⁵ However, emerging scholarship shows that certain types of cognitive de-biasing strategies may be more effective and efficient at improving judgment accuracy than other similar training programs.²⁶ Therefore, JPME Phase I and II courses should explore the findings from Welton Chang et al.²⁷ regarding these types of emerging training techniques. Furthermore, to make critical thinking training more available to a larger audience, the Joint Staff J7 should coordinate with the appropriate stakeholders to explore the development of a DCW computer-based training module. Such a module could also be used in conjunction with and in support of pre-deployment activities.

Joint Metrics and Assessment

One of the most important parts of this implementation program is the

assessment plan, which will determine whether the DCW program is achieving its goals (that is, to improve perception, judgment, and decisionmaking against adversary attempts to distort, disorient, and degrade cognition). Effectively executing the assessment plan will also identify areas for improvement and help justify enduring resource allocation.

JP 5-0, *Joint Planning*, recommends using measures of effectiveness (MOEs) and measures of performance (MOPs) to help gauge success. MOEs determine whether an organization is taking the correct steps to bring about a change in condition. MOPs determine whether an organization is executing those steps correctly. Both are applicable to DCW implementation; however, MOPs will be more useful initially to provide quantitative results that confirm the program is on track. Later, MOEs will be a better barometer to determine DCW's overall effectiveness as a combat enabler.

MOPs. MOPs are less glamorous, but they are essential data points for DCW implementation. Some examples of MOPs include certification accountability, policy adherence, and resourcing.

- **Certification Accountability:** 95 percent of personnel completing DCW training
- **Policy Adherence:** zero findings in quarterly DCW standard operating procedure audits
- **Resourcing:** more than 90 percent of DCW funds obligated by the end of the fiscal year

MOEs. MOEs help identify whether the force is achieving cognitive protection and might use a concept called *clean kill chain* methodology. This method gauges whether an individual can move a “target” through the perception-judgment-decision chain under conditions of active deception. This simple test could begin with a basic prompt and run as follows:

“When the adversary is actively feeding false info, spoofed comms, or deepfake orders, can Blue Forces still move a target cleanly from ‘detect’ to ‘engage’ (that is, from perception to decisionmaking) without a break or excessive delays and without mission-critical errors?” A viable metric that might also be used for post-analysis debriefing could follow the perception-judgment-decision scheme:

- **Perception Evaluation:** Did analysts recognize spoofed information?
- **Judgment Evaluation:** Did commanders weigh evidence correctly, or did bias and planted “intel” derail effective judgment?
- **Decision Evaluation:** Was the final execution order “decision” issued correctly and at the right time?

Lastly, the results, especially for large-scale exercises, should be captured for after-action analytics by the Joint Staff J7. These data should feed directly into the JWC’s multiyear experiment-wargame-assessment loop, ensuring DCW effects are visible in the same dashboards that track fires integration and contested logistics.²⁸ This will also allow commanders to begin to consider cognitive capabilities in the same context as traditional combat enablers.

Implementation Timeline

The overall implementation flow follows four sequential steps:

Doctrine Updates → Training and Education Changes → Exercises Incorporation → Assessment

Phase I: Doctrine

1. Lead Org: Joint Staff J7 (Joint Doctrine Division)
2. Timeline: 0–6 months

The Joint Staff J7 should lead two crucial updates to military doctrine. First, it should coordinate with stakeholders to add a Cognitive Protection Annex to JP 3-04. The lack of definitions for concepts related to cognition and metacognition in the *DoD Dictionary of Military and Associated Terms* shows that doctrinal language lags operational needs in cognitive warfare.

Therefore, the J7 must also coordinate with stakeholders to add an official entry for “defensive cognitive warfare” to the *DoD Dictionary*, using the definition provided in this article.

Phase II: Training and Education

1. Lead Org: Joint Staff J7 (Joint Education and Training Division), National Defense University elements, Service schools
2. Timeline: 6–18 months

The J7 should sponsor an update for computer-based and in-residence DCW modules for student use in professional military education, specifically JPME-I and JPME-II (Joint Forces Staff College). Next, the program should require a DCW computer-based training aid for individuals unable to attend formal courses. This training could leverage the existing Joint Knowledge Online portal. However, in line with guidance from the level of the Office of the Secretary of War, this type of training should be dependent on unit commanders’ prerogatives. Lastly, the Services can begin incorporating and adapting Joint Staff J7-approved material for their own Service-specific professional military education courses (at the U.S. Army Command and General Staff College, the Naval Postgraduate School, Marine Corps University, and the Air Command and Staff College).

Phase III: Operationalization

1. Lead Org: Combatant command J7 (joint force development) and J9 (civil-military operations or inter-agency partnering) and Services
2. Timeline: 18–30 months

Over the next 2–3 years, the combatant commands and Services should embed DCW injects into flagship joint exercises including Global Thunder (Strategic Command), Vigilant Shield (Northern Command/North American Aerospace Defense Command), Rim of the Pacific (Indo-Pacific Command), and the Defender series (European Command). All exercises should run at least one “distort–disorient–degrade” scenario, and component assessment cells should collect data for MOE analysis as described

in Vice Chairman of the Joint Chief of Staffs guidance.²⁹

Phase IV: Assessment and Refinement (30–36 months)

1. Lead Org: Joint Staff J3 (Operations) and J7 Tiger Team with the Office of the Under Secretary of War for Personnel and Readiness
2. Timeline: 30–36 months

At the conclusion of (a) major exercises and (b) the fiscal year, the Joint Staff should publish a joint after-action DCW readiness report for the review of the Secretary of War and the Chairman of the Joint Chiefs of Staff. These reports should recommend force-design changes, resource reallocations, and any follow-on doctrine revisions (that is, JP 5-0 planning annex templates).

Counterarguments and Mitigation

Transparency, legality, and ethics. The DCW definition that this article offers *does not* imply or endorse a higher headquarters, Joint Staff, or the Department of War becoming the arbiter of truth. DCW’s focus is equipping individuals with the tools to become resilient and persevere in the face of cognitive attacks and to highlight the Servicemember’s own thinking as a vulnerability.

Resource constraints. Any new problem that has not been adequately budgeted for faces challenges in the competition for scarce resources. However, the acquisition requirements for this type of program are minimal compared to the more technologically sophisticated means of warfare like fighter jets, tanks, and ships. In comparison, improving cognitive capabilities may generate significant return on investment *because* it is relatively inexpensive. Additionally, this initiative can and should leverage existing funding lines for human performance optimization.³⁰ Ultimately, because of DCW’s cost-effectiveness, it neatly aligns with the Joint Staff’s call to rapidly turn concepts into capabilities, making it actionable *now* for Service rapid prototyping funds.³¹

Information Operations

Duplication. A misconception may



Antonov Airport after Russian invasion of Ukraine and Mriya (Photo by Oleksandr Ratushniak)

exist because similar-sounding terminology, specifically “information operations,” could generate the logical question, “Don’t we do that already?” DCW is focused on improving friendly cognition against adversary attempts to corrupt it. It is about defense, not offense. Therefore, there is no duplication of effort between existing efforts to influence foreign actors, attack information networks, or deny information to adversary forces.

Conclusion: Securing Cognition for Future Military Effectiveness

Defensive cognitive warfare fills a doctrinal gap the joint force can no longer afford to ignore. This article has (1) defined DCW

and situated it within current doctrine and contemporary scholarship; (2) aligned it with joint and service doctrine; (3) deconstructed the definition to ensure doctrinal precision; (4) recommended updates to doctrine, training, and assessment; and (5) proposed a viable implementation plan.

Without a DCW framework, U.S. forces remain vulnerable to adversaries who weaponize techniques that may attack perception, judgment, and decisionmaking. The path forward is clear. First, adopt the proposed definition of DCW as the doctrinal cornerstone for protecting the cognitive domain. Second, create the necessary education and training aids to begin teaching and training the force. Third, begin thinking now about how to

incorporate DCW into exercise and pre-deployment training. Fourth, adopt a rigorous assessment regime based on relevant measures of performance and effectiveness.

The cognitive environment has shifted, and what remains is whether our military will keep pace. Formalizing DCW will arm every commander with a shield equal to the information spear. Now is the time to arm the forces for cognitive battle. JFQ

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Notes

¹ Daniel S. Hall, “America Must Engage in the Fight for Strategic Cognitive Terrain,” *Joint Force Quarterly*, no. 108 (1st Quarter 2023): 75–86, <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/3264639/america-must-engage-in-the-fight-for-strategic-cognitive-terrain/>.

² Mark A. Milley, “Strategic Inflection Point: The Most Historically Significant and Fundamental Change in the Character of War Is Happening Now—While the Future Is Clouded in Mist and Uncertainty,” *Joint Force Quarterly*, no. 110 (3rd Quarter 2023): 8–9, <https://ndupress.ndu.edu/Joint-Force-Quarterly/Joint-Force-Quarterly-110/Article/Article/3447159/strategic-inflection-point-the-most-historically-significant-and-fundamental-ch/>; Thomas A. Walsh and Alexandra L. Huber, “A Symphony of Capabilities: How the Joint Warfighting Concept Guides Service Force Design and Development,” *Joint Force Quarterly*, no. 111 (4th Quarter 2023): 6, <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/3568312/a-symphony-of-capabilities-how-the-joint-warfighting-concept-guides-service-for/>.

³ Russian Ministry of Foreign Affairs (@mfa_russia), “@mod_russia: During the course of the special military operation evidence of an emergency clean-up performed by the Kiev regime was found—aimed at eradicating traces of the military-biological programme, in Ukraine, financed by @DeptofDefense,” Twitter (now X), March 6, 2022, https://x.com/mfa_russia/status/1500539810418671626.

⁴ Edward Wong, “U.S. Fights Bioweapons Disinformation Pushed by Russia and China,” *New York Times*, March 10, 2022, <https://www.nytimes.com/2022/03/10/us/politics/russia-ukraine-china-bioweapons.html>.

⁵ George Lakoff, *Don't Think of an Elephant!: Know Your Values and Frame the Debate* (White River Junction, VT: Chelsea Green Publishing, 2004).

⁶ Emily Bienvenue and Zachary Rogers, “Strategic Army: Developing Trust in the Shifting Landscape,” *Joint Force Quarterly*, no. 95 (4th Quarter 2019), <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/2018788/strategic-army-developing-trust-in-the-shifting-landscape/>.

⁷ Hall, “America Must Engage in the Fight for Strategic Cognitive Terrain,” 75–86.

⁸ Thomas Rid, *Active Measures: The Secret History of Disinformation and Political Warfare* (New York: Farrar, Straus and Giroux, 2020).

⁹ Renée DiResta et al., “In-House vs. Outsourced Trolls: How Digital Mercenaries Shape State Influence Strategies,” *Political Communication* 39, no. 2 (2022): 222–53, <https://doi.org/10.1080/10584609.2021.1994065>.

¹⁰ P. W. Singer and Emerson T. Brooking, *Like War: The Weaponization of Social Media* (Boston: Houghton Mifflin Harcourt, 2018).

¹¹ Walsh and Huber, “A Symphony of Capabilities,” 6–7.

¹² Joint Publication (JP) 3-0, *Joint Campaigns and Operations* (Washington, DC: Joint Chiefs of Staff, 2024).

¹³ This sidebar reference highlights how JP 3-04 marginalizes “cognition,” placing it in a separate section on information fundamentals rather than integrating it with human factors.

¹⁴ JP 3-04, *Information in Joint Operations* (Washington, DC: Joint Chiefs of Staff, 2022).

¹⁵ Uriel Haran et al., “The Role of Actively Open-Minded Thinking in Information Acquisition, Accuracy, and Calibration,” *Judgment and Decision Making* 8, no. 3 (May 2013): 188–201, <https://doi.org/10.1017/S1930297500005921>.

¹⁶ Central Intelligence Agency, *A Tradecraft Primer: Structured Analytic Techniques for Improving Intelligence Analysis* (Washington, DC: Center for the Study of Intelligence, 2009), <https://www.cia.gov/resources/csi/static/Tradecraft-Primer-apr09.pdf>.

¹⁷ Philip E. Tetlock and Dan Gardner, *Superforecasting: The Art and Science of Prediction* (New York: Crown, 2015). Tetlock and Gardner show that with a modicum of training, subjects were able to make surprising cognitive gains.

¹⁸ Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving Decisions about Health, Wealth, and Happiness* (New Haven, CT: Yale University Press, 2008).

¹⁹ Daniel Kahneman et al., *Noise: A Flaw in Human Judgment* (New York: Little, Brown Spark, 2021). Kahneman and his coauthors describe “noise” as the unintentional variability in judgments when they should be identical. While they do not explicitly make the connection between social media and noise effects it is reasonable to infer that, in the future, social media will play a larger role in degrading decisionmakers’ ability to make accurate judgments.

²⁰ Christopher W. Grady, “Sharpening Our Competitive Edge,” *Joint Force Quarterly*, no. 111 (4th Quarter 2023), 16, <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/3569518/sharpening-our-competitive-edge-honing-our-warfighting-capabilities-through-the/>.

²¹ Walsh and Huber, “A Symphony of Capabilities.”

²² These types of pre-deployment drills should be included in the U.S. Navy’s Distributed Maritime Operations plan, the U.S. Army’s Multi-Domain Task Forces, the U.S. Marine Corps’ Expeditionary Advanced Base Operations, and the U.S. Air Force’s Agile Combat Employment scheme of maneuver.

²³ Grady, “Sharpening Our Competitive Edge,” 16.

²⁴ Grady, “Sharpening Our Competitive Edge,” 18.

²⁵ Tetlock and Gardner, *Superforecasting*.

²⁶ Welton Chang et al., “Developing Expert Political Judgment: The Impact of Training and

Practice on Judgmental Accuracy in Geopolitical Forecasting Tournaments,” *Judgment and Decision Making* 11, no. 5 (2023), <https://doi.org/10.1017/S1930297500004599>.

²⁷ Chang et al., “Developing Expert Political Judgment.”

²⁸ Grady, “Sharpening Our Competitive Edge,” 22.

²⁹ Grady, “Sharpening Our Competitive Edge,” 22.

³⁰ Certain Air Force programs already underway at the Air Force’s 711th Human Performance Wing may be logical candidates to use as funding sources for DCW. See “Human Performance,” Air Force Research Lab, accessed August 5, 2026, <https://afresearchlab.com/technology/human-performance/>.

³¹ Milley, “Strategic Inflection Point,” 8–9; Walsh and Huber, “A Symphony of Capabilities,” 6.



U.S. Army Command Sgt. Maj. John W. Troxell, Senior Enlisted Advisor to the Chairman of the Joint Chiefs of Staff, addresses General and Flag Officers at the National Defense University's CAPSTONE Course on Fort Lesley J. McNair, Washington, DC, July 12, 2016. The course objective is to make these individuals more effective in planning and employing U.S. forces in joint and combined operations. (DoD Photo by Army Sgt. James K. McCann / Released)

Boot Camp for the Mind

The Role of JPME in Developing National Security Strategists

By Joseph Gagliano, Derek S. Reveron, Nikolas K. Gvosdev, Rebecca Russo, and Dana Struckman

Warfighting communities provide officers with the necessary skills to operate weapon systems and cultivate their experience to lead

in combat, but once junior officers are promoted to higher ranks, they often lack the abilities required of senior national security professionals. Joint profes-

sional military education (JPME) plays a deliberate and pivotal role in an officer's operational and strategic growth. This growth is essential for the Department of War's development and management of the joint force, not only in building strategic aptitude but also in enabling officers to engage effectively with civilian leaders across the national security system.

The joint force's senior national security professionals hold critical leadership

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responsibilities in strategy development and operational planning. As active participants in civil-military relations, they synthesize political objectives, military capabilities, and interagency tools into coherent strategies and plans that advance national interests. These responsibilities require more than operational experience—they demand a deep understanding of strategy development, planning methodologies, and the broader policymaking context in which national security decisions are made. This is where JPME plays a vital role. It provides a structured environment for officers to develop the intellectual agility, critical thinking, and collaborative skills necessary to lead complex decisionmaking at headquarters preparing for the future battlefield. By exposing leaders to differing perspectives, historical case studies, policy-relevant simulations, and wargames, JPME prepares them to serve at higher headquarters throughout the Department of War.

Developing Leaders as Thinkers

Translating broad strategic guidance into employable strategies and executable plans requires both assessing the international security environment *and* analyzing domestic policymaking system constraints. Simply put, national interests and strategic objectives are not enough to guide national security planning. Instead, leaders and their staffs require methodologies to make sense of two complex environments simultaneously: the international security environment and the domestic policymaking environment.

Today's officers need intellectual depth and agility more than ever. Active and critical thinking is essential for strategists and planners. They must be able to develop a deep understanding of operational context amid evolving policy and security landscapes. Strategic thinking is rarely intrinsic, so JPME institutions develop it deliberately through realistic educational scenarios. JPME plays a key role in conditioning cognitive muscles through reading, analyzing, discussing, and writing. Simply put, JPME is boot camp for the mind.

In-residence JPME leads officers to a better understanding of the profession of arms and their relationship with the civilian policymakers who control the military. Although military officers appreciate the Clausewitzian dictum that war is politics *with*¹ other means, they instinctively avoid anything that seems political. Senior military leaders have largely evolved beyond Samuel P. Huntington's view that civilian and military leaders reside in two separate camps. However, this perception predominates among junior officers entering JPME programs. Subscribing to a simple view of civil-military relations that separates the two camps, these junior officers want civilian leaders to provide defined objectives and allow military leaders to develop plans with desired end states. As the Naval War College's Lindsay Cohn has written, "Politics and policymaking are never that simple or clear-cut."²

Indeed, military planning across civil-military lines customarily is characterized by imperfect understanding from both sides. On the civilian side, policymakers sometimes do not know what the military can and cannot accomplish, often believing that multiple low-level tactical successes will guarantee achieving high-level strategic ends.³ Further, they may not recognize that the military does much more than "fight wars."⁴ In fact, its operations in steady-state environments—long before a crisis is brewing—are marked by deterring adversaries, reassuring allies, and enabling partners to reduce security deficits as a tool of foreign policy. On the military side, officers frequently underestimate the difficulty of obtaining agreement across the interagency community with regard to policy. Summarized by the adage "No plan survives first contact," the process in reality includes iterations and revisions with civilian policymakers as partners. Additionally, military plan development must account for what risk the executive branch can tolerate and what costs the legislative branch can resource, and those restraints often are not articulated until after military leaders submit their plan for review.

By building a richer appreciation for these aspects of civil-military relations,

officers will take part more effectively in the national security system. Bridging this gap requires not only critical thinking but also an institutional setting where theory meets practice. This is where in-residence JPME becomes indispensable—not merely as a means of developing individual strategic acumen, but also as a venue for national security professionals to engage with their peers from across the interagency community.

The National Security Affairs Tradition in Newport

The Naval War College's Alfred Thayer Mahan wrote more than a century ago that, although the direction of national policy is properly set by statesmen, political questions "are also among the data which the strategist, naval as well as land, must consider." Mahan explicitly renounced the notion that "politics are of no professional concern to military [officers]," which he observed "once was so traditional in the navy that it might be called professional."⁵ Ultimately, Mahan embraced the assessment of his contemporary Otto von Bismarck that politics encompasses the "art of the possible" and must concern itself with the allocation of scarce resources to defined priorities.⁶ Naval War College students have long carried on the tradition of examining international affairs through the lens of national interests and the policymaking that defines them.

Today, the Naval War College's Nikolas K. Gvosdev and Derek S. Reveron continue this approach to studying national security affairs.⁷ This approach incorporates contemporary critical issues—such as strategic competition, geoeconomics, and regional challenges—and uses an ends-ways-means framework recognizable by any joint or navy staff worldwide.⁸ Students study how the United States develops strategy and uses it to create specified concepts (that is, how to achieve those objectives), while assessing the capabilities needed to implement that strategy.⁹

This approach stresses that a comprehensive education in national security affairs must acknowledge that a well-crafted security strategy is meaningless if



U.S. Marines show lethality during tactical exercise in the Gulf of Finland
 U.S. Marine Corps Lance Cpl. James Barrett, a cryptologic language analyst with 2nd Radio Battalion, 2nd Marine Expeditionary Force, stands in his camouflage during exercise Baltic Operations 2026 at the Gulf of Finland, June 16, 2026. (U.S. Marine Corps photo by Cpl. Judith Ann Lazaro)

not informed by the domestic policymaking system that develops and resources it. Students examine how strategy development within the domestic policymaking system occurs in executive- and legislative-branch institutions that compete for influence and resources. In doing so,

they identify the friction points where strategy meets reality. Employing modern theories of policy analysis, this approach juxtaposes strategy development with defense policymaking. It seeks to answer the questions “How does policy originate?” and “How does the policymaking

system influence strategy development?” For national security professionals, these analyses are inseparable.

Policy analysis requires students to consider influences including political agendas, personalities, rivalries, bureaucratic interests, the media, legislative input, and outside advocates and lobbyists. It strips away the language of serving vital national interests to consider Robert Putnam’s “two-level game,” where

at the national level, domestic groups pursue their interests by pressuring the government to adopt favorable policies, and politicians seek power by constructing coalitions among those groups. At the international level, national governments seek to maximize their own abilities to satisfy domestic pressures, while minimizing adverse consequences of foreign developments.¹⁰

Officers may want their plans and strategies to be free from politics, but civilian leaders set national objectives. To be sure, those leaders (1) obtained their positions through democratic political elections, (2) represent civilian control of the military, and (3) expect the military to develop plans and strategies in line with their national objectives.¹¹ Suffice it to say, strategic planning cannot remain entirely free from political factors.

This approach joins together an understanding of America’s security role in the world with an understanding of how the U.S. government makes defense policy decisions. In doing so, students learn that strategic considerations are not enough to explain, or anticipate, defense policy—domestic policymaking constraints must be considered as well. For example, in developing warfighting strategy, strategists can explain why the United States attacked Afghanistan in 2001, but without examining the domestic policymaking system and bureaucratic politics, they cannot explain why the United States remained in Afghanistan for 20 years despite not achieving its objectives. In developing grand strategy, strategists hear multiple administrations prioritize shifting resources to countering China in the western Pacific, but without considering domestic policymaking



Global War on Terrorism (GWOT) 20th Anniversary Commemoration

New York City Wide Commemoration of the beginning of the Global War on Terrorism (GWOT). The GWOT commenced following the attacks of September 11th, 2001. The United War Veterans Council, in conjunction with the New York Department of Veterans Services, sponsored the event at the New York Vietnam Veterans Memorial in lower Manhattan.

factors, strategists struggle to rationalize sustained investment of resources in the Middle East. In developing Service strategy, strategists can articulate a future naval force structure needed to execute the national military strategy over the next 30 years, but without understanding the domestic policymaking context, they cannot explain why this century's ship-building plans have been unrealized.¹²

For military officers charged with providing advice and options to senior decisionmakers, a thorough understanding of the policy process enables them to generate options that are realistic and based on the policymaking environment. The notion that there is an ideal "strategic" option that somehow sits above the realities of policy decisionmaking ignores the stubborn reality that politics, personalities, and organizational interests are part of the national security process. This perspective is neatly summarized in Marine Corps doctrine:

For United States Marines, understanding current policy relies in part on understanding the interplay between domestic politics and our enduring vital national interests. Aspects of domestic politics, like the election cycle and contemporary societal issues, affect current policy. These aspects are typically felt by Marines through such things as resourcing decisions, guidance on the composition of the force, and specific direction to focus on particular national interests or particular competitors.¹³

Two Sides of the National Security Coin

For those without experience in Washington witnessing the politics of democracy in practice, the national security system often seems opaque and overwhelming. Students in the Naval War College's national security affairs courses use figure 1 as an analytical roadmap to explore this system. Centered on ends-ways-means, this roadmap empowers national security

professionals to ask practical, informed questions on both sides of the national security coin: the international security environment and the domestic policymaking environment.

Students learn through these courses that strategy development and policy enactment do not occur in series. In practice, the domestic policymaking environment influences strategy development throughout the ends-ways-means process. This reality demands examination of both sides of the national security coin in parallel. When students master this skill, they are more likely to produce strategy and plans that are feasible, acceptable, and suitable.

For example, students seeking to articulate ends will be guided by the top two boxes of figure 1. From an international security environment perspective, they will ask (1) who and what constrain achievable ends in the National Security Strategy, National Defense Strategy, and

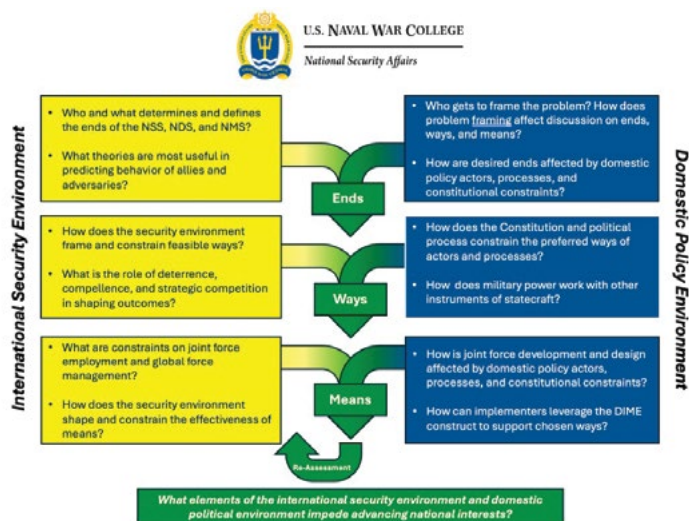
National Military Strategy; and (2) what theories are most useful in predicting other states' behavior. From a domestic policymaking environment perspective, they will ask (1) who frames the problem, and how the framing of the problem influences the desired ends; and (2) how the desired ends are affected by domestic policymaking actors, processes, and constitutional constraints.

By juxtaposing these two sides of the coin, students appreciate that the likelihood of achieving articulated ends is affected by factors in both the international and domestic systems. Neither is necessarily dominant, and they can be mutually constituting. In other words, international security factors may cause domestic policymaking reactions, domestic policymaking factors may cause international security effects, and both may occur simultaneously.

As depicted in figure 1, these dynamics emerge during selection of ways and means as well. On the international side, the ways the United States uses to achieve ends, and the means selected to pursue those ways, are constrained by factors in the international security environment. On the domestic side, selecting ways and means requires an allocation of resources, which necessarily stokes competition within the domestic policymaking system. For example, when President Barack H. Obama considered the costs of continuing the U.S. presence in Afghanistan, he weighed both the economic cost of \$1 trillion over a decade and the fact that it was the same as the estimated cost for his proposed health care plan.¹⁴

Finally, figure 1 illustrates that a seemingly linear ends-ways-means process is in fact circular. Once ways and means are selected and implemented, we know through practice that not all ends will be achieved because of risk injected from the international security and domestic policy environments. Students will then reassess why, and the reasons may lie on the international side, the domestic side, or both. This circular model of assessment and subsequent reassessments places the students in an important practitioner mindset. First, it makes them see the world as it is, rather

Figure 1.



Source: Authors.

than as it should be. Strategy does not unfold in a linear way; instead, both the real international environment and the real domestic policymaking environment can impede advancing national interests. Second, this framework acknowledges that real-world resource allocation is a continuous, repeating process. The executive branch and Congress have competing priorities. At times, this competition removes resources from failing initiatives, but other times, it counterintuitively sustains them.¹⁵ This model of national security decisionmaking helps students understand why and offers analytical methods to discern what likely will drive a particular outcome.

Developing Discernment

Building on this understanding of national security underscores an essential cognitive skill that underpins effective strategic thinking: the development of discernment. Like its predecessor 3030.01A, Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3030.01B, *Implementing Joint Force Development and Design*, calls on professional military education (PME) and JPME institutions to develop those who can (among other capabilities) "discern the military dimensions of national challenges."¹⁶ Similarly, CJCSI 1800.01G, *Officer Professional Military Education Policy*,

states that PME and JPME institutions must provide graduates who are able to discern military dimensions, characterize issues at the policy level, and recommend viable military options.¹⁷ That said, these references do not articulate what exactly officers should be able to discern, and it is rare for students to find explicit information about discernment. At the most basic level, our senior leaders demand graduates who can make sense of an increasingly complex environment, where there are no right answers and no single solutions.

Time studying in an in-residence JPME environment exposes officers to many different theories, frameworks, and tools to help discern the elements of national power in the international security environment and domestic policymaking systems. When studying national security affairs in Newport, students examine at least five perspectives of foreign policy analysis, five theories of international relations, three levels of analysis, and the concept of two-level games.¹⁸

Officers without experience in this type of complex critical thinking can become frustrated that there is no doctrinal solution for this kind of problem-solving. Similar to how the military tool of political, military, economic, social, information, infrastructure, physical environment, and time (PMESII-PT)

guides analysis of the operational environment, students seek doctrinal simplicity to provide answers for the strategic environment. However, complex national security analysis requires multiple ways to frame problems, assess challenges, and develop strategy and plans. Strategists must have the ability to discern the critical actors and influential factors that affect the struggle for power in international security and domestic policymaking environments. They also must be able to wrestle with the discomfort of suspending personal opinions and providing policy options with which they might not personally agree. In-residence JPME provides the education and venue for developing this discernment.

Between preparatory reading and classroom discussions, officers demonstrate discernment as a requisite skill for future national security jobs. This skill development cannot be replicated in short or asynchronous online courses. In-residence seminars allow officers to exercise discerning what is important or unimportant in national security discussions with their peers. They learn to assess what to consider and what to discard.

The classroom experience is crucial. Students will spend hundreds of hours together in small seminar groups, assembled using joint guidance from CJCSI 1800.01G. To maximize its joint quality, class composition exposes students to warfighting perspectives among their classmates—by department/agency, Service, and warfighting community—that they likely have never experienced before. Additionally, every year approximately 100 international officers come to Newport and integrate into seminars with their U.S. counterparts. Since coalition coordination is the norm in modern warfighting, this mix enables U.S. students to gain invaluable experiences cultivating relationships with allies and partners. Each student brings hands-on knowledge and insights into their community's contributions toward national security—contributions that can be incorporated into a comprehensive security strategy that employs the total joint force. Discussing national security issues with peers and international students enables

officers to appreciate how the application of force fits in the U.S. national security system and international security environment.

In a deliberate way, this approach develops warfighting discernment in each student, because officers confined to their own warfighting community are limited by its understanding of value. Mid-career officers naturally value the warfighting platforms they were taught to employ; senior officers with experience outside their warfighting communities discern when another community brings more value to the military operational environment; and senior joint-educated officers discern when other Services, departments, and agencies bring more value to the national strategic environment. This learning is foundational to JPME and an important reason why joint acculturation is the first common education standard of officer professional military education policy.¹⁹

The significance of discernment lies in its ability to show a direct connection between actions and sense-making. If staff officers lack the ability to discern the international security environment and the domestic policymaking environment, the options they propose to their commanders likely will lack the required elements of feasibility, acceptability, and suitability. Consequently, the more practice students gain in assimilating vast amounts of information through readings and discussions with their peers, the more proficient they become in giving their commanders useful recommendations that avoid inefficient staff rework.

Arming the Back Bench

At in-residence JPME programs, military officers instinctively seek relevance. Rather than simply *discussing* abstract academic theories, they ask how the concepts they are learning can be *applied* in practice. After all, they are accustomed to military training, where they learn how to do tangible things—fly planes, navigate the ocean, or conduct large-scale maneuver.

Faculty prompts like “What might be factors?” or reflected questions like “What do you see?” rarely satisfy

first-term students who weigh complex national security questions like “How can we avoid escalation with China over a Taiwan Strait crisis?” or “How does emerging technology impact force development?” However, students in this dual-accredited JPME and master's degree program quickly appreciate that they are learning new ways to think about these types of problems. In-residence JPME disabuses preconceptions that there are textbook solutions to long-standing strategic challenges, and it teaches students to think more deeply than memorizing what to think or which references to use. It helps students shift their focus from an immediate-application mindset toward considering career-long benefits of this education beyond the classroom.

When General Colin Powell spoke at the Naval War College more than two decades ago, he advised the students:

You are about at that point in your career now . . . when you have to have a better understanding of the broader context in which you are serving. When you have to have a better understanding of what is happening on the world scene. Where you need a better understanding of how politics works, of how public relations work, as to how you generate support for the armed forces of the United States. To make sure you understand the influences that are pressing on the Department and on your particular Service.

It's important for you, at this stage in your career, to . . . have a firm grasp of the outside pressures that come to bear, the political pressures, the public relations pressures. I am still not satisfied that senior officers coming up, or officers at this level, really understand the political context and how politics works in Washington. It's not a dirty business. It's the business that the “good guys” upstairs put in place.

Anybody who says that politics is nasty, and military people should stay away from it, or never become a political general—don't worry about that—you're not going to be successful. Politics is the way the country runs; it's the way our Founding Fathers



Retired Gen. Colin Powell addresses leaders from all components at the first CSA Army Profession Symposium, held at the U.S. Military Academy at West Point, NY, July 30, 2014. (U.S. Army photo by Staff Sgt. Mikki L. Sprenkle/Released)

wanted it to run. So, as you become more experienced, as you leave here and go on to jobs, start to understand the international situation a little more. Start to understand the political context in which we do our business. Start to understand the public relations and the media context in which we do our business. Because ultimately we are answerable to the American people, not by us giving speeches, but by us defending our actions to our political leaders, to those who have been elected over us, and by our explaining our actions through the media to the American people, and ultimately ensuring that we are doing what the American people wish us to do.²⁰

And that is the real work of the Naval War College. JPME institutions like ours celebrate when alumni rise in rank to flag and general officers, but the collective national security contribution of those who serve below this rank is far more impactful. Less than 1 percent of O-6s will promote to O-7, and the other 99 percent are the staffers—long known as the “back benchers”—who prepare the work for flag and general officers. Behind every senior leader lies a larger personnel ecosystem of O-4, O-5, and O-6 back benchers who prepare their bosses to be effective decisionmakers.

In today’s world, flag officers are pulled in so many directions, and are managing so many portfolios, that they do not have the bandwidth to develop strategic plans from scratch. They depend on educated, thinking strategists and planners to bring them well-developed options with well-articulated risks. This delegation of responsibility enables the executive to decide efficiently before moving on to the next portfolio decision. This is where the Department of War’s investment in JPME institutions really pays dividends.

In-residence JPME institutions maintain a storied history of graduates



A new U.S. Marine with Alpha Company, 1st Recruit Training Battalion, Recruit Training Regiment, receives his Eagle, Globe, and Anchor (EGA) on Marine Corps Recruit Depot Parris Island, SC, July 11, 2026. Following a culminating 15k hike to the parade deck, recruits are given their EGA and officially become United States Marines. (U.S. Marine Corps photo by Cpl. Dylan Smith)

going on to achieve flag or general rank. But outside the senior officer spotlight of congressional hearings or meetings in the White House Situation Room, other JPME graduates will work from the back bench, preparing information papers and decision briefs, facilitating relationships with civilian leaders and their staffs, and answering congressional inquiries.²¹ Some of these staffers are future flag or general officers themselves, but most are hard-working national security professionals in the most productive assignments of their 20-year military careers. Developing proficient strategies and plans from the back bench does not come with the cachet of flag rank, but that is what nearly all JPME graduates will do.

This is the essence of in-residence JPME programs—building national security teams that work tirelessly around the globe to further the Nation’s interests. Their work at higher echelons is more complex than pairing resources to demands. They must weigh constraints and risk in both the international security and domestic policy environments, discerning the critical actors and influential factors. Photographs capture for history the principals around the table, but success or failure depends on the unsung staff work behind those leaders. In-residence JPME institutions arm these officers for this critical responsibility. JFQ

Notes

¹ James Holmes states that “politics by other means” is a mistranslation and the accurate translation would be “politics with other means.” James R. Holmes, “Everything You Know about Clausewitz Is Wrong,” *The Diplomat*, November 12, 2014, <https://thediplomat.com/2014/11/everything-you-know-about-clausewitz-is-wrong/>.

² Lindsay P. Cohn, “Political Realism and Civil-Military Relations: Clausewitz and the Meaning of War,” in *The Edinburgh Companion to Political Realism*, ed. Miles Hollingsworth and Robert Schuett (Edinburgh: Edinburgh University Press, 2018), 75.

³ Janine Davidson, “Explaining the Broken Dialogue,” *Presidential Studies Quarterly* 41, no. 1 (2013): 129–45, <https://www.jstor.org/stable/43286700>.

⁴ Derek S. Reveron, *Exporting Security: International Engagement, Security Cooperation,*

and the Changing Face of the U.S. Military, 2nd ed. (Washington, DC: Georgetown University Press, 2016).

⁵ Alfred Thayer Mahan, *Naval Strategy Compared and Contrasted with the Principles and Practice of Military Operations on Land* (Boston: Little, Brown, 1918), 107.

⁶ Bismarck’s dispatches from the Frankfurt Diet, quoted in William C. Martel, *Grand Strategy in Theory and Practice: The Need for An Effective American Foreign Policy* (New York: Cambridge University Press, 2015), 35.

⁷ Nikolas K. Gvosdev and Derek S. Reveron, “Geography, Bureaucracy, and National Security: The New Map,” Foreign Policy Research Institute, July 20, 2023, <https://www.fpri.org/article/2023/07/geography-bureaucracy-and-national-security-the-new-map/>.

⁸ For purposes of this article, reference to Naval War College students refers to mid-level and senior level military officers, select civilian students from various government agencies, and international military officers. Joint planning is the deliberate process of determining how to implement strategic guidance: how (the ways) to use military capabilities (the means) in time and space to achieve objectives (the ends) within an acceptable level of risk.” See Joint Publication 5-0, *Joint Planning* (Washington, DC: Joint Chiefs of Staff, 2024). See also John Spencer and Liam Collins, “What Is Strategy in War,” *Small Wars Journal*, May 9, 2025, <https://smallwarsjournal.com/2025/05/09/what-is-strategy-in-war/>.

⁹ Derek S. Reveron et al., “Competing Regionally: Developing Theater Strategy,” *Joint Force Quarterly*, no. 104 (1st Quarter 2022): 48–62, <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/2884235/competing-regionally-developing-theater-strategy/>.

¹⁰ Robert Putnam, “Diplomacy and Domestic Politics: The Logic of Two-Level Games,” *International Organization* 42, no. 3 (Summer 1988): 434, <https://www.jstor.org/stable/2706785>.

¹¹ Nikolas K. Gvosdev, “Should Military Officers Study Policy Analysis,” *Joint Force Quarterly*, no. 76 (4th Quarter 2014): 30–34, <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/577585/should-military-officers-study-policy-analysis/>; Jessica D. Blankshain, “A Primer on US Civil-Military Relations for National Security Practitioners,” *Wild Blue Yonder*, July 6, 2020, 1–30, <https://web.archive.org/web/20250209092502/https://media.defense.gov/2020/Jul/07/2002449936/-1/-1/1/blankshain.pdf>.

¹² Since the beginning of this century, the Navy has submitted to Congress so-called “30-Year Shipbuilding Plans” that respectively have established goals of constructing a Navy consisting of 308, 313, 355, and 381 ships. In August 2003, the Navy fell below 300 ships and has remained between 270 and 300 ships since, with 296 ships at the beginning of 2025. Ronald O’Rourke, *Navy Force Structure and*

Shipbuilding Plans: Background and Issues for Congress (Washington, DC: Congressional Research Service, 2025), <https://www.congress.gov/crs-product/RL32665>.

¹³ Marine Corps Doctrinal Publication 1-4, *Competing* (Washington, DC: Headquarters Marine Corps, 2020), 2–3, <https://www.marines.mil/Portals/1/Publications/MCDP%201-4.pdf>.

¹⁴ Peter Baker, “How Obama Came to Plan for ‘Surge’ in Afghanistan,” *New York Times*, December 5, 2009, <https://www.nytimes.com/2009/12/06/world/asia/06reconstruct.html>.

¹⁵ For example, see Robert Komer’s humbling lessons from Vietnam. Robert W. Komer, *Bureaucracy Does Its Thing: Institutional Constraints on U.S.-GVN Performance in Vietnam* (Santa Monica, CA: RAND Corporation, 1972), <https://www.rand.org/pubs/reports/R967.html>.

¹⁶ CJCSI 3030.01A, *Implementing Joint Force Development and Design* (Washington, DC: The Joint Staff, October 2022), <https://web.archive.org/web/20230102085035/https://www.jcs.mil/Portals/36/Documents/Library/Instructions/CJCSI%203030.01A.pdf>; CJCSI 3030.01B, *Implementing Joint Force Development and Design* (Washington, DC: The Joint Staff, July 2025), <https://www.jcs.mil/Portals/36/Documents/Library/Instructions/CJCSI%203030.01B.pdf>.

¹⁷ CJCSI 1800.01G, *Officer Professional Military Education Policy* (Washington, DC: Joint Chiefs of Staff, 2024), <https://www.jcs.mil/Portals/36/Documents/Library/Instructions/CJCSI%201800.01G.pdf>.

¹⁸ See National Security Affairs syllabi at <https://www.usnwc.edu/Faculty-and-Departments/Academic-Departments/National-Security-Affairs-Department.html>.

¹⁹ CJCSI 1800.01G, A-C-1.

²⁰ Colin S. Powell, “The Triangle Analogy,” excerpt of an address given at the Naval War College, Newport, RI, June 6, 1990.

²¹ For examples of high-profile testimony, see Jessica D. Blankshain et al., “Called to Testify: Congressional Oversight of the Armed Forces,” *Texas National Security Review* 8, no. 2 (2025): 75–96, <https://tnsr.org/2025/03/called-to-testify-congressional-oversight-of-the-armed-forces/>.



The Red Flag 14-1 cyber protection team works on defense procedures inside the Combined Air and Space Operations Center-Nellis during the exercise February 5, 2014, at Nellis Air Force Base, Nevada. The CPT's primary goal is to find and thwart potential space, cyberspace, and missile threats against U.S. and allied forces. (U.S. Air Force photo/Senior Airman Brett Clashman)

Cyberspace Collaborative Awareness

A Model for Unity of Effort in Homeland Defense

By Michael Knapp, Sean Atkins, and Matthew McLaughlin

A renewed wave of cyberattacks on critical infrastructure calls into question the United States' ability to combat cyberspace threats to the systems the nation relies on most. Chinese, Russian, and Iranian intrusions

into the systems underpinning American society—such as utilities, communications, and transportation—dramatically increased in scope and scale from 2012 to 2014, to nearly 13 attacks per second worldwide.¹ During the same period,

known cyberattacks on infrastructure increased by 30 percent.² As one Department of Homeland Security (DHS) official explained, “[Malign cyber actors] have the access that they need, and if the order was given, they could disrupt some services in this country right now.”³

The fact that U.S. critical infrastructure systems remain at demonstrably greater risk despite massive national investment in cyber defense indicates that some underlying fundamentals

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may be wrong.⁴ Senior joint force commanders and members of Congress increasingly highlight the importance of one such fundamental—cyber domain awareness. This is a particularly critical issue for U.S. Northern Command (USNORTHCOM), the organization vested with the responsibility and authorities to defend the homeland across all domains. Indeed, during the closing months of his command of USNORTHCOM, General Glen D. VanHerck testified to Congress that a lack of awareness in the cyber domain hobbled homeland defense efforts:

As competitors and potential adversaries continue to field advanced all-domain capabilities with the potential to create significant effects in the homeland, it is imperative that the United States and Canada move quickly to improve domain awareness from the seafloor to space and cyberspace for all approaches to North America. [Improved awareness capability] will directly correlate to more time available

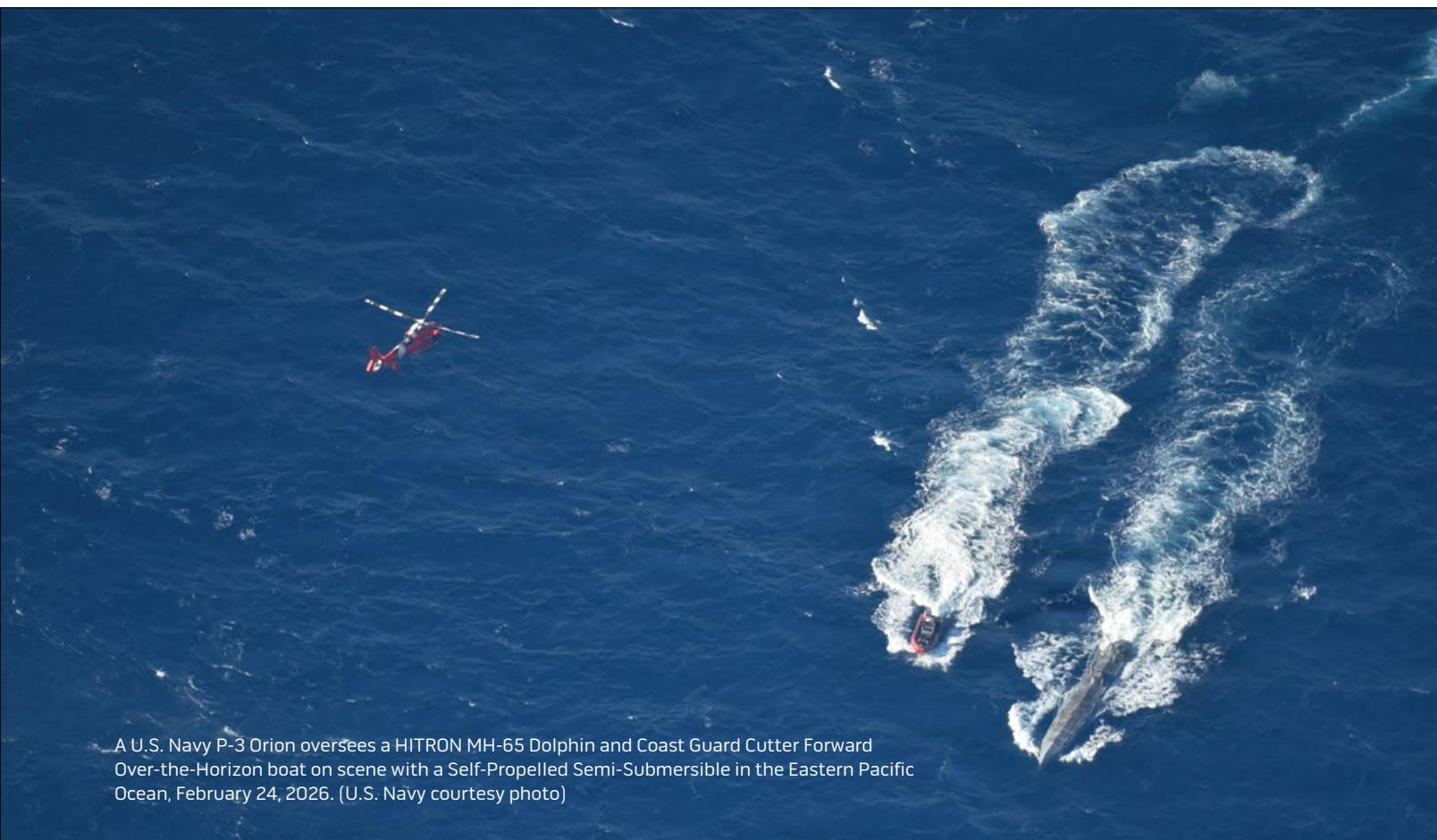
*to leaders at all levels, enabling the creation and employment of better deterrence options and, if required, defeat options.*⁵

The complexity of roles and responsibilities in cyberspace is a nontrivial issue, as private industry owns and operates most of the nation's critical infrastructure, making private firms essential homeland defense and security players. Such ambiguity presents inherent difficulty coordinating between Federal agencies and American industry, thereby hindering unity of effort for homeland defense. In the absence of unity of command across disparate infrastructure cyber systems and actors, homeland defense requires a unity of effort based on a basic shared domain awareness.

Though efforts at developing shared awareness of cyber threats and risks have existed since at least the 1990s,⁶ it was only in 2019 that Congress authorized the U.S. Cyberspace Solarium Commission to “develop a consensus on a strategic approach to defending the United States in cyberspace

against cyberattacks of significant consequences.”⁷ The commission emphasized that establishing an “enhanced level of situational awareness” was critical to countering cyberattacks.⁸ In 2024, Congress considered legislation directing DHS to deepen collaboration among Federal agencies, industry, and partner nations to defend against and recover from cyberattacks.⁹ As the conversation around cyber defense continues to mature, national leaders and practitioners should contemplate how lessons from other domains can inform characteristics of cyber domain awareness.

Government-civilian partnerships in other domains provide successful examples of unity of effort for homeland defense. For instance, the Department of War (DOW) and Department of Transportation maintain awareness of American airspace; an interagency consortium primarily led by the U.S. Coast Guard and U.S. Navy monitors American waters; and DOW, the National Aeronautics and Space Administration



A U.S. Navy P-3 Orion oversees a HITRON MH-65 Dolphin and Coast Guard Cutter Forward Over-the-Horizon boat on scene with a Self-Propelled Semi-Submersible in the Eastern Pacific Ocean, February 24, 2026. (U.S. Navy courtesy photo)

(NASA), the Department of Commerce, and various private operators share responsibility for space domain awareness. However, despite the myriad individual efforts within pockets of industry and government, current arrangements for the cyber domain may not effectively counter the coordinated cyber campaigns facing the United States. At the most basic level, there is no agreed-upon cyber domain awareness concept to guide unity of homeland defense efforts.

An examination of public-private partnerships in the air, maritime, and space domains reveals general domain awareness features that enable government, joint force, and industry leaders to gain “a common understanding of the situation” and synchronize defense efforts.¹⁰ For the cyber domain, a *collaborative awareness* construct based on three foundational principles—visibility, sensemaking, and shareability—contributes to unity of effort in homeland defense.

The Building Blocks of Awareness

On the most basic level, awareness begins with the individual player in an environment. Individuals can broaden their comprehension of the system by aggregating their awareness with others’ understanding to create team awareness or the “active construction of a model

of a situation partly shared and partly distributed between two or more agents, from which one can anticipate important future states.”¹¹ Combinations of teams and individuals can build collaborative situational awareness, in which no single entity maintains a common operating picture; instead, relatively seamless sharing permits different players to have the information they need for their respective missions.

Situational awareness, the conceptual cornerstone of collaborative awareness, has been studied in military flight operations since World War I.¹² Later, in the 1980s, human factors researchers extended their situational awareness studies to civil aviation and the air domain writ large.¹³ The most widely accepted definition of *situational awareness* is a three-level perception, comprehension, and projection model, illustrated in figure 1.¹⁴ The model identifies the first level of situational awareness as mere perception of the environmental cues. The second level understands Level 1 data within the context of current tasks. Finally, the third level combines Levels 1 and 2 data to project future system states.¹⁵

While this model of situational awareness is helpful, it fails to consider the shared awareness of multiple team members. The concept of *team awareness*

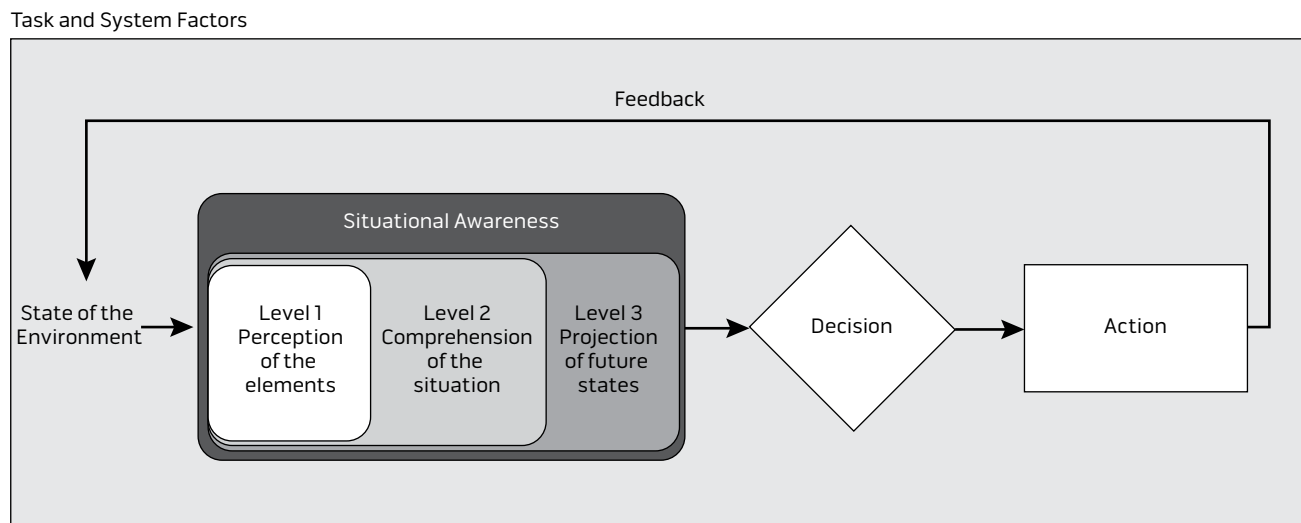
considers the interactions of multiple team members or players seeking to understand the environment. This model overlaps individual players’ zones of situational awareness and considers the now-shared situational awareness elements. Layered awareness allows the individual players to better perceive, comprehend, and project situational awareness in their and others’ roles. Figure 2 depicts where the awareness of individual players is exclusive and where it is shared.

Furthermore, a shared mental model allows team members to track other players’ activity without linear communication processes. Shared mental models “provide team members with a common understanding of who is responsible for what task and what the information requirements are. In turn, this allows individual players to anticipate one another’s needs so that they can work in sync.”¹⁶ The shared mental model derived from team awareness undergirds the unity of *any* effort, let alone national security efforts.

Essentials of Collaborative Awareness

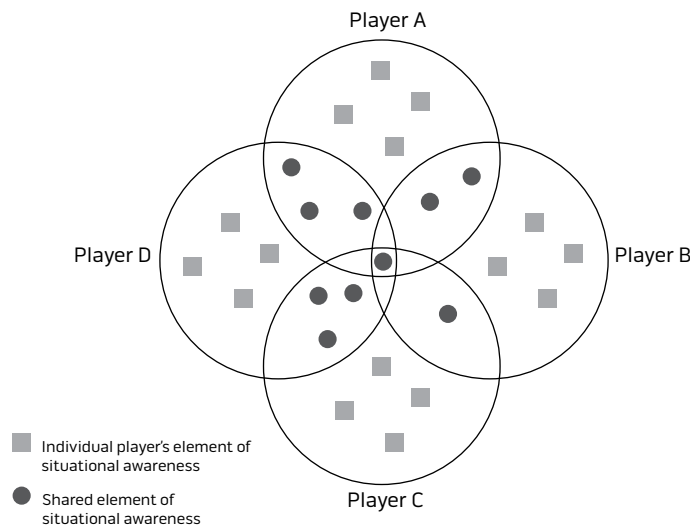
The complexity of the cyber domain and the overlapping equities of its many stakeholders in and out of government muddles earnest attempts at coordinating actions in cyberspace. Rather than building a massive

Figure 1.



Source: Authors.

Figure 2.



Source: Authors.

common operating picture of the cyber environment, national security leaders should endeavor to construct *collaborative awareness*, enabling mutual support among the many players in U.S. cyberspace.

Collaborative Awareness Defined

While human factors researchers assumed that players in a team awareness model would likely have access to the same information, a collaborative awareness

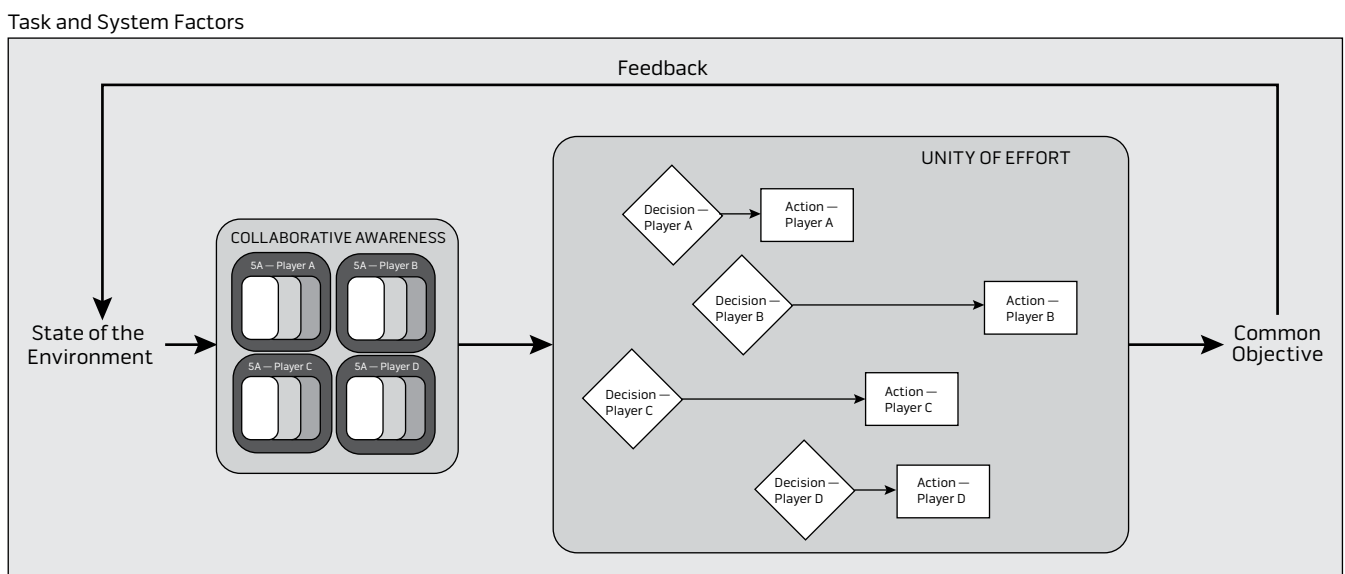
framework does not include this assumption. It acknowledges cognitive limits and the role of mission imperatives by providing enough information for making independent decisions toward a common goal but not enough for a complete common operating picture. Figure 3 illustrates a proposed model of collaborative awareness for the cyber domain.

In the collaborative awareness model, tasks, systems, and other factors interact

within the environment, impacting the shared awareness of individual players. For the cyber domain environment, external factors like electromagnetic spectrum dynamics, internal factors like changing network architectures, and even ambient factors like hurricanes and their impact on infrastructure all affect the environment. Individual players ingest these factors to shape their situational awareness, and the players communicate their separate instances of situational awareness with others to enhance team awareness. Then, the system builds collaborative awareness in which no player has complete awareness, but all players have enough to make decisions. This shared understanding allows players to make decisions and undertake actions on independent timelines toward a common objective, producing unity of effort. Continuously, feedback loops shape the environment and update the players' shared collaborative awareness.

Collaborative awareness allows for the variability and organizational caveats inherent to the cyber domain. Private firms primarily own the hardware and software that form the basis of the cyber domain and may need to protect certain proprietary information as they protect their networks. Government agencies enact

Figure 3.



Source: Authors.

public policy but also may need to protect classified sources or methods. Collaborative awareness and deliberate, measured information-sharing permit players to take required action—including offensive actions for which DOW is authorized—without exposing sensitive information.

Analysis of other domains shows potential foundational principles of collaborative awareness in visibility, sense-making, and shareability. Applying these three principles will help cyber players achieve collaborative awareness on the meta-system level.

Visibility: Ability to Observe Domain Activity

The first principle required for effective collaborative awareness—visibility—describes a player's ability to monitor

activity throughout the domain. From the team awareness model, certain players in the environment may perceive only some activity elements. In that case, any player's visibility must also extend to assimilating elements that only other players perceive. Importantly, visibility involves perceiving both the presence and absence of expected cues, which presents its own challenges. Existing awareness models in the air, maritime, and space domains provide examples of the visibility principle.

Visibility for air domain awareness incorporates a range of environmental cues to support flight safety for civilian aircraft and threat tracking for military applications. Whether air traffic control is provided by a Federal agency in the United States or a private nonprofit in Canada, the flight control body must

comprehend internal and external factors to build awareness of the domain. For instance, to best picture the air domain, controllers must understand an aircraft's physical particulars like speed or altitude, airport conditions like runway closures or taxiway issues, and ambient factors like thunderstorms or outages of global satellite navigation systems. Merely possessing the ability to perceive these environmental factors is not sufficient—interagency processes must also exist to facilitate information sharing and amplify collaborative awareness.

The aircraft hijackings of September 11, 2001, demonstrated two visibility failures. First, air traffic controllers lost track of American Airlines Flight 77 over Ohio after terrorists maneuvered the plane unexpectedly. Initially, radar

U.S. Marines operate an Autonomous Low-Profile Vessel at Naha Military Port, Okinawa, Japan, January 17, 2025. Marines with 12th Littoral Logistics Battalion executed the first ALPV rehearsals in Okinawa, increasing 12th LLB's operational readiness and amphibious capabilities. The ALPV is a semi-submersible autonomous logistics delivery system that has the ability to deliver multiple variations of supplies and equipment through contested maritime terrain. The Marines are with 12th LLB, 12th Marine Littoral Regiment, 3d Marine Division. (U.S. Marine Corps photo by Lance Cpl. Rodney Frye) (Details on the vessel have been blurred for security reasons)



software configurations prevented controllers from seeing the aircraft for 8 minutes. Once radar coverage was technically reestablished, controllers scanned the wrong geographic area, not noticing the plane had turned to the east earlier.¹⁷ In this instance, both technical and procedural issues negatively impacted visibility within the environment. Second, the Federal Aviation Administration (FAA) and North American Aerospace Defense Command (NORAD) failed to build effective team awareness by communicating updated situational awareness factors. On the morning of September 11, NORAD launched multiple fighter aircraft to intercept the hijacked commercial planes. One fighter formation initially flew out over the Atlantic and not toward Washington, DC, ignorant of the FAA's radar tracks. NORAD scrambled other fighters from the Midwest on a false intercept, even while the nearby United Airlines Flight 93 crashed outside Shanksville, Pennsylvania.¹⁸ In both cases, the FAA and NORAD maintained separate awareness of the domain as radar systems were not integrated, and independent visibility of environmental factors was not shared.

Visibility in the maritime domain is typified by information shared globally among players to establish rudimentary domain awareness via basic factors like data on ship positions and crew and cargo manifests. Other environmental factors, such as weather patterns and the bathymetric characteristics of the ocean (for example, tides and depth), are essential to safe navigation and contribute to overall awareness of the domain.

However, drug-smuggling submarines highlight a visibility weakness at the edges of current maritime domain awareness. These submarines and semisubmersibles generally travel at low speeds and present minimal silhouettes above the waterline, if any. Since 2006, narco-cartels have continually innovated the vessels' design to avoid detection, which appears to be working. Though numbers are murky, Colombian cartels produced an estimated 2,664 metric tons of cocaine in 2023, while the U.S. Coast Guard interdicted only 96 metric

tons of cocaine in the Caribbean that same year.¹⁹ The dynamism of the environment and evolution of adversaries' technology requires expanded partnerships "with 15 different interagency partners . . . and . . . 20 different countries" to overcome this maritime domain awareness gap.²⁰

Space illuminates unique aspects of visibility for collaborative awareness. For one, space domain awareness incorporates observable factors and the absence of anticipated observations or *deviations from the expected*. Additionally, players depend on techniques and technology in other domains to build situational awareness in space.

In the space domain, U.S. Space Command and the U.S. Space Force track all orbital objects, whether military or commercial, U.S. or foreign, or natural or artificial. Space provides no cover or concealment, and orbital motion is Newtonian; therefore, all objects are theoretically observable to ground stations, and their future positions can be predicted with high fidelity. Any deviation from an object's expected path alerts authorities to possible system anomalies, benign or malicious. While primarily intended for traffic management and collision avoidance in an ever-more congested environment, this awareness based on path anomalies may also clue players into malign activities in a domain that is ever more contested.

Because of limited access to space, operators must integrate quickly evolving technologies to build awareness. For instance, current sensor capabilities may not detect maneuver dynamics from emerging orbital technologies such as ion thrusters or solar sails, or satellite tracking capabilities may be outpaced by dramatically growing constellation sizes. Meeting these dynamic visibility needs requires space operators, including DOW, to adopt new sensing technology at a rapid rate. And looking holistically, space awareness also depends on awareness in other domains. A satellite launch, for example, requires maritime domain awareness to maintain clear areas downrange of the launch site, air domain awareness for aircraft deconfliction and

weather, and space domain awareness for nearby orbital traffic and solar activity.

The previously examined domains demonstrated the importance of integrating multiple public and private players to build collaborative awareness. Failures on September 11, challenges in undersea observation, and growing commercial satellite constellations each offer lessons related to the visibility principle. Intentionally designing visibility could promote collaborative awareness in cyberspace and support homeland defense efforts.

Sensemaking: Characterization and Projection

The second principle underlying collaborative awareness—sensemaking—builds upon the second and third levels of the situational awareness model. First, a player parses visible and shared factors in the environment to comprehend their position. Then, the player combines their situational awareness with that of others to project future behaviors. While the factors within the environment may differ from domain to domain, making sense of the environment, or characterizing it, and then projecting actions is fundamental to collaborative awareness.

Characterization, the first dimension of sensemaking, involves understanding internal, external, and ambient factors affecting new objects of interest in the environment. In the maritime environment, for example, U.S. Navy ships observe radar returns or positioning data to classify neighboring vessels. Comparing these internal and external factors to known traffic patterns, military operators can then characterize objects in the environment as friendly, neutral, or hostile. And, as much as a vessel's physical characteristics may matter, understanding external and ambient factors like a ship's ownership and registration scheme expands the understanding of the domain. For instance, an obfuscated ownership scheme may indicate that a vessel participates in illicit activity. In one example, opaque registration and neglected position reporting (that is, a deviation from the expected) have permitted North Korea to conduct at-sea transfers of oil with



A U.S. Marine Corps F-35B Lightning II assigned to Marine Fighter Attack Squadron (VMFA) 121, 31st Marine Expeditionary Unit, prepares to take off during flight operations in the Philippine Sea, February 15, 2026. Marine F-35Bs bring a 5th generation multi-discipline strike capability to support combined-joint all domain operations in key maritime terrain. The 31st MEU is a persistent, combat credible force operating aboard the ships of the Tripoli Amphibious Ready Group in the U.S. 7th fleet area of operations, routinely interacting and operating with our allies and partners to contribute to deterrence, security, crisis response, and combat operations in the Indo-Pacific region. (U.S. Marine Corps photo by Lance Cpl. Victor Gurrola)

blacklisted tanker vessels and evade international sanctions.²¹ Not only are internal, external, and ambient factors essential for characterizing an object in a domain, but they also aid in projecting future states.

Projection, the second aspect of sensemaking, extrapolates from the characterization of the environment and the objects it may contain, anticipates changes in that environment, and projects possible impacts of players' actions. Returning to the maritime domain, a U.S. Coast Guard cutter can anticipate another ship's intentions at sea from attributes such as its size, onboard equipment, and course. Moreover, by integrating information from other players, like a cargo manifest from U.S. Customs and Border Protection, the Coast Guard cutter could better anticipate the intent and subsequent actions of the cargo vessel. The Coast Guard applied this skill at least twice in 2024, joining partner nations to combat illegal, unreported, and unregulated fishing. First, a Coast Guard cutter joined with partner nations to prevent "a fleet

of 800 Chinese vessels [from] plundering South America's fishing grounds [and avert an] environmental collapse."²² Then, Coast Guard assets joined civil and military organizations from Japan, South Korea, and Canada to counter illegal fishing in the Pacific through "high seas patrols, air surveillance, and electronic monitoring."²³ The multiple information sources improved individual players' awareness and facilitated quick team sensemaking and action to build collaborative awareness to deter illegal fishing operations.

Accessibility of the range of observational and contextual data largely determines the simplicity or complexity of sensemaking. In the case of air domain awareness, commercial flights are well documented and monitored in the United States, giving air traffic controllers the requisite information to project weather impacts on the flights, for instance. In sharp contrast, incursions of unidentified drone swarms over and near Langley Air Force Base, Virginia, in 2024 demonstrate the limits

of sensemaking—visual observations provided location, but lack of contextual data like aircraft ownership concealed intent.²⁴

Collection capacity also affects analysis that supports sensemaking. In a domain overwhelmed by background noise, like a radar return in the air domain, established processes that once served to accelerate sensemaking may in fact hinder awareness. The Chinese balloon that traversed the United States in 2023 entered undetected into North American airspace. Early warning radars, calibrated to defend the homeland from bomber aircraft and missile attacks, were not calibrated to detect slow-moving objects. Rather than tracking every bird, piece of windswept debris, or balloon in the air, NORAD's systems were "filtering out that data," as General VanHerck stated. But tellingly, in that same interview General VanHerck warned that even though the United States requires better visibility into the Pacific, Arctic, and Atlantic regions to detect threats to the homeland, he is "most concerned about the cyber domain

and our ability to understand the threats in the cyber domain that impact [U.S.] power projection.”²⁵

Sensemaking consists of tools and processes to characterize and project actions based on visible factors in the domain environment. Because of the ever-expanding nature of the domain, sensemaking in cyberspace assuredly requires evolving technology and processes. Understandably, those advanced monitoring tools or developed cognitive processes will be distributed across industry and government players. Collating aspects of those capabilities in pursuit of common national security objectives requires well-defined shareability standards.

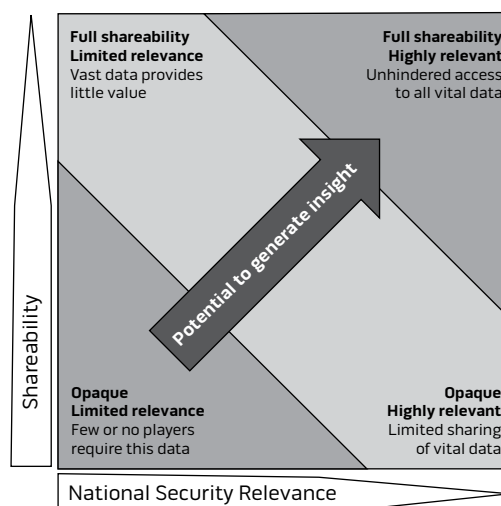
Shareability: Distributing Both Raw Data and Refined Analysis

The final principle necessary for collaborative awareness—shareability—predicates any unity of effort in cyberspace. Developing a shared, collaborative awareness for homeland cyber defense depends entirely on the ability to pass information among all players easily via agreed-upon pathways. This team includes players from across government and the private sector, as well as allies and partners who have roles in contributing to U.S. national security. A shared understanding of environmental factors enables not only collaborative awareness but also players’ independent actions that contribute to a common goal.

Shareability in pursuit of collaborative cyber domain awareness does not translate as “radical transparency,” but instead balances the competing interests or externalities for the team of players. Business gurus may argue that organizational performance is boosted when every organizational member knows all the details of every other member’s work (that is, radical transparency).²⁶ However, that argument may not apply when team members share a common goal like national security but maintain competing objectives like increasing shareholder value or protecting proprietary material. Figure 4 illustrates the range of shareability and relevance to national security for potential data.

Different players will place the same data sets at various points in figure 4,

Figure 4.



Source: Authors.

depending on their situational awareness needs and the relevancy of the data. Case in point: weather data may be superfluous to one player but vital to another, while equally accessible to both. In general, the potential to leverage collaborative awareness to generate new insights will increase with greater shareability of data relevant to the problem set.

Sharing efforts in other domains can be instructive here. The National Maritime Intelligence-Integration Office, for instance, pursues initiatives to “prevent intelligence and information gaps and to facilitate an effective understanding of the maritime domain.”²⁷ Its initiatives seek to shepherd new relationships and engage with existing regional architecture to “improve access to common and interoperable maritime domain awareness data and tools” for stakeholder companies, government agencies, and international partners like INTERPOL.²⁸ For situational awareness in space, the U.S. Government shares basic data on potential satellite collisions and atmospheric reentries at no cost to users to enhance safety in space and support commercial development.²⁹ At the same time, DOW also advances efforts to integrate data from the growing space sensing industry. Recently, the U.S. Space Force prioritized efforts to share advanced, actionable threat information

between DOW and the commercial sector.³⁰ The shared awareness enables commercial space operators to respond to threats and increases DOW’s visibility and understanding of the space domain.

Inevitably, not all information can be shared freely, whether because of its classified sources or proprietary status. Two options should exist in these cases to maximize shareability while protecting various interests. One category of data would contain essential awareness data that is broadly sharable but pared of sensitive details, while a second version contains high-fidelity information for trusted partners. Again, the maritime and space domains provide examples of this information categorization. In the maritime domain, the Department of Transportation broadly transmits ship traffic data that other agencies could combine with unique information to build insightful threat awareness at various levels of releasability.³¹ Space awareness data also has distinct levels of shareability. The Department of Commerce manages broadly available information on essential satellite orbital details and anomalies in one data set version. A second data set provides higher fidelity classified data to trusted government, international, and key industry space operators who require more details on specific threat behavior.³² Commercial

partners also have valid concerns with information shareability, and a well-designed shareability framework should account for disparate equities.

From a cyber perspective, shareability is an essential but challenging element of developing collaborative awareness. The private sector broadly owns and operates cyberspace, and collaborative awareness is unachievable without broad industry participation. Now, private industry owns 85 percent of the U.S. infrastructure networks.³³ Likewise, over 90 percent of U.S. military and intelligence communications rely on commercial telecommunication networks.³⁴ Homeland security and defense efforts must integrate industry partners. Only by combining information and perspectives from all cyberspace players can a sense of domain-level awareness emerge to feed unity of effort. Shareability is especially important to counter adversaries campaigning to disrupt critical U.S. infrastructure and commercial networks. Because adversaries' actions may only be apparent after aggregating clues from multiple networks, shareability is a crucial principle of collaborative awareness.

Despite the shared need, there are innumerable policy, legal, and interest impediments to information sharing between government and private industry organizations. Some organizations have powerful business interests in not sharing broadly, such as regulatory effects or impacts to competitive advantage. For others, there are valid concerns about privacy protections for customer data and network traffic, which are significant considerations when sharing data with the government. Even producing something as basic as the cyber equivalent of Notices to Air Missions or Notices to Marines in a reliably consistent and timely way has yet to be achieved. The relatively slow march toward greater domain awareness may be due more to divergent interests and policies than to technical challenges.

In fact, some technological advancements may increase the possibility of a workable solution to shareability. Research in areas like anonymization produces new methods that aid collaborative awareness participation by

allowing players to share relevant cyber defense information while lowering organizations' negative externalities and increasing the potential to generate domain insight.³⁵ As cyberspace evolves, a set of agreed-upon data standards will also benefit shareability. The 2018 National Space Traffic Management Policy emphasized common standards as a priority for space domain awareness as commercial sensing players and new data types continued to proliferate.³⁶

The evolution of airspace awareness may also prove illustrative. Since 2020, the FAA has required aircraft to broadcast position and flight data via Automatic Dependent Surveillance-Broadcast (ADS-B) in most airspace to feed the FAA's monitoring systems. Since ADS-B data quality and speed outperform traditional radar returns, ADS-B information improves short-term aircraft trajectory projections. With this enhanced sense-making, commercial carriers expanded domestic service in mountainous areas where radar could not provide coverage.³⁷ While not mandatory, aircraft can also receive ADS-B information directly from other aircraft instead of relying on a central actor like an air traffic controller to provide awareness. This federated shareability of information substantially increases aviation safety. For general aviation aircraft that were *broadcasting* ADS-B, accidents were reduced by 53 percent. Moreover, fatal accidents were reduced by 89 percent for aircraft *receiving* ADS-B information.³⁸

Shareability must account for various players' perspectives and data needs. Air, maritime, and space domain awareness rely on accurate and timely information sharing to build awareness. As government and industry develop a collaborative awareness in cyberspace, shareability must be purposely crafted to support unity of effort for homeland defense.

Crafting Collaborative Awareness in Cyberspace

Regardless of the domain, homeland defense requires a shared awareness of activity in the environment to inform individual action and unify disparate efforts toward common objectives.

Across domains, this awareness is best achieved through information sharing to enhance visibility and sensemaking by all players with roles in securing the domain. Against the apparent need for a shared understanding for cyberspace defense, a collaborative cyber awareness construct remains unrealized at the national level despite significant government and industry initiatives. U.S. national security leaders must thoughtfully organize public and private players and properly resource efforts to achieve collaborative awareness in the cyber domain in support of homeland defense.

While building collaborative awareness in cyberspace seems daunting, other domains may again prove enlightening regarding organizing and resourcing national-level awareness of a whole-of-nation domain. In particular, the development of NORAD's Semi-Automatic Ground Environment (SAGE) in the 1950s provides an example of a herculean effort to develop a shared awareness of a (then) cloudy domain. Early in the Cold War, NORAD lacked the awareness and command and control necessary to direct air defense efforts against a large-scale attack by nuclear-armed Soviet bombers. In response, the Department of Defense developed SAGE, a public-private national defense endeavor that eclipsed the Manhattan Project in cost and scale.³⁹ Used until 1984, SAGE linked hundreds of radar sites, control centers, U.S. military airfields, and surface-to-air missile sites to build NORAD's situational awareness and enable North American airspace defense: "It was far and away the most grandiose systems engineering effort—and the largest electronic system-of-systems 'ever contemplated.'"⁴⁰ Collaborative awareness for cyber defense does not require total information transparency or centralized control, tenets inherent to the design of SAGE. Instead, appropriate organization and well-defined roles can assist unity of effort for homeland defense.

To this end, the White House's Office of Science and Technology Policy (OSTP) could lead public and private entities to formulate a shared concept for collaborative awareness in cyberspace.

Already, OSTP leads nationally important initiatives like coordinating 13 Federal agencies and offices to explore quantum information science or synchronizing up to 35 public and private industry entities to draft responsible artificial intelligence policy.⁴¹ No equivalent organization holds the attention of industry and academia while also maintaining access and influence over the whole of the U.S. Government and, to some extent, international partners. Of course, the Cybersecurity and Infrastructure Security Agency (CISA) would play a prominent role in authoring a concept for collaborative awareness, and the National Institute for Standards and Technology could referee technical standards underlying the visibility and shareability principles. Also, a properly structured nonprofit or quasi-public entity without regulatory authority could gain broader private sector participation, which is a challenge for current CISA initiatives, as evidenced by industry withdrawals from the Joint Cyber Defense Collaborative in late 2023 and early 2024.⁴² To achieve consensus for a vision of collaborative cyber awareness, each player must also agree upon set roles and responsibilities.

DOW is critical in the collaborative awareness conversation because of its unique capabilities and equities. As with awareness in all other domains, DOW must be a key advocate for the homeland defense perspective in this cyber awareness effort. But first, the Pentagon must better define its homeland defense roles and responsibilities in cyberspace. To date, DOW is reluctant to become overly involved in largely private networks on American soil, resulting in an ill-defined line between homeland defense and homeland security. Undoubtedly, there are legal questions concerning military operations and the homeland, but cyberspace is detached from national borders, with its physical infrastructure and cyber effects spanning the globe. DOW understands homeland defense to start within the United States but extend to the nation's approaches and forward regions, just like cyberspace. To that end, DOW possesses unique authorities and capabilities, making it a powerful defensive

partner. Unlike industry, the military can and does operate beyond the bounds of the virtual United States, even on adversary cyber terrain, to gain insight into or eliminate malign threat vectors.

DOW also maintains a national defense perspective that is unique among players. While other Federal agencies like DHS or CISA may offer opinions that align with DOW's perspective, only DOW can represent its defense equities. For instance, the growing risk to commercially owned critical infrastructure in the United States highlights the necessity of shepherding private and public capabilities for national security. Today, combatant commanders wonder aloud about the Nation's ability to project the joint force. The commander of U.S. Transportation Command, General Randall Reed, stated in his September 2024 Senate confirmation hearing that he would prioritize cyber resilience for broader logistics enterprise because the joint force "faces increasingly capable contests and disruptions in the air, land, sea, space, and cyberspace domains."⁴³ General Reed also noted the need for public-private partnership in the same hearing: "Since cyber is so connected between the government and the commercial world, having good quality relationships with the commercials is fundamental."⁴⁴ Developing collaborative awareness in cyberspace ahead of any serious conflict is essential to prevent disruptive attacks on critical U.S. infrastructure, which would negatively impact the military as well as Main Street.

Conclusion

Defeating large-scale, wartime cyberattacks on the homeland—and even mitigating ongoing day-to-day malign activity—requires awareness of the virtual battlefield to sense disturbance before disturbance and danger before danger, as Sun Tzu counseled. Given the nature of privately owned infrastructure and deep public-sector interest, developing the necessary level of collaborative awareness for homeland defense requires coordination between industry and government agencies.

Collaborative awareness acknowledges the interconnectedness of

government and commercial networks and the independent goals of each player in cyberspace. The principles of visibility, sensemaking, and shareability all helped baseline awareness efforts in other domains and show promise in guiding future work in the cyber domain.

National security leaders can advance cyber collaborative awareness by developing proper organizational constructs, interagency roles, and resourcing. In turn, this shared understanding of cyber domain hazards enables government and private-sector organizations to detect and defeat critical cyber threats, achieving unity of effort for homeland defense. JFQ

Notes

¹ Cybersecurity and Infrastructure Security Agency (CISA), "PRC State-Sponsored Actors Compromise and Maintain Persistent Access to U.S. Critical Infrastructure," CISA, February 7, 2024, <https://www.cisa.gov/news-events/cybersecurity-advisories/aa24-038a>; CISA, "Iranian Cyber Actors' Brute Force and Credential Access Activity Compromises Critical Infrastructure Organizations," CISA, October 16, 2024, <https://www.cisa.gov/news-events/cybersecurity-advisories/aa24-290a>; CISA, "Russian Military Cyber Actors Target U.S. and Global Critical Infrastructure," CISA, September 5, 2024, <https://www.cisa.gov/news-events/cybersecurity-advisories/aa24-249a>.

² "2023 Global Threat Roundup Report: Trends in Cyberattacks, Exploits, and Malware," Forescout Research—Vedere Labs, January 24, 2024, https://www.forescout.com/resources/research-report_2023-threat-roundup, 4.

³ Martin Matishak, "CISA's Top China Specialist Departs for Role at CIA," *The Record*, August 29, 2024, <https://therecord.media/cisa-china-specialist-departs>; Sarah Krouse et al., "China-Linked Hackers Breach U.S. Internet Providers in New 'Salt Typhoon' Cyberattack," *Wall Street Journal*, September 26, 2024, <https://www.wsj.com/politics/national-security/china-cyberattack-internet-providers-260bd835>.

⁴ The U.S. budget for fiscal year 2025 alone allocated \$27.5 billion across civilian and defense departments. See Office of Management and Budget, "Budget of the U.S. Government—Fiscal Year 2025," The White House, 2024, https://www.whitehouse.gov/wp-content/uploads/2024/03/budget_fy2025.pdf.

⁵ *Hearing to Receive Testimony on the Posture of United States Northern Command and United States Southern Command in Review of the Defense Authorization Request for Fiscal Year 2024 and the Future Years Defense Program*,

Before the Senate Armed Services Comm., Subcomm. on Strategic Forces, 118th Cong., 1st sess., 9-10 (March 23, 2023) (statement of General Glen D. VanHerck, Commander, United States Northern Command and North American Aerospace Defense Command), https://www.armed-services.senate.gov/imo/media/doc/NNC_FY23%20Posture%20Statement%2023%20March%20ASAC%20FINAL.pdf; Joint Cyber Defense Collaborative Act, H.R. 9768, 118th Cong., 2nd sess. (2024), <https://www.congress.gov/bill/118th-congress/house-bill/9768/text>. Emphasis added.

⁶ Sean Atkins and Chappell Lawson, “An Improvised Patchwork: Success and Failure in Cybersecurity Policy for Critical Infrastructure,” *Public Administration Review* 81, no. 5 (2021): 847–61, <https://doi.org/10.1111/puar.13322>.

⁷ Section 1652 (Cyberspace Solarium Commission), John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, <https://www.congress.gov/115/plaws/publ232/PLAW-115publ232.pdf>.

⁸ Cyberspace Solarium Commission (CSC), March 2020 CSC Report (Washington, DC: CSC, 2020), <https://cybersolarium.org/march-2020-csc-report/march-2020-csc-report/>; Jiwon Wa and Mark Montgomery, *2024 Annual Report on Implementation* (Washington, DC: CSC, 2024), <https://cybersolarium.org/annual-assessment/2024-annual-report-on-implementation/>.

⁹ Joint Cyber Defense Collaborative Act, H.R. 9768, 118th Cong., 2nd sess. (2024), <https://www.congress.gov/bill/118th-congress/house-bill/9768>.

¹⁰ *Unity of Effort Framework Quick Reference Pamphlet* (Washington, DC: The Joint Chiefs, 2013), 2, https://web.archive.org/web/20250823195221/https://www.jcs.mil/Portals/36/Documents/Doctrine/pams_hands/uef_qr.pdf.

¹¹ Christer Garbis and Henrik Artman, “Situation Awareness as Distributed Cognition,” paper presented at the 9th European Conference on Cognitive Ergonomics, in *Proceedings of ECCE 1998—Limerick*, ed. T.R.G. Green et al. (Limerick, Ireland: European Association of Cognitive Ergonomics, 1998), 152, <https://www.eace.site/Proceedings/ECCE%201998.pdf>.

¹² M. Press, “Situation Awareness: Let’s Get Serious About the Clue-Bird” (unpublished manuscript, 1986), quoted in Mica R. Endsley, “Toward a Theory of Situation Awareness in Dynamic Systems,” *Human Factors* 37, no. 1 (March 1995): 32, <https://doi.org/10.1518/001872095779049543>.

¹³ Mica R. Endsley, “A Survey of Situation Awareness Requirements in Air-to-Air Combat Fighters,” *International Journal of Aviation Psychology* 3, no. 2 (April 1993): 158, https://doi.org/10.1207/s15327108ijap0302_5.

¹⁴ Paul M. Salmon et al., *Distributed Situation Awareness: Theory, Measurement, and Application to Teamwork* (London: CRC Press, 2017).

¹⁵ Salmon et al., *Distributed Situation Awareness*, 10–11.

¹⁶ Renée J. Stout et al., “Planning, Shared Mental Models, and Coordinated Performance: An Empirical Link is Established,” *Human Factors* 41, no. 1 (March 1999): 61–71, <https://doi.org/10.1518/001872099779577273>.

¹⁷ National Commission on Terrorist Attacks, *The 9/11 Commission Report: Final Report of the National Commission on Terrorist Attacks upon the United States* (New York: Norton, 2004), 25, <https://govinfo.library.unt.edu/911/report/911Report.pdf>.

¹⁸ National Commission on Terrorist Attacks, *The 9/11 Commission Report*, 28.

¹⁹ “Colombia: Potential Cocaine Production Increased by 53 Per Cent in 2023, According to New UNODC Survey,” press release, United Nations Office on Drugs and Crime, October 18, 2024, <https://www.unodc.org/unodc/press/releases/2024/October/colombia-potential-cocaine-production-increased-by-53-per-cent-in-2023-according-to-new-unodc-survey.html>; *The Coast Guard’s Fiscal Year 2025 Budget Request, Before the Committee on Transportation and Infrastructure, Subcommittee on Coast Guard and Maritime Transportation*, 118th Cong., 2nd sess., May 23, 2024 (statement of Admiral Linda L. Fagan, Commandant, U.S. Coast Guard), <https://www.congress.gov/118/chrg/CHRG-118hhrg56929/CHRG-118hhrg56929.pdf>.

²⁰ Diego Laje and Nuray Taylor, “Narco-Subs: A Game of Hide-and-Seek,” *SIGNAL*, June 1, 2023, <https://www.afcea.org/signal-media/technology/narco-subs-game-hide-and-seek>.

²¹ Christoph Koettl, “How Illicit Oil Is Smuggled Into North Korea With China’s Help,” *New York Times*, March 26, 2021, <https://www.nytimes.com/2021/03/24/world/asia/tankers-north-korea-china.html>.

²² “U.S. Coast Guard Supports Partner Nations’ Fight Against Illegal Chinese Fishing,” *Dialógo Américas*, June 25, 2024, <https://dialogo-americas.com/articles/us-coast-guard-supports-partner-nations-fight-against-illegal-chinese-fishing>.

²³ “U.S. Coast Guard, Canadian Forces, International Partners Wrap-Up Operation North Pacific Guard 2024,” press release, United States Coast Guard News, October 29, 2024, <https://www.news.uscg.mil/Press-Releases/Article/3949614/us-coast-guard-canadian-forces-international-partners-wrap-up-operation-north-p>.

²⁴ Gordon Lubold et al., “Mystery Drones Swarmed a U.S. Military Base for 17 Days. The Pentagon Is Stumped,” *Wall Street Journal*, October 12, 2024, <https://www.wsj.com/politics/national-security/drones-military-pentagon-defense-331871f4>.

²⁵ Patrick Smith, “Chinese Spy Balloon Exposed Gaps in U.S. Ability to Detect Threats, NORAD Commander Says,” *NBC News*, July 20, 2023, <https://www.nbcnews.com/news/us-news/chinese-spy-surveillance-balloon-flaws-threat-detection-norad-defense-rcna95094>.

²⁶ Ryan Smith and Golnaz Tabibnia, “Why Radical Transparency Is Good Business,” *Harvard Business Review*, October 11, 2012, <https://hbr.org/2012/10/why-radical-transparency-is-good-business>.

²⁷ “Maritime Information Sharing Initiatives,” National Maritime Intelligence-Integration Office, <https://nmio.isc.gov/Initiatives/Maritime-Information-Sharing-Initiatives/>.

²⁸ “Maritime Information Sharing Initiatives.”

²⁹ Donald J. Trump, memorandum, Space Policy Directive-3, “National Space Traffic Management Policy,” *Federal Register* 83, no. 120 (June 21, 2018): 28973, <https://www.federalregister.gov/documents/2018/06/21/2018-13521/national-space-traffic-management-policy>.

³⁰ U.S. Space Force, *U.S. Space Force Commercial Space Strategy* (Washington, DC: Department of the Air Force, 2024), 12, https://www.spaceforce.mil/Portals/2/Documents/Space%20Policy/USSF_Commercial_Space_Strategy.pdf.

³¹ “Data Statistics,” Maritime Administration, U.S. Department of Transportation, updated August 2, 2023, <https://web.archive.org/web/20230902142102/https://www.maritime.dot.gov/data-reports/data-statistics/data-statistics>.

³² Center for Strategic and International Studies, “Space Situational Awareness and Space Traffic Management Coordination Among U.S. Agencies,” CSIS, November 17, 2020, <https://youtu.be/BVSfBzmjCU8>.

³³ Jeffrey F. Addicott, “Cyber Security and the Government/Private Sector Connection,” *Pas It On* 21, no. 3 (Spring 2012): 1, <https://commons.stmarytx.edu/facarticles/475>.

³⁴ Adam Segal, “Bridging the Cyberspace Gap: Washington and Silicon Valley,” *PRISM* 7, no. 2 (2017): 67, https://ndupress.ndu.edu/Portals/68/Documents/prism/prism_7_2/prism_7-2.pdf.

³⁵ Jeremy Kepner et al., “What is Normal? A Big Data Observational Science Model of Anonymized Internet Traffic,” *arXiv e-prints* (2024), <https://doi.org/10.48550/arXiv.2306.09267>.

³⁶ Trump, Space Policy Directive-3, 28970.

³⁷ Woodrow Bellamy III, “What’s Next for ADS-B in the U.S. Air Traffic System?,” *Avionics International*, accessed November 8, 2024, <https://interactive.aviationtoday.com/whats-next-for-ads-b-in-the-us-air-traffic-system>.

³⁸ Christian Ramsey, “Reducing Runway Incursions Isn’t a \$100M Problem. It’s Much Less,” *uAvionix* (blog), May 26, 2023, <https://uavionix.com/reducing-runway-incursions-isnt-a-100m-problem-its-much-less>.

³⁹ “SAGE: Semi-Automatic Ground Environment Air Defense System,” Lincoln Laboratory Massachusetts Institute of Technology, accessed November 11, 2024, <https://www.ll.mit.edu/about/history/sage->

semi-automatic-ground-environment-air-defense-system; Stephen Lukasik, "Why the ARPANET Was Built," *IEEE Annals of the History of Computing* 33, no. 3 (2011): 4–21, <https://doi.org/10.1109/MAHC.2010.11>.

⁴⁰ "SAGE."

⁴¹ "Office of Science and Technology Policy," White House, accessed November 11, 2024, <https://web.archive.org/web/20241111002538/https://www.whitehouse.gov/ostp/>.

⁴² Joseph Gedeon, "Cyber Pros Are Giving Up on a Key Government Program," Politico, February 5, 2024, <https://www.politico.com/newsletters/weekly-cybersecurity/2024/02/05/cyber-pros-are-giving-up-on-a-key-government-program-00139540>.

⁴³ *U.S. Transportation Command Nomination Hearing Before the [Senate] Comm. on Armed Services*, 118th Cong., 2nd sess., September 17, 2024 (stenographic transcript of hearing for the nomination of Lieutenant General Randall Reed, U.S. Air Force), 77, https://www.armed-services.senate.gov/imo/media/doc/nomination_hearing.pdf.

⁴⁴ *U.S. Transportation Command Nomination Hearing Before the Committee on Armed Services*, 88.



A Ranger assigned to the 2nd Ranger Battalion conducts a platoon live-fire exercise at Joint Base Lewis-McChord, Washington, June 6–10, 2025. The exercise integrated unmanned aerial systems, snipers, mortars and heavy weapons systems to enhance battlefield awareness and lethality. (U.S. Army photo by Spc. Samuel Dreher)

Mission Over Bureaucracy

Special Operations Command's Warrior-Driven Model for Defense Innovation

By Robert D. Seader

The character of war is undergoing a seismic transformation driven by emerging technologies like artificial

intelligence (AI), autonomy, and quantum-enabled capabilities. Meanwhile, the United States Department of War (DOW)

faces a well-documented crisis of speed and innovation in its acquisition system. Decades of peacetime optimization and bureaucratic layering have yielded a process that is “too slow to be competitive and is only incrementally innovative.”¹

Researchers have found that the defense acquisition cycle now takes four times longer than it did in the 1950s,

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largely attributed to a proliferation of oversight and procedures that impede timely decisionmaking.² In an era of Great Power competition and rapid technological change, this sluggish pace threatens to undermine the U.S. military's edge and U.S. national security. As James F. "Hondo" Geurts—former acquisition executive for the United States Special Operations Command (USSOCOM or SOCOM) and former Performing the Duties of the Under Secretary of the Navy—puts it, "The Pentagon must focus on outcomes, not processes."³

In search of models for agility, many experts point to USSOCOM—the unified command responsible for Special Operations Forces (SOF)—which has pioneered a faster, more innovative acquisition approach aligned to the needs of its warfighters. This article examines USSOCOM's unique role and evolution in defense acquisition and argues that, where practicable, the military Services should adopt key elements of USSOCOM's model: an outcomes-focused, mission-centric culture that empowers the acquisition workforce; networked teams that tightly integrate warfighters, requirements personnel, acquisition professionals, and industry partners; and an organizational structure that limits bureaucracy and streamlines decisionmaking to best accelerate innovation and rapid capability development for the warfighter.

The analysis in this piece draws on extensive primary-source interviews with key leaders in industry, government, academia, and acquisition who have experience in USSOCOM and traditional Service acquisition environments.⁴

The Special Operations Command Advantage: Evolution of an Agile Acquisition Powerhouse

Origins and Unique Authority

In response to the failed 1980 Iran hostage rescue mission (Operation *Eagle Claw*), USSOCOM was established by the Goldwater-Nichols Department of Defense Reorganization Act of 1986 and the Nunn-Cohen Amendment to

the National Defense Authorization Act of 1987 to unify and strengthen special operations capabilities across all military branches. The amendment granted unprecedented Service-like authorities to develop and acquire special operations—peculiar equipment and control a dedicated budget through Major Force Program-11 funds. As the only combatant command with "Head of Agency" contracting status, USSOCOM gained the ability to function like a military Service but with remarkably streamlined bureaucracy and a locked-arm connection to the warfighter.⁵

The war on terror became the crucible that forged USSOCOM's innovative acquisition approach. With SOF leading initial operations and playing critical, ever more central roles throughout the wars in Afghanistan, Iraq, and the world over, urgent battlefield demands necessitated the rapid fielding of new capabilities.⁶ Under leaders like Geurts, USSOCOM's acquisition arm—SOF Acquisition, Technology, and Logistics—cultivated the mindset that "acquisition is a warfighting function," recognizing that equipping the force was as critical to the command's mission success as the operations.⁷

USSOCOM pioneered several innovations to accelerate capability development. The creation of the SOFWERX platform in 2015 established a collaborative innovation hub that brought warfighters together with nontraditional partners outside bureaucratic constraints.⁸ This Partnership Intermediary Agreement operates left of requirements, exploring solutions before formal requirements are written.⁹ USSOCOM also distinguished itself by creatively exploiting mature technologies. Eighty-eight percent of its weapon system programs are small, short-cycle projects that modify existing equipment or integrate commercial solutions.¹⁰

Crucially, USSOCOM achieves its speed within the same legal framework governing all defense acquisition. Its advantage stems not from special authorities, but from shared culture and organizational strategy. The combination of an outcomes-focused, unapologetically

warrior-centric culture shared across a command and a flat organizational approach is a built-in advantage.¹¹

USSOCOM maintains a "streamlined procurement system with limited oversight and increased tolerance for technical risk."¹² This approach contrasts sharply with the Services' risk-averse culture and multiple layers of oversight for large programs. At its core, SOF Acquisition, Technology, and Logistics embraces calculated risk when opportunities justify it, encouraging experimentation and tolerating early failures, knowing they lead to faster ultimate success.¹³

The result is a dramatic difference in capability delivery timelines. The average Service acquisition takes 10 to 20 years from concept to fielding. In contrast, USSOCOM regularly delivers new capabilities in 12 to 24 months—a pace essential to meeting the challenges posed by emerging technologies and Great Power competition.¹⁴

Core Elements of SOCOM's Acquisition Success Model

Purpose Over Process: SOCOM's Empowerment Culture

"Culture eats strategy for breakfast."

—Peter Drucker¹⁵

Building upon SOCOM's unique authorities and acquisition evolution, the article now examines the first critical element that Services can adopt: SOCOM's distinctive culture. Dan Ward, a retired Air Force acquisition officer and lifelong learner and innovator, provided a concise definition of culture—"shared beliefs and behaviors."¹⁶ SOCOM culture emanates from five foundational principles known as the SOF Truths. Three of these Truths—#1, #2, and #5, respectively—are directly applicable to scaling acquisition to the Services: people are more important than hardware; *when it comes to people*, quality is better than quantity; and most special operations require non-SOF assistance.¹⁷ These shared beliefs and behaviors permeate the command, act as a glue that holds USSOCOM together, and guide the



Rangers assigned to the 2nd Ranger Battalion conduct a platoon live-fire exercise at Joint Base Lewis-McChord, Washington, June 6–10, 2025. The exercise integrated unmanned aerial systems, snipers, mortars, and heavy weapons systems to enhance battlefield awareness and lethality. (U.S. Army photo by Spc. Samuel Dreher)

actions of individuals and the organization. Critical tenets that follow these warrior-centric SOF Truths include a vigilant mission-centric, outcomes-focused approach that requires empowered individuals, teams that are warrior-inclusive and agile, and a refusal to tolerate unnecessary bureaucracy.

As retired Lieutenant General Christopher C. Bogdan reflected on his time at USSOCOM while Program Executive Officer at the command's Big Safari (named for the Air Force's secretive, streamlined acquisition program): "Big Safari did not have time for the b-----t. Getting things in the hands of the warfighter and ensuring we did right by the taxpayer was paramount. This shared mentality is a built-in advantage."¹⁸ With everyone aligned toward the mission, USSOCOM's culture provides a decisive edge.

At the heart of USSOCOM's acquisition success is a mission-centric, outcomes-focused culture that empowers its acquisition professionals and diverges sharply with the process-driven philosophy prevalent in much of DOW. SOCOM acquisition begins and ends with the warfighter's mission. Essentially, all USSOCOM is focused on what the warfighter needs down range to succeed and make it home alive. In contrast, as Brandon Tseng—former Navy SEAL and the president and co-founder of Shield AI—observed to the House Armed Services Committee in September 2024, the Department of Defense (now DOW) at large often fixates on completing detailed requirements documents rather than actually solving the warfighter's problem.¹⁹ Tseng said that to truly innovate, the Department "needs to shift funding and priorities toward solving problems instead of fulfilling requirements."²⁰ To maintain a mission-focused culture, SOCOM emphasizes outcomes and pushes authority down to empower its workforce.

Being outcomes-focused is critical to agile innovation at SOCOM. This approach manifests in the command's problem-based acquisition process. For example, rather than starting with rigid specifications for a new drone, SOCOM might begin with the problem: "Our

operators need to surveil targets in dense urban terrain without being detected." SOCOM would then encourage creative solutions from its program teams and industry partners by emphasizing the end state: a silent, covert surveillance tool. The system is established to refine problems to be solved and evaluate solutions without dictating the means, focusing everyone on outcomes and potential value delivery to the mission.²¹ In short, the SOCOM culture asks, "What does the operator need to accomplish?," not "Did we follow the process?"—a crucial distinction as overly burdensome processes often lead to highly prescriptive requirements that stifle creative solutions.

At SOCOM, empowerment of the acquisition workforce is understood to be critical to mission accomplishment. The first SOF truth—that people are more important than hardware—is fundamental to this tenet.²² The command's leadership philosophy for more than 20 years has been to clearly communicate intent and risk tolerance, then "empower program managers to make decisions at the appropriate level."²³ Frontline acquisition professionals are treated as trusted warfighters in their domain, not merely bureaucrats. USSOCOM explicitly considers acquisition a warfighting function and getting SOF operators the tools they need critical to mission success.²⁴ To drive this point home, to highlight SOF Truth #5 (that most special operations require non-SOF assistance), and to further embolden its workforce, SOCOM renamed its acquisition professionals "SOF Acquirers."²⁵

Geurts's reflection on successful programs sums it up like this: "I have seen that it is possible to execute an operationally responsive acquisition system when there is a clear understanding of intent, a sense of urgency at all levels of the organization, a close connection between the acquirer and the operator . . . and an empowered and accountable acquisition workforce."²⁶ In practice, this means program managers at SOCOM are expected to understand the mission imperative and are given latitude to use flexible authorities, take calculated risks, and make quick decisions in conjunction

with their operational counterparts. They are expected to treat speed and mission success as top priorities—akin to how a SOCOM field commander trusts a special operations team to execute a mission with autonomy within a commander's intent.

Lieutenant General Bogdan reinforces this mindset with a powerful guiding principle from his career: "It's less about the rules and more about doing what's right for the taxpayer and the warfighter. Keep those as the guiding principles. Anything that is stupid, wastes time, or does not support the warfighter or the taxpayer, we're going to change, fight, or ignore. As a leader, my job was to have [my workforce's] back when they did that."²⁷

In contrast, the broader DOW's "acquisition culture prioritizes avoiding failure over embracing innovation—disincentivizing bold decisions and stifling transformative efforts."²⁸ Additionally, many in DOW often view acquisition as a back-office process that is a distant, non-attached subset of the mission. Empowering individuals will be essential if the Services hope to emulate SOCOM's speed. Indeed, many flexible tools exist "on the books" in DOW today, but as Geurts observed, implementation is key—acquisition officers must be trained and encouraged to use them.²⁹ Without the impetus of a mission-centric, outcomes-focused culture, new authorities or reforms may languish unused, or worse yet, allow risk aversion to win the day.

When asked why this empowered, mission-focused approach is not standard in Major Defense Acquisition Programs (MDAPs), Lieutenant General Bogdan explained the institutional barriers: "People have been burned too many times, so most MDAPs are not like that. Everyone is gun-shy, contractors are not willing to try anything new, finance folks are worried about being audited, lawyers fear being sued, and engineers believe the new thing is too risky. That all accumulates like bricks in a rucksack. You can't get up the mountain with all those bricks!"³⁰

This "purpose over process" culture, where empowerment and outcomes take precedence over procedural adherence, creates the foundation for SOCOM's acquisition success. With this cultural



A second B-21 Raider, the nation's sixth-generation stealth bomber, joins flight testing at Edwards Air Force Base, California, September 11, 2025. The program is a cornerstone of the Department of the Air Force's nuclear modernization strategy, designed to deliver both conventional and nuclear payloads. (U.S. Air Force Photo)

foundation in place, SOCOM builds upon it with a distinctive approach to team composition that further accelerates innovation through cross-functional integration, as this article will examine next.

Integrating Warfighters: Cross-Functional Teams That Deliver

“Velocity is my combat advantage. Iteration speed is what I’m after because if I can go five times faster, I can fail four times and still beat you to the target.”

—James “Hondo” Geurts’s
*Principle of Velocity*³¹

Building upon the mission-centric, outcomes-focused culture that empowers SOCOM’s acquisition workforce, the command’s approach to team composition and interaction represents another critical element of its success. A cornerstone of SOCOM’s acquisition approach that has proven scalable even to the largest and most complex MDAPs is the concept of warrior-inclusive agile teams. Where traditional acquisition processes

often isolate operators from developers through layers of requirements documents and formal feedback channels, SOCOM deliberately creates tightly integrated teams that embed warfighters with acquisition professionals, engineers, testers, and industry partners throughout the entire lifecycle of a project or program. This networked teaming approach—akin to the cross-functional integration of an elite special operations unit—breaks down the traditional silos that plague conventional acquisition.

When asked about this practice, professor—and former AC-130 program manager—Jeffrey “Shady” LaFleur explained how this warrior-centric approach fundamentally transformed the development of the AC-130 gunship: “Those warfighters lived with us . . . they lived with the engineers every minute to ensure real-time feedback and alignment of the product with operational needs.”³² This co-location and continuous interaction create an environment in which feedback loops are measured in hours rather than months or years, enabling rapid design iterations and preventing

disconnects between operational requirements and engineering solutions. The operators essentially become part of the development team, bringing their real-world experience and tactical knowledge into the design process—directly contributing to tailored needs at the speed of relevance. This increases velocity and keeps programs on track to produce effective systems for the warfighter.

Lieutenant General Bogdan identified this integrated teaming approach as a critical lesson from his time at USSOCOM’s Big Safari that he deliberately carried forward throughout his career, including to the F-35 program: “Another thing SOCOM was good at, you have to interact with the warfighter and industry, and it is always best to have that interaction together. Contractors, lawyers, and engineers hated it!”³³ This resistance highlights the cultural shift required to implement SOCOM’s model—traditional acquisition stakeholders often prefer to work within their separate domains rather than in the collaborative, sometimes chaotic environment that warrior-inclusive teams create.

Lieutenant General Bogdan further emphasized the immense value derived from this approach: “Every opportunity to put technology in the hands of the warfighter and get feedback sooner rather than later—it’s worth its weight in gold.”³⁴ This insight reflects SOCOM’s understanding that early and frequent operational testing with actual users provides intelligence no requirements document can capture. By identifying usability issues, tactical limitations, or unexpected capabilities early in development, the team can pivot or refine the solution before significant resources are committed to a flawed approach.

The integration of warfighters is not without challenges. As Bogdan candidly observed, “it’s going to be painful, because you have to figure out when they’re giving you wants or needs,” adding that “you have to educate them to understand the difference and impact to cost, schedule, and performance. We’re in the business of delivering needs, not wants.”³⁵ His point reveals a critical nuance to successful implementation—warrior inclusion does not mean blindly implementing every operator request. Rather, it requires a balanced dialogue in which acquisition professionals help operators understand tradeoffs while operators help acquisition teams understand operational context. It is important to note that an overemphasis on the operator has its drawbacks. Just as tacticians may not understand the impact of requested changes to an existing program, they may also not have the insight or vision to understand how emergent technologies can or are changing the character of war.

The power of this approach lies in its deliberate disruption of traditional acquisition roles and boundaries. Rather than treating warfighters as occasional stakeholders who provide input at predetermined milestones, SOCOM elevates them to core team members with continuous input throughout development. This integration challenges the conventional wisdom that complex acquisition requires strict separation between the requirements, development, and testing communities. Instead, SOCOM

demonstrates that bringing these perspectives together actually accelerates innovation by enabling rapid learning cycles and preventing miscommunication. Warrior-inclusive teaming, while powerful on its own, becomes even more effective when paired with SOCOM’s streamlined bureaucracy and organizational structure approach, which further removes barriers to rapid decisionmaking and innovation, as we will examine next.

Organizational Agility: Decision Speed as a Combat Advantage

“Fundamentally, acquisition organizations don’t build; they make decisions, so the most important thing they can do is make the right decision at the right time. We’re in the decision-making business.”

—Lieutenant General
Christopher C. Bogdan³⁶

Building upon SOCOM’s mission-focused culture and warrior-inclusive teams, the command’s organizational structure forms the third critical element of its acquisition advantage. This insight drives SOCOM’s deliberate design of flatter, more responsive organizational structures that enable agile decisionmaking.

This streamlined bureaucracy is the most immediately transferable aspect of USSOCOM’s acquisition practice. In stark contrast to the layered approval chains typical in Service acquisition, the command has deliberately designed a flatter, horizontal organizational structure. It maintains decision authority at the lowest possible level and provides program managers unimpeded access to milestone decision authorities, increasing the velocity of acquiring combat capabilities.³⁷ This approach reflects James Geurts’s Principle of Velocity.

In practice, streamlining means if a SOCOM project manager needs approval from their program executive officer for a project decision, that coordination can be arranged within hours. If a program executive officer or project manager needs the acquisition executive to decide on something, they can secure a decision

from the acquisition executive within days—not the weeks or months common in Service bureaucracies. This rapid access is possible because SOF Acquisition, Technology, and Logistics has maintained smaller, more agile teams and flatter organizational structures, and because mission-centric, outcomes-focused leadership is culturally inclined to expedite requests. In contrast to a Services-style bureaucracy, SOCOM facilitates an environment where tailored acquisition strategies thrive, and senior leaders know the difference in risks between rapid and deliberate processes.³⁸ By keeping decision cycles short, SOCOM can iterate quickly, much like a Silicon Valley tech company doing weekly sprints instead of annual reviews.

When scaling this concept to major programs, Lieutenant General Bogdan—who took and rescued the F-35 program following a Nunn-McCurdy breach—emphasized organizational structure as a cornerstone principle he carried from his SOCOM experience. He further explained, “Organizationally, when you are running an acquisition-to-development program, it is really, really important to organize in a way where you can make rapid decisions. Operational tempo was my number-one focus—build the organization around that. Do that before you lay out the boxes and lines.”³⁹ He warns against excessive vertical structure: “If you’re too vertically structured, it will take you forever to make decisions. Organize your team horizontally.”⁴⁰ While acknowledging span of control limitations, he advocates for streamlined processes: “Now, you don’t want 40 people reporting to you, but you can have a reasonable span of control. Streamline the process and ensure the correct information gets to the right people at the right time. To do this, people must know what their responsibilities are and are not. Again, this is all built around the operational tempo you need to maintain.”⁴¹

Beyond organizational structure, SOCOM reduces bureaucracy by tailoring documentation and oversight to the minimum needed for effective program control. Its Directive 70-1 (Acquisition Management System) explicitly tailors

DOW 5000-series processes using flexibility already allowed in DOW policy to fit SOCOM's needs and streamline procurement.⁴² As a result, SOCOM can combine or waive milestone documents that add minimal value, use nontraditional methods that bypass the slowest acquisition steps where prudent, and keep internal boards and external reviews lean but effective.

This is not to say oversight is absent; rather, it is right-sized. SOCOM provides transparency through frequent stakeholder engagement—SOF operators and combatant commanders have insight into progress, and Congress receives regular briefings—but it avoids redundant reviews. Notably, when asked what regulatory reforms he requested from Congress during his tenure as SOCOM acquisition executive, Geurts responded, “We never needed more authority to do our job and do it quickly; we had everything we needed.”⁴³ Instead, he emphasized streamlining bureaucratic obstacles while ensuring program

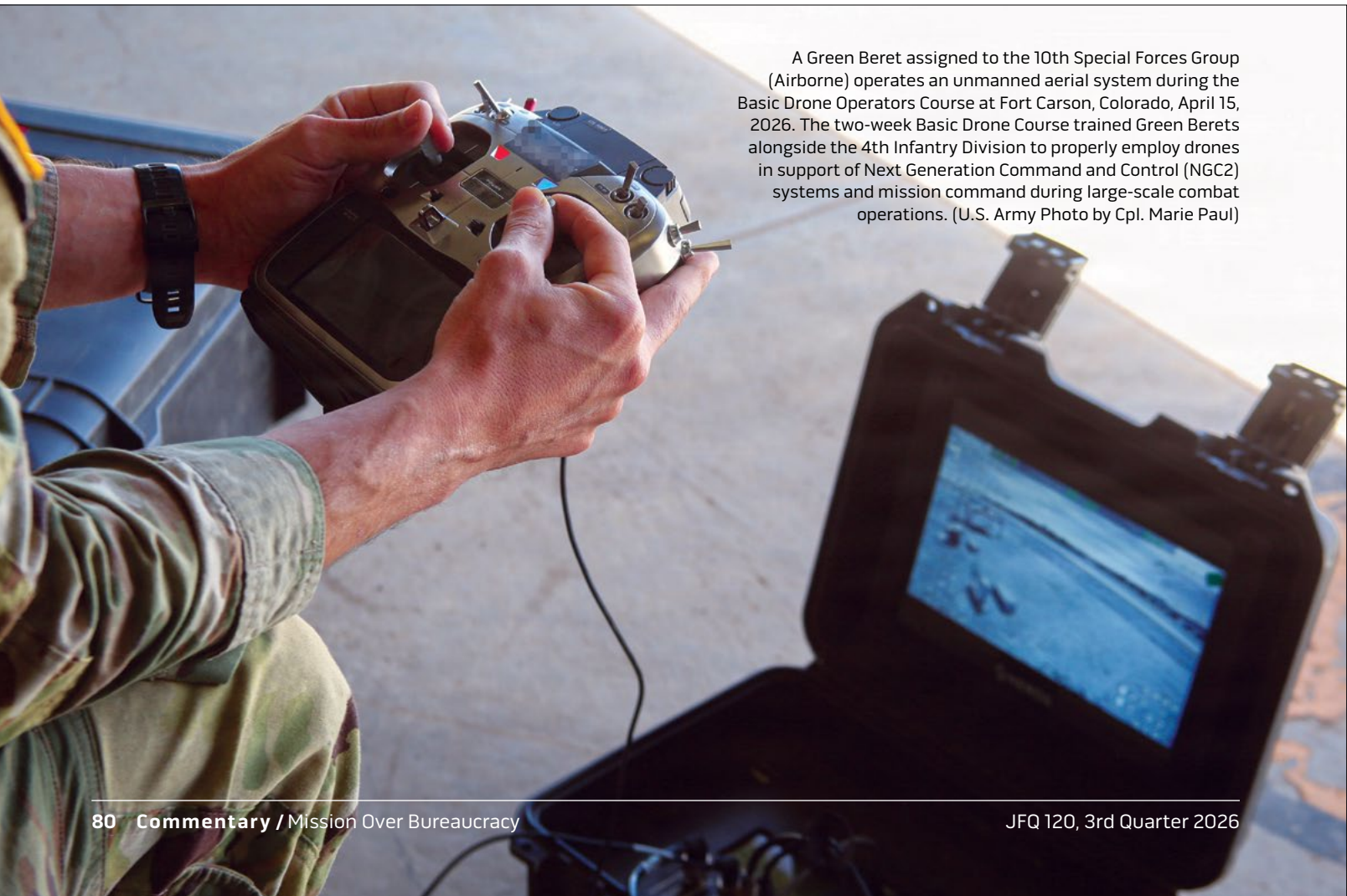
managers had direct access to decisionmakers—creating an environment where acquisition professionals were empowered to innovate with purpose and deliver results.⁴⁴ In his January 2025 testimony before the Senate Armed Services Committee at its hearing on defense innovation and acquisition reform, Geurts continued to highlight the need in defense acquisition at large to “rebalance the reviewer-to-doer ratio” because, currently, “too many bureaucrats slow decision-making.”⁴⁵

This balance at SOCOM tilts decisively toward doers: a 450-person acquisition workforce manages dozens of programs efficiently, providing SOF with an average of 700 tactical vehicles; 4,000 weapons; 20 million munitions; 3,000 radios; 2,000 command, control, communications, computers, and intelligence (C4I) items; and 600 intelligence, surveillance, and reconnaissance (ISR) kits every year. By comparison, a Service might employ thousands of staff to manage a similar portfolio, with each

layer reviewing the work of the other.⁴⁶ If the Services can empower more doers and trim the number of overseers, they can start matching SOCOM's agility. Expressly, fewer approval gates and shorter approval timelines translate directly to faster capability delivery.

SOCOM's agile funding mechanisms also contribute to its speed advantage. With control over its SOF-peculiar budget and relative ease in reprogramming within Major Force Program-11, the command can rapidly initiate new projects when operational needs emerge. Shield AI's Brandon Tseng has recommended that Congress create similar flexible budgeting mechanisms for problem-solving Service acquisitions, allowing the Services to focus on value delivered rather than cost control.⁴⁷ SOCOM's experience validates this approach, particularly through “jumpstart” funds and contingency reprogramming authority that allow rapid responses to emerging requirements.

The combination of streamlined organizational structure, tailored processes,

A close-up photograph of a person's hands operating a drone controller. The person is wearing a camouflage uniform and a black wristwatch. The controller is a silver and black device with multiple joysticks and buttons. A cable connects the controller to a monitor. The monitor is displaying a live feed of a landscape, possibly a beach or a field. The background is slightly blurred, showing an outdoor setting with a clear sky.

A Green Beret assigned to the 10th Special Forces Group (Airborne) operates an unmanned aerial system during the Basic Drone Operators Course at Fort Carson, Colorado, April 15, 2026. The two-week Basic Drone Course trained Green Berets alongside the 4th Infantry Division to properly employ drones in support of Next Generation Command and Control (NGC2) systems and mission command during large-scale combat operations. (U.S. Army Photo by Cpl. Marie Paul)

right-sized oversight, and flexible funding creates an acquisition system optimized for speed and agile innovation. These core principles offer valuable lessons for reducing unnecessary bureaucracy across defense acquisition.

Proof of Concept: SOCOM Practices in Large-Scale Programs

Adopting USSOCOM's agile acquisition practices across the Services has unique challenges. At first glance, one might not believe that SOCOM's practices can scale to such hefty endeavors, but they can. In addition to the SOCOM characteristics that Lieutenant General Bogdan scaled throughout his career and eventually applied to the F-35 program, Professor LaFleur provided examples from USSOCOM and the Rapid Capabilities Office.

For over a decade, the Air Force struggled to define its next-generation gunship without results. In 2007, USSOCOM's James Geurts proposed rapidly converting existing C-130H transports into AC-130 gunships using off-the-shelf components.⁴⁸ The result, Project Dragon Spear, "fielded 12 gunships in 15 months from scratch" compared to the Air Force's "10 years of nothing."⁴⁹ The program came in under budget and was enthusiastically received by operators.

When SOCOM attempted to upgrade 36 AC-130J models with the same weapons package, responsibility shifted to the Air Force acquisition system. What should have been a rapid development program that quickly moved into production ballooned into a "multiyear quagmire" under the traditional bureaucracy.⁵⁰ A 300-person test organization created an "absurd" test program to verify even obvious capabilities.⁵¹ Because of schedule slips, the program nearly faced cancellation until a SOCOM-trained project manager was put back in charge.

The new project manager obtained leadership backing to fire the test organization that had encumbered the effort and replaced the 300-person bureaucracy with a lean "10-person organization to go and make it happen."⁵² This small,

empowered team co-located warfighter representatives with engineers to ensure critical warfighter needs were met.⁵³

Rather than focusing solely on eliminating technical risk, the new team balanced safety with urgency and opportunity. They shifted from managing stateside program risks to weighing operational realities, recognizing that delays meant lives lost in theater: "We recognized that every day we didn't have the airplane downrange, warfighters were dying."⁵⁴ To this end, the acquisition team prioritized only essential testing to verify airworthiness, then quickly validated weapons in combat-like conditions.

The results were stunning: "In 4 months, it was done."⁵⁵ The rebooted program delivered the AC-130J fleet on schedule and under budget, with performance exceeding expectations. This demonstrated that SOCOM's acquisition model—empowered, decentralized decisionmaking; cross-functional teams with embedded operators; and streamlined bureaucracy—could succeed even on larger programs traditionally deemed too complex for rapid methods.

SOCOM's acquisition culture has begun seeping into the broader U.S. military. The Air Force's Rapid Capabilities Office (RCO) was explicitly modeled on SOCOM's way of doing business, often staffed with personnel who learned their craft in SOCOM programs.⁵⁶ The payoff is evident: the RCO-managed B-21 Raider stealth bomber program—a massive ACAT I effort—has stayed on track and on budget by all accounts, a feat virtually unheard of in modern defense acquisition. "I firmly believe if that was being run by the [general Service acquisition] culture, it would be a decade later and 10 times higher in cost, but because the RCO culture—which matches SOCOM's culture—is running it, it's on track, it's on cost," LaFleur observed.⁵⁷ By streamlining bureaucracy and empowering small, cross-functional teams, the RCO achieved what many thought impossible: mirroring SOCOM's success at speed. This cross-pollination suggests that when small, empowered teams with clear purpose and authority are allowed to work directly with end

users and focus on outcomes rather than process, extraordinary results are possible, even in complex defense programs, thus proving SOCOM's model.

Imperative for Change: Adopting SOCOM's Model to Maintain Military Dominance

The stark reality is that those who cannot adapt at the speed of today's technological change face catastrophe on tomorrow's battlefield. As early airpower theorist Giulio Douhet warned, "Victory smiles upon those who anticipate the change in the character of war, not upon those who wait to adapt after the changes occur."⁵⁸ The fate of America's military dominance hangs in the balance of our ability to innovate and acquire faster, and USSOCOM's model offers a vital path forward.

USSOCOM's track record over the past two decades demonstrates that a faster, more innovative acquisition system is not only possible within the U.S. defense establishment, but that such a system can thrive in a joint environment even under the pressure of continuous combat operations. By fostering an outcomes-focused, mission-centric culture that empowers the acquisition workforce to take prudent risks; by building tight-knit teams that integrate warfighters, requirements personnel, acquisition professionals, and industry partners; and by organizing to slash unnecessary bureaucratic delay, SOCOM has delivered timely and often game-changing capabilities to America's special operators and forces downrange.

The broader U.S. military, facing rapid technological revolutions and strategic threats from China and others, has strong incentives to learn from and institutionalize these practices. As Geurts put it, "The challenges facing the Department are many. . . . The Nation needs to be innovative, productive, and agile."⁵⁹ Yet achieving this requires more than policy reforms; it demands cultural transformation. SOCOM succeeds not through special authorities but by cultivating a fundamentally different mindset about risk, speed, and mission accomplishment. The Services must likewise break the stranglehold of risk-averse,

compliance-driven processes and embrace an outcomes-focused approach. It means empowering acquisition professionals as force multipliers, not compliance managers. It means building networked teams that tightly integrate warfighters with acquirers to increase the velocity and relevance of capability delivery. It means organizing for speed and collaboration, not siloed rigidity. JFQ

Notes

¹ *Hearing to Receive Testimony on an Update on the State of the Department of Defense Acquisition System Before the Senate Armed Services Comm., Subcomm. on Readiness and Management Support*, March 20, 2024 (statement of William C. Greenwalt, Nonresident Senior Fellow at the American Enterprise Institute), <https://www.armed-services.senate.gov/hearings/to-receive-testimony-on-an-update-on-the-state-of-the-department-of-defense-acquisition-system>.

² Roger F. Wicker, *Restoring Freedom's Forge: America's Innovation Unleashed* (Washington, DC: Office of Senator Roger F. Wicker, 2024), https://www.govinfo.gov/app/details/GOVPUB-Y1_3-PURL-gpo244599.

³ James F. "Hondo" Geurts (described below in endnote 4), interview by author, February 19, 2025.

⁴ These leaders include Shield AI cofounder Brandon Tseng (former Navy Surface Warfare Officer and Navy SEAL); MITRE's innovation expert Dan Ward (retired Air Force acquisition officer); Jeffrey "Shady" LaFleur, Director of the Senior Acquisition Course and Professor of Innovation and Entrepreneurship in Defense Acquisition at the Dwight D. Eisenhower School for National Security and Resources Strategy, National Defense University (former Air Force Acquisition Officer with extensive experience at Socom and the Rapid Capability Office); James Geurts, former Assistant Secretary of the Navy for Research, Development, and Acquisition, 2017–2021, including Performing the Duties of Under Secretary of the Navy in 2021, and former Acquisition Executive, United States Special Operations Command (USSOCOM or Socom); and retired Lieutenant General Christopher C. Bogdan, former Program Executive Officer for USSOCOM's Big Safari, the Boeing KC-46 Pegasus program, and (from 2012 to 2017) the F-35 Joint Program Office.

⁵ Interviews conducted with the leaders described above in endnote 4.

⁶ Bryan D. "Doug" Brown, "U.S. Special Operations Command: Meeting the Challenges of the 21st Century," *Joint Force Quarterly* 40 (1st Quarter 2006): 38–43, <https://ndupress.ndu.edu/portals/68/Documents/jfq/jfq-40.pdf>.

⁷ Geurts, interview by author.

⁸ Sam Lisbonne, *Sharpening the Tip of the Spear: Evaluating Technology Integration in Special Operations Forces* (undergraduate honors thesis, Stanford University, Center for International Security and Cooperation, Freeman Spogli Institute for International Studies, 2017), https://stacks.stanford.edu/file/druid:qk949kk4731/Lisbonne_Sharpening%20the%20Tip%20of%20the%20Spear_FINAL.pdf.

⁹ Lisbonne, *Sharpening the Tip of the Spear*.

¹⁰ Lisbonne, *Sharpening the Tip of the Spear*.

¹¹ Christopher C. Bogdan (described above in endnote 4), interview by author, April 21, 2025.

¹² Jonathan P. Wong et al., *Improving Defense Acquisition: Insights From Three Decades of RAND Research* (Santa Monica, CA: RAND Corporation, 2022), https://www.rand.org/pubs/research_reports/RR1670-1.html.

¹³ Joseph Capobianco and David Phillips, "Strengths and Myths of What Makes Special Operations Forces Acquisition Special," U.S. Army, May 14, 2018, https://www.army.mil/article/205259/strengths_and_myths_of_what_makes_special_operations_forces_acquisition_special; Geurts, interview by author.

¹⁴ Wong et al., *Improving Defense Acquisition*; Jeffrey "Shady" LaFleur (described above in endnote 4), interview by author, May 1, 2025.

¹⁵ Vince Molinaro, "What Really Eats Strategy for Breakfast? Leadership Culture," *Forbes*, October 2, 2024, <https://www.forbes.com/councils/forbesbusinesscouncil/2024/10/02/what-really-eats-strategy-for-breakfast-leadership-culture/>.

¹⁶ Dan Ward (described above in endnote 4), interview by author, February 28, 2025.

¹⁷ "SOF Truths," U.S. Special Operations Command, accessed June 8, 2026, <https://www.socom.mil/about/sof-truths>.

¹⁸ Bogdan, interview by author.

¹⁹ *Hearing, Fielding Technology and Innovation: Industry Views on Department of Defense Acquisition*, Before the House Armed Services Comm., September 16, 2024 (statement of Brandon Tseng, Co-Founder, President, and Chief Growth Officer, Shield AI), <https://armedservices.house.gov/calendar/eventsingle.aspx?EventID=3531>.

²⁰ *Hearing, Industry Views on Department of Defense Acquisition* (statement of Tseng).

²¹ Geurts, interview by author.

²² "SOF Truths."

²³ Geurts, interview by author.

²⁴ Geurts, interview by author.

²⁵ Geurts, interview by author.

²⁶ *Hearing to Receive Testimony on Defense Innovation and Acquisition Reform Before the Senate Comm. on Armed Services*, January 28, 2025 (statement of James F. Geurts, former Assistant Secretary of the Navy for Research, Development and Acquisition), <https://www.armed-services.senate.gov/hearings/to-receive-testimony-on-defense-innovation-and-acquisition-reform>.

²⁷ Bogdan, interview by author.

²⁸ David H. Berger et al., *Strategic Edge: A Blueprint for Breakthroughs in Defense Innovation* (Washington, DC: Bloomberg New Economy Forum Report, January 2025), https://assets.bbbhub.io/dotorg/sites/56/2025/01/Strategic-Edge_A-Blueprint-for-Breakthroughs-in-Defense-Innovation.pdf.

²⁹ *Hearing, Defense Innovation and Acquisition Reform* (statement of Geurts).

³⁰ Bogdan, interview by author.

³¹ Geurts, interview by author.

³² LaFleur, interview by author.

³³ Bogdan, interview by author.

³⁴ Bogdan, interview by author.

³⁵ Bogdan, interview by author.

³⁶ Bogdan, interview by author.

³⁷ Patrick Horvat (Program Manager, USSOCOM SOF Acquisition, Technology, and Logistics; Program Executive Officer SOF Warrior), interview by author, January 21, 2025; Capobianco and Phillips, "Strengths and Myths of What Makes Special Operations Forces Acquisition Special."

³⁸ Capobianco and Phillips, "Strengths and Myths of What Makes Special Operations Forces Acquisition Special."

³⁹ Bogdan, interview by author.

⁴⁰ Bogdan, interview by author.

⁴¹ Bogdan, interview by author.

⁴² USSOCOM Directive 70-1, *Acquisition Management System* (MacDill Air Force Base, FL: USSOCOM, September 27, 2023), https://www.waru.edu/sites/default/files/2024-05/USSOCOM%20Directive%2070-1_27%20Sep%202023.pdf.

⁴³ Geurts, interview by author.

⁴⁴ Geurts, interview by author.

⁴⁵ *Hearing, Defense Innovation and Acquisition Reform* (statement of Geurts).

⁴⁶ "About Us," Special Operations Forces Acquisition, Technology, and Logistics, accessed 24 June 2026, <https://www.socom.mil/SOF-ATL/Pages/AboutUs.aspx>; Lisbonne, *Sharpening the Tip of the Spear*.

⁴⁷ Brandon Tseng (described above in endnote 4), interview by author, September 26, 2024.

⁴⁸ LaFleur, interview by author.

⁴⁹ LaFleur, interview by author.

⁵⁰ LaFleur, interview by author.

⁵¹ LaFleur, interview by author.

⁵² LaFleur, interview by author.

⁵³ LaFleur, interview by author.

⁵⁴ LaFleur, interview by author.

⁵⁵ LaFleur, interview by author.

⁵⁶ LaFleur, interview by author.

⁵⁷ LaFleur, interview by author.

⁵⁸ Quoted in Arsenio T. Gumahad II, "The Profession of Arms in the Information Age," *Joint Force Quarterly*, no. 15 (Spring 1997): 14, <https://ndupress.ndu.edu/portals/68/Documents/jfq/jfq-15.pdf>.

⁵⁹ *Hearing, Defense Innovation and Acquisition Reform* (statement of Geurts).



U.S. Air Force Airman 1st Class Joseph Saldana, a boom operator assigned to 50th Air Refueling Squadron, observes the Alaskan landscape during a refueling mission at Northern Edge 23-1 at Joint Base Elmendorf-Richardson, Alaska, May 18, 2023. Northern Edge provides a large-scale opportunity to enhance inter-service capabilities focused on joint combat operations in the Indo-Pacific region. (U.S. Navy Photo by Mass Communication Specialist 1st Class Jen S. Martinez)

Disjointed Command and Air Domain Challenges in Alaska

The Case for a Single U.S. Combined/Joint Force Air Component Commander

By Jeffrey W. Kempff

On February 13, 2025, in testimony before the Senate Armed Services Committee, the Commander of U.S. Northern

Command (USNORTHCOM) and the North American Aerospace Defense Command (NORAD), General Gregory M. Guillot, expressed concern

over rising threats to the homeland. Specifically, he mentioned increased cooperation among China, Russia, North Korea, and Iran; combined Chinese-Russian bomber patrols near Alaska; and Russian naval incursions along the U.S. East Coast.¹ Notably, in September 2024, China and Russia

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conducted another combined approach into North American waters along Alaska while forward-posturing and flying advanced fighters and strategic bombers.² According to the 2025 USNORTHCOM Posture Statement—which General Guillot delivered to the House Armed Services Committee on April 1, 2025—adversaries are increasing their capabilities to conduct direct conventional strikes on the homeland across multiple domains, accelerating the urgency for integrated defense.³

These threats underscore a critical vulnerability in the current homeland defense posture: fractured command organization and relationships in the air domain over Alaska. The existing U.S. defensive command and control structure within NORAD and USNORTHCOM is incoherent and non-doctrinal, hampering rapid response, fragmenting unity of effort, and degrading lethality. While these overlapping command authorities may have sufficed during the Cold War or eras marked by violent extremist organizations, they are ill-suited to the modern all-domain threat landscape posed by peer adversaries. The “tyranny of distance” keeping North America safe has eroded, leaving the United States and Canada vulnerable to threats across multiple vectors, not just the air domain.

Alaska’s strategic location makes it the key terrain for both homeland defense and Great Power competition. The 2024 Department of Defense Arctic Strategy illustrates capability gaps across the High North, outlining the need to enhance domain awareness and capabilities, engage with allies and partners, and demonstrate America’s presence in the Arctic.⁴ The Arctic Strategy highlights a seam in command and control between U.S. Pacific Command and USNORTHCOM that America’s adversaries—namely, China and Russia—could exploit. As figure 1 illustrates, the most direct air and sea supply routes from the continental United States to the western Pacific pass through USNORTHCOM’s area of responsibility, highlighting Alaska’s importance in protecting staging areas and resupply lines. Unlike Guam, with its integrated joint defense,⁵ Alaska’s

Figure 1.



Source: Author.

Aleutian islands of Shemya, Attu, and Adak are particularly vulnerable, and even Anchorage is closer to potential conflict zones than Hawaii. This disparity, combined with Alaska’s limited unity of effort in the air domain, creates complex coordination challenges that underleverage the air domain’s critical role in integrated deterrence and defense.

Defense of the homeland has historically been the highest priority of the National Defense Strategy⁶ and will be a transregional joint multifunctional battle across all domains—air, land, sea, subsurface, space, cyberspace, and information.⁷ As General Guillot testified to the House Armed Services Committee, “Defending North America is inherently linked to the ability of the joint force to operate effectively across the entire USNORTHCOM area of responsibility—to include the Arctic.”⁸ Meeting this imperative requires a deliberate modernization of organizational structure and command relationships. These organizational changes require seamless integration between domains and within domains. The first and most immediate step is to unify the air domain with a complete air component for NORAD and USNORTHCOM under a single U.S. Combined/Joint Force Air Component Commander (C/JFACC)—specifically, a *single* Airman commanding the Alaskan and Continental NORAD Regions, aligned with the Joint Force Air Component Commander (JFACC) responsibilities—and recraft that

person’s subordinate commands to mirror each other.

Context and Background

NORAD and USNORTHCOM: A Bifurcated Defense Architecture

While NORAD’s air defense mission successfully safeguarded North America until 9/11, the subsequent shifts in homeland defense introduced bifurcations in the U.S. defense posture. President George W. Bush established USNORTHCOM to lead all-domain homeland defense and civil support rather than reforging NORAD as a coalition command. Meanwhile, NORAD maintained responsibility for air defense in regions like the Alaskan NORAD Region, and USNORTHCOM assumed broader authority over the Alaska Theater of Operations. In 2014, Alaskan Command transferred from U.S. Pacific Command to USNORTHCOM, formally aligning Arctic defense under a homeland-focused structure. However, no additional forces or staff accompanied the shift, further complicating regional command coherence. The resulting NORAD and USNORTHCOM organizational structure leaves overlapping roles and responsibilities. Where Alaskan Command fits into the USNORTHCOM area of responsibility remains nebulous, and air domain command and control has not been cohesively adapted since the creation of USNORTHCOM.



A U.S. Air Force F-22 Raptor assigned to the 3rd Wing receives fuel from a KC-135 Stratotanker assigned to 50th Air Refueling Squadron during Northern Edge 23-1 at Joint Base Elmendorf-Richardson, Alaska, May 18, 2023. Northern Edge 23-1 provides an opportunity for joint, multinational, and multi-domain operations designed to implement high-end, realistic warfighter training, develop and improve joint interoperability, and enhance the combat readiness of participating forces. (U.S. Navy Photo by Mass Communication Specialist 1st Class Jen S. Martinez)

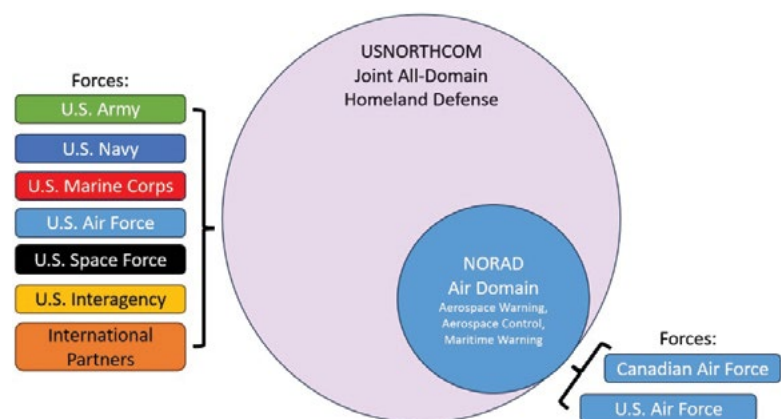
Meanwhile, China emerged as the U.S. military's primary pacing challenge.⁹ Successive National Security Strategies have documented China's expanding conventional military capabilities, including bombers, cruise missiles, and hypersonic weapons.¹⁰ While Guam and Hawaii have received integrated joint defense layering, Alaska remains organizationally fractured despite its geographic proximity to the Indo-Pacific (see figure 1). USNORTHCOM lacks dedicated forces in the Alaska Theater of Operations, and NORAD retains air-focused assets in the Alaskan NORAD Region area of operations. The limited availability of assigned forces in USNORTHCOM potentially inhibits the combatant commander's ability to defend the homeland against the all-domain threat that present and future China possesses.

Although NORAD and USNORTHCOM share the same

four-star commander and support each other by policy, their operations remain split, as depicted in figure 2. NORAD is the bedrock of the strong North American alliance, providing a vital relationship and scalable command structures for mutual defense. However,

the binational treaty does not support joint all-domain operations,¹¹ limiting NORAD's ability to react and respond in the modern all-domain threat environment. Within the NORAD and USNORTHCOM headquarters, separate J3 (operations) directorates run

Figure 2.



Source: Author.



A C-130 Hercules from the 144th Airlift Squadron, Alaska Air National Guard, flies away from Denali, the highest point in North America, March 4, 2017. After 41 years of flying the C-130 aircraft, the 144th Airlift Squadron's eight C-130s were divested, with the planes either being transferred to outside units or retired from service. The unit's last two aircraft departed Joint Base Elmendorf-Richardson, Alaska, the following day. (U.S. Air National Guard photo by Staff Sgt. Edward Eagerton/released)

semiparallel operations,¹² further complicating integration despite contemporary alignment efforts. Moreover, the lack of a unified air component disrupts joint warfighting principles such as simplicity, unity of effort, and integrated command and control—particularly in the Alaska Theater of Operations and the Alaskan NORAD Region area of operations. Additional modern doctrine, including the emerging Joint Warfighting Concept 3.0, calls for seamless command and control across all domains and unified joint force integration.¹³ Yet Alaska's bifurcated air domain—divided between NORAD's Regional command and USNORTHCOM's theater oversight—undermines these objectives.

As shown in figure 3, the NORAD Agreement divides air defense responsibilities into three regions—the Alaskan

NORAD Region, the Continental NORAD Region, and the Canadian NORAD Region—which in turn are further subdivided into four Sectors.

NORAD Regions have assigned air defense forces, including an Air Operations Center, fighters, tankers, airborne early warning assets, and Battle

Figure 3.



Source: Author.

Figure 4.



Source: Author.

Control Center. In contrast, in figure 4, USNORTHCOM's area of responsibility is not sectorized similarly and relies on the Global Force Management process to allocate joint forces, none of which are permanently assigned to Alaskan Command.

Where Is Here?

USNORTHCOM is charged with leading all-domain homeland defense; however, within the Alaska Theater of Operations, this mission is complicated by force structure gaps and command friction. A small number of forces in Alaska are assigned to the U.S. Element of NORAD (USELEMNORAD), primarily postured for aerospace warning and control and delegated to the commander of the Alaskan NORAD Region. While unrestrained in their ability to support USNORTHCOM missions, these forces are limited in scope and readiness to conduct broader all-domain operations. For example, in 2024, while a combined Chinese-Russian flotilla patrolled the Bering Sea,¹⁴ the USNORTHCOM JFACC had no assigned assets other than those supporting assets assigned to the Alaskan NORAD Region Combined Force Air Component Commander (CFACC). However, the Alaskan NORAD Region CFACC concurrently employed those assets to counter violations of America's airspace.¹⁵ No one functional air domain commander could prioritize the use of air assets, thus violating unity of effort. An aligned single U.S. C/

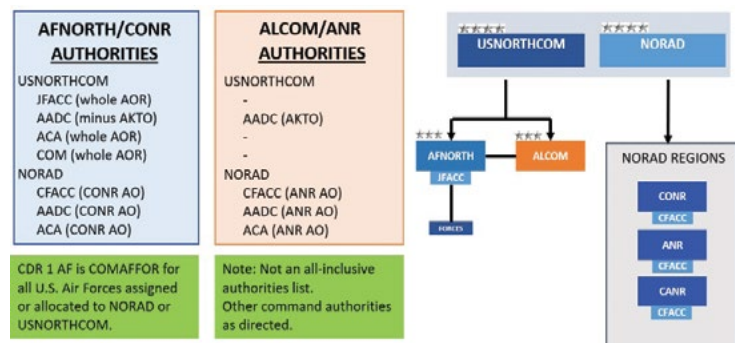
JFACC would easily smooth the command friction and would keep the ability to distribute the limited assigned forces within the air domain.

The challenge of bifurcated commands in the air domain is compounded by the existence of these two peer-level air commanders operating in the same airspace: one, the Alaskan NORAD Region CFACC, reporting to NORAD, and the other, the USNORTHCOM JFACC. This violates the joint command and control principle of simplicity.¹⁶ These commanders split the responsibilities of the Alaska Theater of Operations and the Alaskan NORAD Region area of operations and operate under distinct authorities, priorities, chains of command, rules of engagement, and planning processes. In the

contiguous United States (CONUS), one general serves simultaneously as Continental NORAD Region CFACC and USNORTHCOM JFACC—ensuring simplicity, clarity, and integrated control. In Alaska, this cohesion breaks down. The resulting fractured unity of command and divided unity of effort requires adjudication at the combatant commander level rather than at the air component level.

Additionally, a notable divergence of Area Air Defense Commander (AADC) authorities in Alaska results in a disaggregated defense design. The AADC is appropriately aligned to the commanders of the Alaskan NORAD Region and Continental NORAD Region for their respective areas of operation in NORAD channels. However, the AADC's responsibilities also include defense design and resource allocation outside the NORAD mission sets. In USNORTHCOM channels, the AADC follows the JFACC except in the Alaska Theater of Operations, where the AADC is aligned to the commander of Alaskan Command. However, the preponderance of U.S. AADC efforts is assigned to the commander of the Continental NORAD Region and the USNORTHCOM JFACC, including command of the Army subordinates and a preponderance of air defense assets. These conflicting assignments of authorities hamper defense design and again call for adjudication at the combatant commander level to defend the

Figure 5. Current Command Organization, Relationships, and Authorities

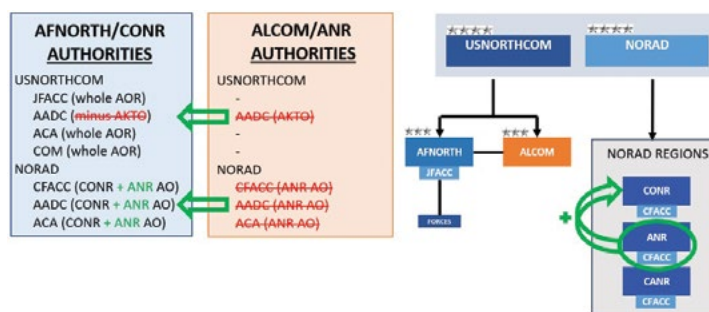


Source: Author.

aggregate area of responsibility. Figure 5 highlights the disparity and inconsistent organization and authorities under NORAD and USNORTHCOM.

Consider if the commander of Naval Forces Northern Command (NAVNORTH) were designated as the supported commander for an operation in Alaska. The commander of NAVNORTH would have a default JFACC¹⁷ with no assigned forces, functionally attempting to align air domain efforts in the Alaska Theater of Operations. Simultaneously, the commander of the Alaskan NORAD Region would be the supported command in NORAD lanes and functionally attempt to align air domain efforts in the Alaskan NORAD Region area of operations. These two peer-level air domain functional commanders in the same geographic area would leave the commander of NAVNORTH uncertain about whom to coordinate with, like the AI robot in figure 6. Again, this bifurcated command friction differs from the

Figure 6. Simple, Unifying Proposed Changes



Source: Author.

supported/supporting relationships in the CONUS air domain, where unity of command (aligned CFACC, JFACC, and Area Air Defense Commander) is codified, and simplicity is prevalent when executing air operations. The air domain over Alaska remains the only geography in the USNORTHCOM area of responsibility and NORAD area of operations without a unified, integrated C/JFACC and Area Air Defense Commander. Unified effort in the air domain enables

mission success by integrating joint effects in USNORTHCOM, thus effectively supporting the lead command.

Alaska Past and Present Operations

Russian incursions into Alaskan air-space have been a recurring reality for decades—an air threat that NORAD was built to counter and continues to manage effectively. In 2023, the shooting down of high-altitude airborne objects over North



East-Coast-based U.S. Naval Special Warfare Operators (SEALs) conduct a patrol on Shemya Island, Alaska, September 4, 2023, as part of Operation POLAR DAGGER. During the operation, special operations forces projected the ability of U.S. forces to defend critical infrastructure, enhanced all-domain awareness, demonstrated operational reach, and strengthened our understanding of activity in the Arctic. (U.S. Navy photo by Mass Communication Specialist 2nd Class Matthew Dickinson)

America¹⁸ demonstrated how NORAD forces were used in unilateral support of a USNORTHCOM-led mission. This coordination, while successful, exposed a key friction point: air assets under the NORAD CFACC executing missions directed by the USNORTHCOM JFACC without unified command and authorities. In recent years, combined Chinese-Russian maritime patrols, often incorporating strategic bombers and fighter aircraft in the Bering Sea, have further highlighted the strain in coordinating across mission sets that span both NORAD and USNORTHCOM areas of responsibility.¹⁹ This adversary maritime presence, a USNORTHCOM issue, requires layered air integration and control with NORAD air defense efforts. As the increase in combined adversary naval patrols and the hypothetical NAVNORTH example highlight, these responsibilities are currently split across air component commanders and exceed the limits of NORAD's air-centric mission.

Imagine this realistic, complex scenario. The commander of Alaskan Command is the supported commander providing civil support following a massive 7.0 earthquake, such as the one that struck Anchorage in 2018.²⁰ Concurrently, as the commander of the Alaskan NORAD Region, that person is the supported commander to intercept a Russian airborne incursion and simultaneously support the USNORTHCOM JFACC to intercept and shoot down a high-altitude object. Meanwhile, the CFACC and JFACC must coordinate airspace and support the Joint Force Maritime Component Commander monitoring a combined Chinese-Russian surface action group. Rather than one commander and staff coordinating air effects in Alaska, there are two: the JFACC in Florida and the local CFACC. Having two different air component commanders in the same geographical area strains the commanders' span of control during peacetime, let alone moving from crisis into conflict.

Future Operations and Emerging Air Domain Demands

On January 27, 2025, President Donald J. Trump issued an executive order establishing the "Iron Dome for America" initiative—renamed "Golden Dome for America"²¹—to counter advanced airborne threats such as ballistic, hypersonic, and cruise missiles.²² This evolving initiative reflects the growing complexity of defending the U.S. homeland across multiple vectors, with effects that straddle both NORAD and USNORTHCOM's responsibilities. The proliferation of unmanned systems, nonkinetic threats, and long-range strike capabilities from adversaries²³ only sharpens the need to unify the air domain across NORAD and USNORTHCOM. Future defense efforts will integrate emerging technologies and layered defense systems to protect critical national infrastructure and the lines of resupply and power projection. As capabilities and authorities converge across multiple joint air defense systems, clear command and control alignment would ensure seamless coordination, rapid response, and efficient resource allocation—especially in the high-risk terrain of Alaska and the Arctic.

As homeland defense evolves toward multidomain, all-threat engagement, it is imperative to immediately designate

"An offensive spirit must be inherent in the conduct of all defensive operations." In the United States and Canada, the U.S. JFACC handles offense while the NORAD CFACC and the area air defense commander provide defense.

Those are different commanders in Alaska, but not different commanders in Canada or the rest of USNORTHCOM.

a single U.S. C/JFACC and Area Air Defense Commander to unify air domain responsibilities across the Alaskan NORAD Region area of operations and the Alaska Theater of Operations. Doing so will eliminate unnecessary seams between NORAD and USNORTHCOM efforts and ensure that lethality and responsiveness are maximized in the most strategically exposed and vital airspace of the U.S. homeland.

Air Domain Structure: Gaps in Unity, Resourcing, and Doctrine

Lethality in the homeland air domain—particularly over Alaska—is diminished by structural misalignment and doctrinal inconsistency. Unity of command is fractured but can be restored by addressing two interrelated but distinct command seams.

First, the commanders of the Continental NORAD Region and Alaskan NORAD Region are separate individuals. This creates an imbalance in command authority across the U.S. portion of NORAD, preventing one commander from holistically allocating air domain resources or synchronizing decisions (including with Area Air Defense Commander responsibilities). Second, within the USNORTHCOM Alaska Theater of Operations, the NORAD CFACC and USNORTHCOM JFACC remain separate individuals. This bifurcation splits unity of effort in a shared geographic and operational domain, leading to coordination challenges and overlapping tasking of limited resources.²⁴

Organizationally, the Alaskan NORAD Region lacks a complete and functional air component, having only the 611th Air Operations Center (611 AOC), unlike the rest of the NORAD

Regions. AOCs do not support all-domain wars alone; they require integration with a dedicated Air Force staff and clear Service component responsibilities. Currently, the 611 AOC operates without a dedicated or complete Air Force Service component structure, relying instead on fragmented support arrange-

ments. Even designating the commander of Air Forces Northern (AFNORTH) as USNORTHCOM JFACC and even a support relationship to Alaskan Command leaves a disjunction—AFNORTH is led by a different commander than the Alaskan NORAD Region, the 611 AOC, and Alaskan Command—leaving an incomplete air component in the Alaskan NORAD Region.

In contrast, CONUS presents a model of coherence. The commander of First Air Force serves as CFACC for the Continental NORAD Region, JFACC for USNORTHCOM, Area Air Defense Commander, Airspace Control Authority, and Collections Management. This centralized leadership enables responsive and unified operations under a single Airman and is supported by a whole air component staff—AFNORTH—and the 601st Air Operations Center (601 AOC).²⁵ The mismatch between the Alaska Theater of Operations and the Alaskan NORAD Region area of operations splits these roles between two commanders and two Air Operations Centers, diluting command authority, generating conflicting directives, and creating gaps in operational execution. A previous proposal to assign AFNORTH as the air component supporting the Alaskan NORAD Region would create the same challenges; it would demand that a single staff support two separate commanders.

At the tactical command and control level, the disparities continue. The Continental NORAD Region's Sectors—the Eastern Air Defense Sector and the Western Air Defense Sector—are each staffed with approximately 350 personnel and commanded by two O-6s (one with Title 10 authority and one with Title 32 authority). In contrast, the Alaskan NORAD Region's Alaska Air Defense Sector is a Sector in name only: manned by only about 150 personnel and led by an O-5 commander under Title 32 authority. The O-6 commander of the 611 AOC must dual-hat to fulfill Title 10 Sector requirements when needed. While all three Sectors are assigned to USELEMNORAD, they support both NORAD and USNORTHCOM missions, and the Alaska Air Defense Sector remains significantly under resourced and structurally unequal.

Balancing these disparities is not simply a matter of equity—it is a prerequisite for increasing interoperability, achieving doctrinal coherence, and restoring lethality across the homeland air.

Previously Attempted Solutions

Repeated efforts to address command and control seams dividing Alaska's air domain have emerged since at least 2014 but have failed to achieve lasting unity of effort. While institutional change is challenging, modernizing air domain command and control is essential for maintaining lethality in a high-end conflict. NORAD and USNORTHCOM have experimented with annual Tier 1 exercises since at least 2023, yielding valuable insights and momentum toward improvement. Yet despite clear organizational friction and lack of unity of effort, refining the air domain has never sustained the urgency required to outpace competing crises or bureaucratic inertia.

Recent exercises have explored a range of concepts to modernize the air domain command and control structure in Alaska, particularly in pursuit of a single U.S. C/JFACC and Area Air Defense Commander. During Exercise Vigilant Shield 2023, the 611 AOC was experimentally converted into an AFNORTH detachment, establishing a forward presence under a complete air component. While the concept showed potential, its execution revealed areas for improvement in preparation and staff integration, highlighting the value of a more deliberate and extended test period. In 2024, the follow-on exercise adopted a different, nondoctrinal approach: two Air Operations Centers operated simultaneously under a single U.S. C/JFACC and Area Air Defense Commander. This configuration

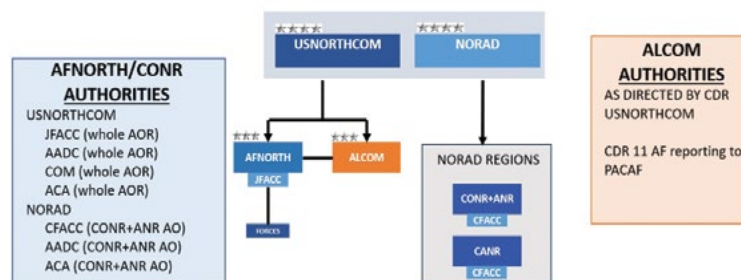
significantly improved unity of effort across the air domain and streamlined coordination. The commander of NORAD and USNORTHCOM saw measurable gains in logistic agility, lethality, and decision space left of launch. The AFNORTH staff, with clearly defined authorities, enabled the single U.S. C/JFACC to integrate and synchronize joint effects effectively, ensuring mission success and seamless support across Service and functional components.

Call to Action—Align the Air Domain

Command and control of the air domain can be rectified in a legal, doctrinally sound, and simplified manner to enhance joint all-domain defense across the homeland. Immediate reorganization is required due to the bifurcated organizational command structure, lack of unity of effort, past exercise successes, and the evolving threat environment posed by China and Russia. These recommended solutions leverage and incorporate lessons and best practices from previous Tier 1 exercises and are doctrinally correct for a future joint all-domain operations fight. As illustrated in figure 7, there are two steps to achieve this result, both of which can be started immediately.

Step 1 (Immediate): Establish a single U.S. C/JFACC and Area Air Defense Commander for USNORTHCOM and NORAD to unify command and control of the air domain across the entire USNORTHCOM area

Figure 7. Simple and Unified Command Organization and Relationships



These authorities are seamless and allow a single Commander in the U.S. Air Domain for increased lethality.

Source: Author.

of responsibility and the U.S. portion of the NORAD area of operations.

Assigning one U.S. Airman as both CFACC and JFACC will:

- Eliminate conflicting authorities between the current CFACC and JFACC roles in Alaska
- Balance air defense prioritization between CONUS and Alaska
- Align Area Air Defense Commander and Airspace Control Authority responsibilities under one commander
- Doctrinally align the air component in NORAD and USNORTHCOM
- Enable a unified Joint Air Operations Plan, Air Operations Directive, Special Instructions, and Air Tasking Order cycle
- Streamline decisionmaking and increase lethality in both peacetime and conflict

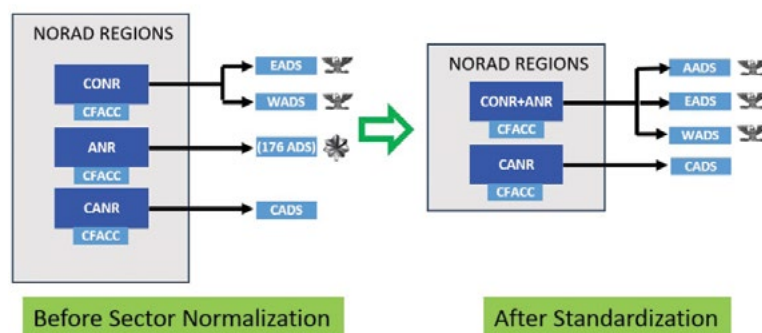
Under Title 10 U.S.C. § 162, the commander of USELEMNORAD has full authority to designate a single general officer as both commander of the Alaskan NORAD Region and commander of the Continental NORAD Region. This internal U.S. alignment requires no change to the NORAD Agreement or Terms of Reference. The Canadian Alaskan NORAD Region deputy commander and deputy CFACC can remain in place, reporting to the newly aligned U.S. CFACC, mirroring existing structures in the Continental NORAD Region.

This realignment supports NORAD modernization and integrated deterrence without impacting Alaskan Command or Eleventh Air Force command structures. It is entirely executable within current authorities and frameworks.

The commander of NORAD/USNORTHCOM/USELEMNORAD should:

- Create the single U.S. C/JFACC for at least one year to validate operational effectiveness. This provides sufficient time to participate in a major Tier 1 exercise, face numerous adversary incursions in Alaska's airspace, potentially experience a combined Chinese-Russian maritime or air patrol, assess staff buy-in and

Figure 8. NORAD Sector Uniformity and Re-Alignment



Source: Author.

cohesion, and provide unity of effort through the process of developing the Golden Dome for America

- Task the U.S. C/JFACC with delivering a Commander's Estimate after 180 days outlining progress, resourcing needs, risk, and recommendations

As seen in figure 8, this step delivers immediate improvement to U.S. and North American air defense, aligns with strategic guidance, and closes a critical seam in homeland defense—without requiring legislative or treaty changes.

Step 2 (Short-Term): The commander of USELEMNORAD should re-task the 611th Air Operations Center (611 AOC) to convert to and function as the Alaska Air Defense Sector (AADS). In tandem, advocate with the Secretary of the Air Force and Pacific Air Forces to formally reorganize assigned forces and rebrand the 611 AOC as the AADS. While the 611 AOC functions well during Phase 0 and limited Phase I operations, maintaining two Air Operations Centers under one Service component commander (the commander of First Air Force) is inefficient. Combining the 611 AOC and the 176th Air Defense Squadron into a cohesive AADS as an organization under the Alaska Air National Guard creates a modernized warfighting organization that can scale beyond peacetime operations into the full spectrum of conflict. This structure mirrors the construct and leadership of the other NORAD Sectors. Beginning transition to a dedicated AADS within the first 90–180 days

will enable a seamless handover of the mission of the Alaskan NORAD Region area of operations from the 611 AOC to the 601 AOC and AFNORTH staff. While establishing and stabilizing a properly resourced AADS (notably by converting existing billets into tactical command and control and cyber support positions) will take additional time and planning, this initial transition successfully begins the process. Visualized in figure 9, the benefits of this reorganization include:

- **Standardization:** Aligns the new Alaskan Air Defense Sector with the Western Air Defense Sector and the Eastern Air Defense Sector, creating a common structure and doctrine across all three U.S. NORAD Sectors to enhance interoperability and unity of effort
- **Command Alignment:** Establishes a constituent leadership model across the three Sectors, each led by an O-6 commander for Title 10 requirements, enabling rapid activation of a Regional Air Defense Commander, and an O-6 with Title 32 authorities supporting the Sector mission
- **Manpower Aggregation:** Consolidates the 611 AOC (approximately 110 funded personnel of an authorized 240 billets) with the 176th Air Defense Squadron (approximately 150 personnel), justifying O-6 level command and building parity with other Sectors with an Air Defense Group
- **Preservation of Expertise:** Retains existing 611 AOC personnel during

the transition, ensuring continuity of operations and critical institutional knowledge of Alaska and the Arctic

- **Streamlined Integration:** Strengthens command and control across the air domain by aligning the reformed Alaskan Air Defense Sector under the single U.S. C/JFACC

This newly forged Alaskan Air Defense Sector will scale beyond Phase 0, increasing operational efficiency and ensuring all U.S. NORAD Sectors can support steady-state and crisis operations with unified doctrine and structure that present manpower does not support.

No Roadblocks—Only Challenges to Overcome

There are no roadblocks to implementing any recommended organizational or relationship adjustments. However, there are staff-perceived impediments to change. Unified Campaign Plan changes, communications challenges, revisions to the NORAD Agreement

and/or Terms of References, and sensitivities with manpower and resources in Alaska top the list of difficulties that hinder progress.

Legal and Statutory Difficulties

A seemingly daunting legal and statutory challenge arose following previously attempted solutions to improve the air component command organization in Alaska. That challenge was that removing one of the Alaska three-star's hats would require Senate reconfirmation. However, the current legal framework does *not* require Senate reconfirmation for changes in duty assignment. General and flag officers are appointed and confirmed to the grade, then assigned to a duty position. For example, Lieutenant General Case Cunningham was confirmed "to the grade indicated while assigned to a position of importance and responsibility" under Title 10 U.S.C. § 601.²⁷ Moreover, Title 10 U.S.C. gives the President, on the recommendation of the Secretary of Defense (§ 161–167)

or Secretary of the Air Force (§ 9013), the authority to assign a three-star rank to positions they deem of "importance and responsibility." Finally, suppose the commander of NORAD and USNORTHCOM decides to realign responsibilities, reorganize forces, or remove a hat. In that case, no new Senate confirmation is required—just an internal reassignment within the Department of War's existing legal authority.

Legal precedent and statutory authority support reorganization. The perceived legal barrier is actually a matter of internal delegation—not law. Legally, a three-star is not mandated nor limited for either Eleventh Air Force or Alaskan Command individually or in combination. Statutorily, a three-star position could continue to be justified as commander of Alaskan Command as a critical sub-unified command and because of Alaska's key strategic location. Law and statute would not require any change to the Alaska general officer's appointment.

U.S. Army soldiers assigned to 1st Battalion, 501st Parachute Infantry Regiment, 2nd Infantry Brigade Combat Team (Airborne), 11th Airborne Division, provide security as part of a force projection operation to Shemya Island, Alaska, in the North Pacific Ocean, September 13, 2024. The U.S. and Alaska are immense in size and the division's ability to project forces quickly to any environment, no matter how remote, is critical to our nation's defense and the strength of our relationships with partner nations and allies throughout the Indo-Pacific. (U.S. Army photo by Spc. Brandon Vasquez)



Lost Communications

Distributed operations and communication reliability are common, modern facets of warfare. The homeland is no different, and within the air domain, implementing a Regional Air Defense Commander construct would acknowledge and mitigate these issues while adhering to Air Force²⁸ and joint doctrine.²⁹ Leveraging the existing NORAD Sector structure (the Eastern Air Defense Sector, the Western Air Defense Sector, and the Alaska Air Defense Sector) and codifying the Regional Air Defense Commander construct would ensure seamless decentralized execution. Additionally, agile combat employment concepts, such as mission-type orders, are U.S. Air Force-endorsed methods to deal with this exact air domain situation. Applying the current doctrine will streamline and simplify command and control, keeping it at the appropriate level of warfare. Therefore, a single U.S. C/JFACC, supported by doctrinally sound procedures and existing infrastructure, could effectively command and control the air domain—even under contested or degraded communications conditions.

Binational Command or Unified Campaign Plan Changes

The foremost proposed changes—creating an aligned single U.S. C/JFACC for the two U.S. Regions—do not require modification of the binational NORAD Agreement with Canada or the NORAD Terms of Reference. The NORAD command structure incorporates Canadian partners throughout the chain of command—key to a unified, cohesive defense strategy. The NORAD deputy commander, J3 director, and two Canadian deputy commanders for the U.S. NORAD Regions can remain in place, conducting operations as they do today and reinforcing the Regional Air Defense Commander proposition. Therefore, these core NORAD documents dictate the existence of the Alaskan NORAD Region and the Continental NORAD Region but do *not* prescribe by whom or how Region command or manpower is fulfilled,

thus enabling the designation of a new commander without changing the documents. Unlike the key NORAD documents, the U.S. Unified Campaign Plan is frequently updated.

Early in his second term, President Trump proposed consolidating combatant commands. If U.S. Northern Command and Southern Command were merged in a revised Unified Campaign Plan,²⁶ the core argument for increased lethality, simplicity, and unity of effort in Alaska as outlined in this article would remain sound and fundamentally unaffected. Strategically, closing the gaps in authorities and command relationships within NORAD, and between NORAD and USNORTHCOM in Alaska, would fulfill the same intent as consolidating Northern and Southern Commands. Given the inherent structural reorganization resulting from such a merger, these proposed changes can serve as a template for other reorganizations.

Transition of Resources

Executing the immediate reorganization of the 611 AOC into an Alaska Air Defense Sector proper is a decisive first step that yields immediate operational benefits. To achieve full capability and long-term stability, however, negotiated planning must follow to codify the Sector's permanent structure, manning, and resourcing. This analysis and planning can unfold following the initial change, with several aspects already partly developed or that could be mimicked from existing frameworks.

As the newly minted single U.S. C/JFACC, the commander of First Air Force should oversee this planning effort in coordination with Canadian partners, Pacific Air Forces, the Alaska Air National Guard, and civilian leadership. The primary task will be negotiating and codifying the force structure model, including a transfer of authority—transitioning the 611 AOC's approximately 110 funded billets to the Alaska Air National Guard to conduct the Sector and Regional Air Defense Commander missions on behalf of the commander of USELEMNORAD.

These decisions will drive a plan to address billet specialty mismatches, fulfill previous manpower studies, and secure funding streams. Fortunately, this effort will not start from scratch. Leadership within the Alaska Air National Guard has already made strides toward some of these solutions, and the other NORAD Sectors provide proven models to guide the final force structure and training requirements for the new Alaska Air Defense Sector.

Conclusion

The United States is increasingly vulnerable to all-domain threats as the Nation's adversaries continue to invest and innovate. China and Russia have demonstrably identified the gap in the air domain in Alaska and the friction along combatant command boundaries. This evolving threat landscape demands more than recognition; it requires strategic discipline and decisive action to optimize command structures for joint all-domain operations. Failure to adapt the command relationships in the air domain leaves a friction point that adversarial malign actors could exploit, risking an aerial attack on North America because of complex authorities. Enhancing the command relationships and organizational structures in the air domain will enhance joint all-domain defense and resilience.

As one step along that journey, repairing the fractured command and control structure over Alaska's air domain is logical and overdue. The recommendations presented in this article directly support an enhanced defense of Alaska, the Arctic, and the broader U.S. homeland, contributing meaningfully to joint operations in a future conflict with China or Russia. Unify the U.S. air component under NORAD by designating the commander of the Continental NORAD Region as the commander of both that Region and the Alaskan NORAD Region, thus closing the gap between two separate NORAD CFACCs, and by removing the bifurcation between CFACC and the USNORTHCOM JFACC. Once in place, realigning the supporting authorities—AADC, Airspace Control Authority, and

Collections Management—would become a matter of administrative efficiency, not political complexity.

Bottom line: The threat is real. The solution is viable. The time to pull the trigger and resolve the air domain's fractured command relationships is now in order to enhance lethality, decision space, and the survivability of the homeland. JFQ

The author thanks Commander Otis Dunlap, USN, for his invaluable contributions in crafting this article.

Notes

¹ Matthew Olay, "Top NORTHCOM, NORAD Officer Highlights Trio of Homeland Security Concerns During Senate Testimony," *DOD News*, February 13, 2025, <https://www.defense.gov/News/News-Stories/Article/Article/4066756/top-northcom-norad-officer-highlights-trio-of-homeland-security-concerns-during/>.

² Dzirhan Mahadzir, "9 Russian, Chinese Warships on Joint Patrol in the Northwest Pacific After Major Naval Exercise," *USNI News*, October 1, 2024, <https://news.usni.org/2024/10/01/9-russian-chinese-warships-on-joint-patrol-in-the-northwest-pacific-after-major-naval-exercise>.

³ Statement of General Gregory M. Guillot, United States Air Force, Commander United States Northern Command and North American Aerospace Defense Command, Before the Armed Services Committee, U.S. House of Representatives, April 1, 2025, https://armedservices.house.gov/uploadedfiles/gen_guillot_n-nc_2025_posture_statement.pdf.

⁴ *2024 Arctic Strategy* (Washington, DC: Department of Defense, 2024), 15–17, <https://media.defense.gov/2024/Jul/22/2003507411/-1/-1/0/dod-arctic-strategy-2024.pdf>.

⁵ "Sling Stone Enhances Warfighter Capabilities, Defense of Guam," U.S. Navy Pacific Fleet, December 10, 2024, <https://www.cpf.navy.mil/Newsroom/News/Article/3994074/sling-stone-enhances-warfighter-capabilities-defense-of-guam/>.

⁶ *2022 National Defense Strategy of the United States of America* (Washington, DC: Department of Defense, 2022), 7, <https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-national-defense-strategy-npr-mdr.pdf>.

⁷ Joint Publication (JP) 5-0, *Joint Planning* (Washington, DC: The Joint Staff, December 1, 2020), I-1.

⁸ Statement of General Gregory M. Guillot, 17.

⁹ *2022 National Defense Strategy of the*

United States of America, 1.

¹⁰ Statement of General Gregory M. Guillot, 13–14.

¹¹ *Agreement Between the Government of the United States of America and the Government of Canada on the North American Aerospace Defense Command*, Ottawa, April 28, 2006, <https://www.norad.mil/portals/29/documents/history/norad%20agreements/2006%20norad%20agreement.pdf>.

¹² NORAD and NORTHCOM Education and Training, "North American Aerospace Defense Command and United States Northern Command—Command Staff Structure," United States Northern Command, accessed June 24, 2026, 3, https://www.northcom.mil/Portals/28/Documents/Supporting%20documents/Education%20and%20Training/NNCJ722_CommandStaffStructureForInterns_20190813.pdf.

¹³ JP 1, *Joint Warfighting* (Washington, DC: The Joint Staff, August 27, 2023), III-5.

¹⁴ Mahadzir, "9 Russian, Chinese Warships on Joint Patrol in the Northwest Pacific After Major Naval Exercise."

¹⁵ Mahadzir, "9 Russian, Chinese Warships on Joint Patrol in the Northwest Pacific After Major Naval Exercise."

¹⁶ JP 1, *Joint Warfighting*, II-15.

¹⁷ Doctrinally, the commander of NAVNORTH could be designated as JFACC with the preponderance of air assets and the ability to command and control them. However, for the purpose of this example, assume that other circumstances require the standing USNORTHCOM JFACC to remain JFACC during these operations.

¹⁸ Ryan Chan, "U.S. Military Reveals Second Chinese Balloon Shot Down in 2023," *Newsweek*, February 25, 2025, <https://www.newsweek.com/us-news-military-reveals-air-force-shot-down-china-balloon-alaska-2023-2035652>.

¹⁹ Statement of General Gregory M. Guillot, 6–7, 17.

²⁰ Camila Domonoske, "Magnitude 7.0 Earthquake Shakes Alaska, Damaging Roads, Buildings," NPR, November 30, 2018, <https://www.npr.org/2018/11/30/672240051/magnitude-7-0-earthquake-shakes-alaska-tsunami-warning-in-effect>.

²¹ Jen Judson, "Iron Dome for America Gets a Golden Makeover," *Defense News*, February 25, 2025, <https://www.defensenews.com/pentagon/2025/02/25/iron-dome-for-america-gets-a-golden-makeover/>.

²² The White House, "The Iron Dome for America," January 27, 2025, <https://www.whitehouse.gov/presidential-actions/2025/01/the-iron-dome-for-america/>.

²³ David Vergun, "Leaders Describe Host of Threats to Homeland, Steps to Mitigate Them," *DOD News*, April 1, 2025, <https://www.defense.gov/News/News-Stories/Article/Article/4142304/leaders-describe-host-of-threats-to-homeland-steps-to-mitigate-them/>.

²⁴ JP 3-0, *Joint Campaigns and Operations*,

Revision 1 (Washington, DC: The Joint Staff, September 10, 2024), A-2.

²⁵ Air Combat Command Mission Directive 302, *Numbered Air Forces—HQ First Air Force (Air Forces Northern and Air Forces Space)* (Joint Base Langley-Eustis, VA: Headquarters Air Combat Command/A3C, September 28, 2023), <https://static.e-publishing.af.mil/production/1/acc/publication/accmd202/accmd202.pdf>.

²⁶ 10 U.S. Code § 601, "Positions of Importance and Responsibility: Generals and Lieutenant Generals; Admirals and Vice Admirals," December 5, 1991, <https://www.law.cornell.edu/uscode/text/10/601>.

²⁷ Air Force Doctrine Publication 3-0.1, *Command and Control* (Maxwell Air Force Base, AL: LeMay Center for Doctrine Development and Education, January 22, 2025), 38, https://www.doctrine.af.mil/Portals/61/documents/AFDP_3-0_1/AFDP3-0.1CommandandControl.pdf.

²⁸ JP 3-01, *Countering Air and Missile Threats*, Incorporating Change 1 (Washington, DC: The Joint Staff, March 13, 2024), II-4.

²⁹ Jason Smith, "Consolidate NORTHCOM and SOUTHCOM," *Defense One*, August 5, 2025, <https://www.defenseone.com/ideas/2025/08/consolidate-northcom-and-southcom/407221>.



U.S. Air Force Staff Sgt. Kenyah Smith, 25th Fighter Generation Squadron weapons load crew member, inspects munitions during a weapons load crew competition at Osan Air Base, Republic of Korea, June 9, 2023. Smith was one of three members representing the A-10C Thunderbolt II team during the competition, where the event consisted of building and loading weapons onto an F-16 Fighting Falcon and A-10 aircraft. (U.S. Air Force photo by Senior Airman Thomas Sjoberg)

Reimagining U.S. Industrial Mobilization

By Alexis Johnson

Arthur Herman, in *Freedom's Forge*, observed: “Business leaders discovered that in a crisis their most valuable assets were not just factories and capital, but their own knowledge, skills, and ideas.”¹ This insight captures the essence of how the United States

emerged as a global industrial powerhouse during and after World War II through the rapid expansion and mobilization of a formidable defense industrial base (DIB). However, the scale, agility, and integration of today’s DIB no longer mirror the wartime capacities of that era. As a result,

the United States now faces a strategic vulnerability not encountered since the Second World War—an emerging challenge posed by a near-peer competitor with growing military and industrial capabilities. This vulnerability is particularly acute in the Pacific region, where the ability to sustain joint force operations during a large-scale mobilization or peer conflict is increasingly at risk. The current defense logistics system, while effective in steady-state operations, is not optimized for the scale, distribution, and

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surge demands required in a contested Pacific environment. The United States has not had a formalized mechanism for integration during crisis since the War Production Board, established in 1942 to coordinate and direct war-related industrial production.²

Today, while the Organic Industrial Base (OIB) remains vital for depot-level sustainment, it is increasingly strained by aging infrastructure, workforce shortages, and limited surge capacity. The OIB is the Department of War–maintained “network of industrial facilities that produce certain kinds of equipment (mainly conventional ammunition) and conduct repair, maintenance, and overhaul activities for various weapons systems.”³ To prepare for the possibility of a high-end conflict in the Pacific between 2027 and 2030, the United States must implement a modern counterpart to that wartime framework, one that ensures sustainment readiness across a distributed and contested logistics environment. In this article, the author proposes the establishment of a Civil Reserve Sustainment Readiness Program (CRSRP), a public-private logistics framework modeled on successful initiatives such as the Civil Reserve Air Fleet. The CRSRP would formalize and mobilize commercial sustainment infrastructure during crisis or mobilization, leveraging maintenance, repair, and overhaul (MRO) capacity, skilled labor, and commercial facilities to augment military sustainment through Federal incentives, pre-negotiated contracts, and strategic alignment with national defense objectives.

The Case for a Civil Reserve Sustainment Readiness Program

Today, the only existing authority that closely resembles the intent and function of the CRSRP is the Defense Production Act (DPA). The DPA provides the President with a number of authorizations that the President may use to influence domestic industry in the interest of national defense.⁴ However, although the DPA plays a vital role in expanding industrial production and accelerating the manufacturing and delivery of critical components, it does

not offer a structured mechanism for pre-integrating commercial sustainment services—such as MRO, warehousing, or forward logistics—into military operations. In contrast, the Civil Reserve Air Fleet and the Voluntary Intermodal Sealift Agreement serve as long-standing public-private partnerships that provide the Department of War (DOW) with access to commercial air and sealift capacity during times of crisis or large-scale mobilization.⁵ Though both programs are indispensable for strategic transportation, they are limited in scope and do not address the broader array of sustainment functions required to support contested logistics environments and prolonged joint operations.

The author’s firsthand observations at major OIB depots across the military Services further underscore the urgent need for a CRSRP. Although these depots play an essential role in sustaining combat power, they face a number of common challenges: chronic understaffing amid an aging workforce, deteriorating infrastructure with limited prospects for military construction (MILCON) funding, persistent supply chain vulnerabilities amplified by recent global disruption such as the COVID-19 pandemic, and a bureaucratic environment that hinders timely action.⁶ These structural vulnerabilities highlight the difficulty the OIB would face in meeting surge demands, sustaining forward operations, and preserving readiness in a contested logistics environment. A CRSRP would not only fill this gap but also serve as a strategic force multiplier. It would transform the industrial base from just a builder of war to a sustainer of combat power.

Integrating Commercial Industry into U.S. Defense Sustainment

Throughout the author’s OIB seminar studies and visit to the Republic of Korea, one point came up repeatedly: if a crisis happens in theater, it will take weeks or months for the follow-on forces and weapon systems to arrive.⁷ The Regional Sustainment Framework—DOW’s strategic approach to building a globally integrated, resilient, and collaborative

sustainment ecosystem that aligns the United States, allies, and industry to deliver MRO capabilities near the fight—is supposed to be the answer to address MRO concerns in theater.⁸ However, a future war with a near peer may present a need for a surge of MRO capacity and capability for weapon systems in the United States to get to the theater quickly to replenish the joint forces.

To ensure strategic sustained readiness and MRO of weapons systems during crisis and military mobilization, the United States should establish a CRSRP. With this article, the author proposes a public-private partnership framework designed to enhance the U.S. military’s sustainment capacity by formally integrating commercial logistics and maintenance capabilities into contingency planning and wartime operations. The CRSRP would establish Federal incentives, subsidies, and pre-negotiated agreements with industry partners across the sustainment enterprise, including MRO workforce capacity, facilities, and expertise to augment military sustainment operations. The program’s primary objective would be to ensure that, in the event of a large-scale mobilization or peer conflict, DOW can rapidly activate and scale commercial sustainment resources to augment the OIB and maintain force readiness in contested or degraded environments.

While traditional defense contractors such as Boeing and Northrop Grumman would be expected to play a central role in the CRSRP, the program must expand beyond conventional industry participants. A forward-leaning, strategically adaptive approach requires leveraging nontraditional commercial companies with large-scale maintenance operations, infrastructure, and supply chains that either mirror or can be modified to support military MRO needs. Given the scale and complexity of a potential conflict with a near-peer adversary—something that the United States has not faced since World War II—the sustainment enterprise must adopt an innovative and expansive mindset. In short, we must think beyond the defense-industrial complex to build a robust and flexible sustainment network.



U.S. Airmen assigned to the 509th Bomber Generation Squadron weapons section prepare to load AGM-158 joint air-to-surface standoff missiles into a B-2 Spirit weapons trainer at Whiteman Air Force Base, Missouri, August 8, 2025. The Airmen participated in a weapons load competition that tested them on various components of loading munitions. (U.S. Air Force photo by Staff Sgt. Joshua Hastings)

Several commercial sectors and companies offer promising potential for integration into the CRSRP, particularly those with large-scale, high-readiness maintenance and logistics operations. In the maritime sector, companies like Carnival Corporation and Royal Caribbean Group manage complex global fleets and maintain contracts with international shipyards, offering scalable port logistics and ship maintenance capabilities.⁹ BAE Systems Ship Repair provides significant commercial ship repair services across key U.S. ports, such as San Diego and Jacksonville.¹⁰

In the aviation sector, firms like Delta TechOps (the MRO division of Delta Air Lines) and American Airlines maintain large commercial fleets with extensive depot-level repairs and global logistics capability, already serving both the military and the civilian market.¹¹ For ground transportation, Ryder Systems operates thousands of

maintenance and logistics centers across the country, while WM (formerly Waste Management) maintains a fleet of heavy-duty vehicles supported by a highly distributed maintenance network.¹²

The heavy equipment and industrial machinery sector also presents valuable opportunities. Caterpillar offers global sustainment infrastructure, field repair capabilities, and a robust network ideal for combat engineering platforms.¹³ Similarly, the John Deere Defense Division provides direct support to military engineering and sustainment units.¹⁴ Lastly, nontraditional enterprises such as amusement parks and resorts possess surprising relevance. Disney Theme Parks and Six Flags maintain sophisticated and security-critical systems that all require round-the-clock maintenance by highly skilled technical teams.¹⁵

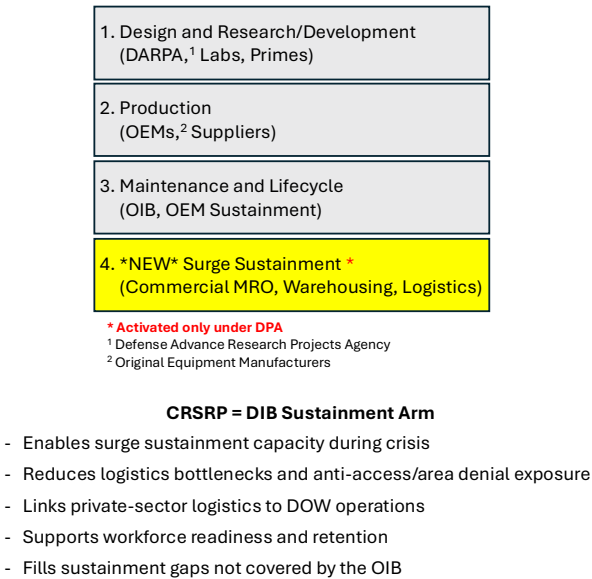
These sectors collectively represent a diverse and capable industrial base that, when aligned with the CRSRP, could

significantly bolster the nation's sustainment readiness in a future contested environment. As proposed, the CRSRP would offer Federal incentives, subsidies, and contractual agreements to these companies in exchange for pre-committed access to a portion of their workforce capacity, technical expertise, infrastructure, and supply networks. This approach would not only enhance surge readiness but also strengthen national resilience by expanding the sustainment base beyond traditional military-industrial actors.

Bridging Production and Endurance

To operate the CRSRP as a formal and durable component of the national defense strategy, a new title should be added to the Defense Production Act (DPA), complementing existing authorities under Titles I and III, which focus primarily on production prioritization and industrial capacity expansion.¹⁶ Although the DPA supports

Figure 1. Defense Industrial Base Layers



Source: Author.

manufacturing surge and resource allocation, it lacks a structured mechanism for sustaining military operations through a commercial logistics partnership. Therefore, the proposed new title—Title VIII: Civil Sustainment and Mobilization Readiness—would provide the statutory foundation to organize, incentivize, and coordinate civilian MRO and logistics partners under a unified national mobilization framework. By structuring the CRSRP within the DPA, the new title would directly expand the scope of the DIB to include sustainment surge capability, bridging the gap between production readiness and operational endurance in future conflicts (see figure 1).

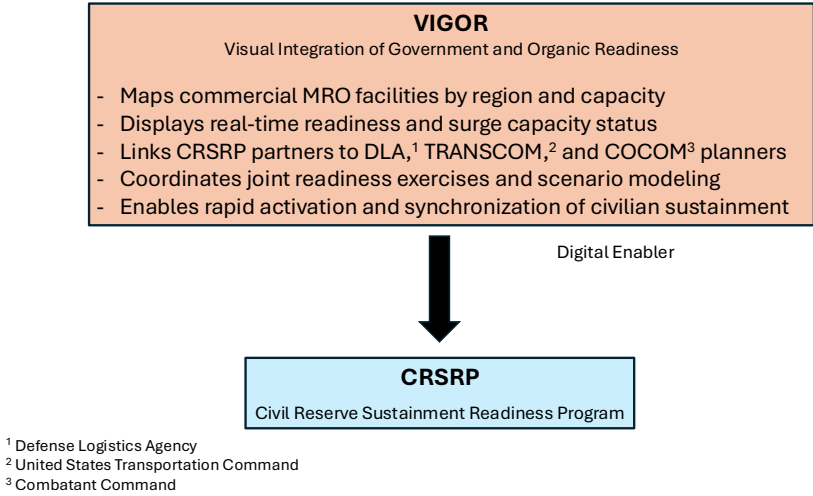
This addition would align the CRSRP with broader resilience efforts for the industrial base, establish readiness reporting and activation protocols, and enable annual exercises to validate commercial sustainment integration in support of joint operations. To support these objectives, the author proposes Visualized Integration of Government and Organic Readiness (VIGOR), which would provide the operational interface needed to manage CRSRP participation, sustainment visibility, and surge activation across the commercial industrial base. In DOW’s evolving logistics architecture,

Global Enterprise Network for Universal Sustainment (GENUS) is to the Regional Sustainment Framework (RSF) what VIGOR would be to the CRSRP, with each serving as the digital backbone for its respective strategic framework. The RSF outlines DOW’s vision for aligning U.S., allied, and industry sustainment capabilities in a globally distributed and contested logistics environment.¹⁷ To operationalize that vision, one of

GENUS’s capabilities is providing a data-driven platform that connects depots, commercial MRO facilities, and forward logistics nodes, enabling real-time sustainment coordination and predictive decision-making.¹⁸ Similarly, the CRSRP seeks to integrate commercial sustainment capacity into wartime logistics operations. Its digital enabler, VIGOR, would serve as the readiness management and coordination tool, mapping commercial MRO capabilities, tracking surge readiness, and coordinating activation plans and exercises (see figure 2).

VIGOR is envisioned as the operational control system for the CRSRP. Designed to provide visibility, coordination, and readiness management of commercial sustainment partners, VIGOR would function as a digital dashboard enabling real-time insight into available MRO capacity across the commercial sector. It would allow DOW and its logistics agencies to track which commercial facilities are surge-ready, what services they offer, and how quickly they can be activated. VIGOR would integrate sustainment planning with scenario modeling, track facility readiness status (for example, workforce, parts inventory, and certifications), and coordinate exercises with CRSRP participants. Much like GENUS provides decision support for global logistics under the RSF, VIGOR

Figure 2. How VIGOR Would Enable the CRSRP



Source: Author.

would enable scalable activation and synchronization of sustainment capacity across a distributed commercial network, ensuring that the joint force has the logistical depth it needs in crisis or conflict.

Analytical Framework of the CRSRP

Theory of Constraints

Applying the Theory of Constraints to the CRSRP provides a crucial framework for maximizing its effectiveness. This theory suggests that a small number of constraints limit any system's performance.¹⁹ For the CRSRP, the primary constraint appears to be a lack of governance and readiness visibility. Without clear legal authority, such as the proposed Title VIII under the Defense Production Act, and a digital tool like VIGOR to track and manage commercial partners, the program would lack essential structure. Therefore, the initial focus should be on exploiting existing public-private models like the Civil Reserve Air Fleet and the Voluntary

Intermodal Sealift Agreement, along with current tools like GENUS, as interim solutions until legislation is passed to finalize the CRSRP. All other activities, including acquisition, outreach, and policy development, should be subordinated to support establishing this governance and visibility. Elevating the constraint requires structuring the CRSRP with proper funding and authority and fully developing VIGOR. Following implementation, the process should be repeated to identify and address subsequent constraints, such as activation speed, supply chain resilience, or transportation challenges. This continuous application of the Theory of Constraints will ensure that the CRSRP remains adaptable and ready to meet evolving defense sustainment needs.

Supply and Demand

The CRSRP can be analyzed through the lens of supply and demand. On the demand side, DOW faces increasing sustainment needs because of

geopolitical factors, aging infrastructure, and a shrinking workforce. This creates a demand for surge repair capacity, rapid MRO turnaround, and flexible warehousing and transportation—a demand the OIB struggles to meet alone. Conversely, the commercial sector possesses a significant MRO and logistics capacity, representing a substantial supply. However, this supply remains inaccessible to DOW during crises because of the lack of legal frameworks, readiness visibility, and economic incentives. The CRSRP would bridge this gap by acting as a market alignment mechanism. It would leverage pre-negotiated contracts, incentives, and predictable demand signals to encourage commercial participation while employing tools like VIGOR to provide real-time visibility into available resources. This would effectively shift the supply curve to the right, increasing availability and lowering costs during emergencies. Essentially, the CRSRP would transform unstructured commercial capacity into a



U.S. Air Force Airman 1st Class Cameron Dunlap, 509th Bomber Generation Squadron weapons load crew member, adjusts a strap during a weapons load competition at Whiteman Air Force Base, Missouri, August 8, 2025. Airmen were tasked with loading AGM-158 joint air-to-surface standoff missiles into a B-2 Spirit weapons trainer during the competition. (U.S. Air Force photo by Staff Sgt. Joshua Hastings)

managed, reliable surge supply, ensuring that DOW can meet spiking demand during crises.

The CRSRP's Relevance to Key Strategic Goals

The CRSRP would directly support three key strategic objectives: reimagining the OIB of the future, supporting the RSF, and bolstering MRO readiness for potential peer conflict. First, the CRSRP would augment the OIB's future operating model by expanding capacity beyond government-owned depots through pre-arranged public-private sustainment partnerships. This would provide scalable, distributed surge capacity, enhancing readiness in high-demand scenarios and transitioning the OIB from a centralized model focused on the contiguous United States to a hybrid network integrating organic and commercial capabilities. Second, the CRSRP would bolster the RSF by providing surge capacity, strategic backhaul, and repair services, enhancing global logistics chain resilience and extending joint force endurance. Finally, the CRSRP would enhance MRO readiness by formally structuring commercial industrial base participation to provide on-demand repair, warehousing, and transportation support during crises or conflicts. This capability is essential for countering near-peer adversaries, where rapid force regeneration and logistic resilience will be decisive factors in determining operational outcomes.

The Challenges of the CRSRP

Current DOW policy, as stipulated by the "50-50 rule" (10 U.S.C. § 2466), mandates the allocation of at least 50 percent of depot-level maintenance workload to the OIB, composed of DOW-operated depots.²⁰ While this apportionment safeguards OIB viability during peacetime, it may introduce limitations during large-scale mobilization scenarios. The CRSRP, a surge mobilization framework activated under national emergency authorities such as the DPA, should therefore be exempt from this restriction. Applying peacetime workload limitations to the CRSRP during a major conflict would undermine its core purpose: the rapid

mobilization of commercial MRO and logistics capacity to augment joint force readiness. Consequently, upon activation of the DPA, waiving the 50-50 rule would be crucial to ensure the CRSRP's full potential is realized, providing the necessary agility, scalability, and sustainment depth for effective operation in contested environments.

Another key challenge in implementing the CRSRP hinges on effectively addressing the complex challenge of sharing technical data and maintenance documentation with commercial partners. Unlike transportation-focused programs like the Civil Reserve Air Fleet and the Voluntary Intermodal Sealift Agreement, the CRSRP necessitates access to sensitive information, including technical orders, proprietary specifications, and diagnostic software, often controlled by original equipment manufacturers or the Federal Government for intellectual property (IP) protection and security reasons. This creates obstacles related to IP and licensing constraints, as well as cybersecurity and operational security concerns regarding potential exposure of system vulnerabilities. A robust legal and technical framework encompassing data rights, nondisclosure agreements, cybersecurity protocols, and stringent contractor vetting is essential. Furthermore, preemptive acquisition of sufficient Government Purpose Rights in technical data during procurement is vital to ensure DOW's ability to delegate sustainment tasks during national emergencies. Failure to resolve these data-sharing issues will impede effective repairs and diagnostics by CRSRP partners, ultimately undermining the program's surge sustainment capabilities.

Policy Recommendations to Activate the CRSRP

To make the CRSRP a fully operational and enduring component of national defense strategy, the following recommended actions must be implemented across the domains:

1. **Add Title VIII to the Defense Production Act (legislative authority):** A proposed DPA Title VIII

would authorize the government to pre-identify, contract, and incentivize commercial sustainment providers, waive peacetime restrictions, secure data rights, and mandate interagency coordination for crisis mobilization.

2. **CRSRP Office within the Office of the Secretary of War (program governance):** An Office of the CRSRP, under the Assistant Secretary of War for Sustainment, would manage a partner registry, coordinate CRSRP integration with military Services and interagency logistics planning, and oversee VIGOR platform development.
3. **Multiyear Funding and Incentive Authority (budget mechanism):** Congress should appropriate funds under the CRSRP account that would authorize multiyear funding agreements, support exercises and training, fund readiness incentives and facility upgrades, and enable rapid disbursement during crises.
4. **Public-Private Sustainment Agreements (legal framework):** CRSRP contracts should predefine activation criteria, mandate readiness standards including cybersecurity and IP protection, and specify participation levels during surge periods.
5. **Develop and Deploy the VIGOR Platform (digital infrastructure):** VIGOR will map CRSRP facilities, model surge activations, integrate with RSF data systems, and enable interagency tasking of commercial partners.

From Industrial Agility to Strategic Endurance

In today's era of Great Power competition, the ability to sustain the joint force in contested environments is no longer a logistic detail; it is a strategic imperative. The CRSRP offers a modern solution to a modern problem: how to rapidly expand sustainment capacity and resilience through pre-integrated commercial partnerships. Building on the lessons of World War II, the CRSRP would formalize access to commercial MRO, logistics, and infrastructure, ensuring that DOW can surge capabilities during a crisis when organic resources fall short. As this article



U.S. Air Force Staff Sgt. Peter Bryant, 8th Aircraft Maintenance Unit weapons load crew chief, assists in loading a GBU-38 bomb onto a F-16 Fighting Falcon during the 4th Quarter Load and Maintenance Competition at Holloman Air Force Base, New Mexico, January 30, 2026. Airmen participating in the competition were evaluated on job ability and efficiency while working as a cohesive unit to simulate preparing mission-ready aircraft. (U.S. Air Force photo by Airman 1st Class Ryan Witkop)

has argued, the CRSRP would support the strategic goals of reimagining the OIB of the future, supporting the RSF, and ensuring MRO readiness for peer conflict. By structuring the CRSRP under a new Title VIII of the DPA, the United States can build a sustainment enterprise capable of withstanding the rigors of future war. In doing so, the nation will not only restore industrial agility but will also reassert a foundational truth: victory in conflict depends not only on who can build faster but also on who can sustain longer. The CRSRP would ensure that the United States is prepared to do both. JFQ

Notes

¹ Arthur Herman, *Freedom's Forge: How American Business Produced Victory in World War II* (New York: Random House, 2013).

² Oklahoma Historical Society, "War Production Board," *The Encyclopedia of Oklahoma History and Culture*, accessed June 4, 2026, <https://www.okhistory.org/publications/enc/entry?entry=WA021>.

³ Luke A. Nicastro, *The U.S. Defense Industrial Base: Background and Issues for Congress*, R47751 (Washington, DC: Congressional Research Service, September 23, 2024), 15, <https://www.congress.gov/crs-product/R47751>.

⁴ Alexandra G. Neenan, *The Defense Production Act of 1950: History, Authorities, and Considerations for Congress*, R43767 (Washington, DC: Congressional Research Service, October 6, 2023), <https://www.congress.gov/crs-product/R43767>.

⁵ Yool Kim and George Nacouzi, *A Framework for Building a Civil Reserve Space Program: Applicability of U.S. Transportation Command's Commercial Partnership Models* (Santa Monica, CA: RAND, November 2023), <https://www.rand.org/pubs/perspectives/PEA980-1.html>.

⁶ Interviews with OIB depot leaders during site visits to Anniston Army Depot, Naval Station Norfolk, and Tinker Air Force Base, April 2025.

⁷ Interviews with leadership of U.S. Army Materiel Support Command–Korea during site visit to Camp Carroll, April 10, 2025.

⁸ Warfighting Acquisition University, "Regional Sustainment Framework," accessed June 4, 2026, <https://www.waru.edu/acquipedia-article/regional-sustainment-framework>.

⁹ Melinda Crow, "Cruise Ship Dry Dock: What You Can Expect," *CruiseCritic*, October 24, 2023, <https://www.cruisecritic.com/articles/cruising-before-or-after-a-dry-dock-what-to-expect>.

¹⁰ BAE Systems, "Ship Repair," accessed June 4, 2026, <https://web.archive.org/web/20230205010103/https://www.baesystems.com/en-us/product/ship-repair>.

¹¹ Delta TechOps, "Delta TechOps—Your Trusted Partner for Integrated MRO Solutions," 2026, <https://deltatechops.com>.

¹² Ryder, "Ryder SelectCare Maintenance," accessed June 4, 2026, <https://www.ryder.com/en-us/fleet-maintenance>; WM, "Transportation [sic] Services," accessed June 4, 2026, <https://www.wm.com/us/en/environmental-solutions/transportation-services>.

¹³ Interviews with Caterpillar leadership during site visit to Caterpillar Defense Headquarters, Dallas, Texas, April 3, 2025.

¹⁴ John Deere, "Federal and Military Purchasing," accessed June 4, 2025, <https://www.deere.com/en/government-and-military-sales/federal-and-military-purchasing/>.

¹⁵ MAPCON, "Simplify Operations with Theme Park Management Software," accessed June 4, 2026, <https://www.mapcon.com/us-en/theme-park-maintenance>.

¹⁶ Neenan, *The Defense Production Act of 1950*.

¹⁷ Warfighting Acquisition University, "Regional Sustainment Framework."

¹⁸ Grady Epperly, "A Homefield Advantage at an Away Game: Air Force Sustainment Center Expands Global Reach," Air Force Sustainment Center, February 18, 2025, <https://www.afsc.af.mil/News/Article/4065662/a-homefield-advantage-at-an-away-game-air-force-sustainment-center-expands-glob/>.

¹⁹ Eliyahu M. Goldratt and Jeff Cox, *The Goal: A Process of Ongoing Improvement*, 4th ed. (Great Barrington, MA: North River Press, 2014).

²⁰ Cameron M. Keys and Luke A. Nicastro, *Defense Primer: Department of Defense Maintenance Depots*, IF11466 (Washington, DC: Congressional Research Service, November 14, 2024), <https://www.congress.gov/crs-product/IF11466>.



U.S. Army Pfc. Anthony Concepcion, assigned to Dental Health Command Europe, reacts to contact while completing an Expert Field Medical Badge lane during Medical Readiness Command, Europe's 2025 Best Leader Competition at Grafenwoehr Training Area, Bavaria, Germany, March 18, 2025. (U.S. Army photo by Pfc. Brent Lee)

Resilient by Design

Reforming Medical Logistics to Support Global Operations

By Michael Ackman and Jon Fowler

In March 1942, the Japanese Empire seized Java, an island in the South Pacific located between Sumatra and Bali. In doing so, it eliminated 90 percent of the world's supply of quinine, the most

effective antimalarial drug in existence at the time.¹ In the years that followed, as the United States waged a counteroffensive, U.S. troops were ravaged by 572,950 cases of malaria.² General Douglas

MacArthur, hero of the U.S. Army during the war, was famously quoted as saying: “[T]his will be a long war if for every division I have facing the enemy I must count on a second division in the hospital with malaria and a third division convalescing from this debilitating disease.”³

More recently, when Hurricane Maria hit Puerto Rico in 2017, the result was severe disruption to the production

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of intravenous fluid from Baxter International, affecting more than 50 percent of U.S. hospitals.⁴ This also happened in 2024 when Hurricane Helene hit the Southeast United States, and again a Baxter International facility was flooded and forced to suspend production.⁵ Perhaps the most widely observed instance of medical supply shortages was during the COVID-19 pandemic, when medical personnel used homemade masks because of shortages of personal protective equipment. Shortages of other critical supplies, such as oxygen and ventilators, were far too common.

These lessons from history should serve as a cautionary tale about the risks associated with the global medical supply chain. What will happen to our Class VIII supplies (medical materiel) if we go to war tomorrow? As we plan for global military operations and shift our focus from counterinsurgency operations to large-scale combat operations, we need to ensure our medical supply chains are flexible, resilient, and adaptable. We simply cannot afford to be complacent in peacetime only to find ourselves in extremis during wartime execution.

Medical Challenges in Large-Scale Combat Operations

The war in Ukraine that started in February 2022 is now in its fifth year. The Center for Strategic and International Studies (CSIS) estimated that as of December 2025, the Ukrainian forces had sustained 500,000–600,000 casualties, including 100,000–140,000 deaths, and that the Russian forces had suffered nearly 1.2 million casualties, with 275,000–325,000 deaths. In its January 2026 report, CSIS stated, “Combined Russian and Ukrainian casualties may be as high as 1.8 million and could reach 2 million total casualties by the spring of 2026.”⁶

The gross number is staggering and is cause for concern. In a future fight with a peer competitor, the U.S. military’s ability to handle large numbers of battlefield casualties will be tested to the extreme. Our joint force is excellent and capable, but the major medical assets that we possess, such as our fleet’s hospital ships and the Army’s field hospitals, take time and resources to deploy and may not meet the demands for care that the enemy might impose in early phases of crisis or conflict. In addition, our major medical

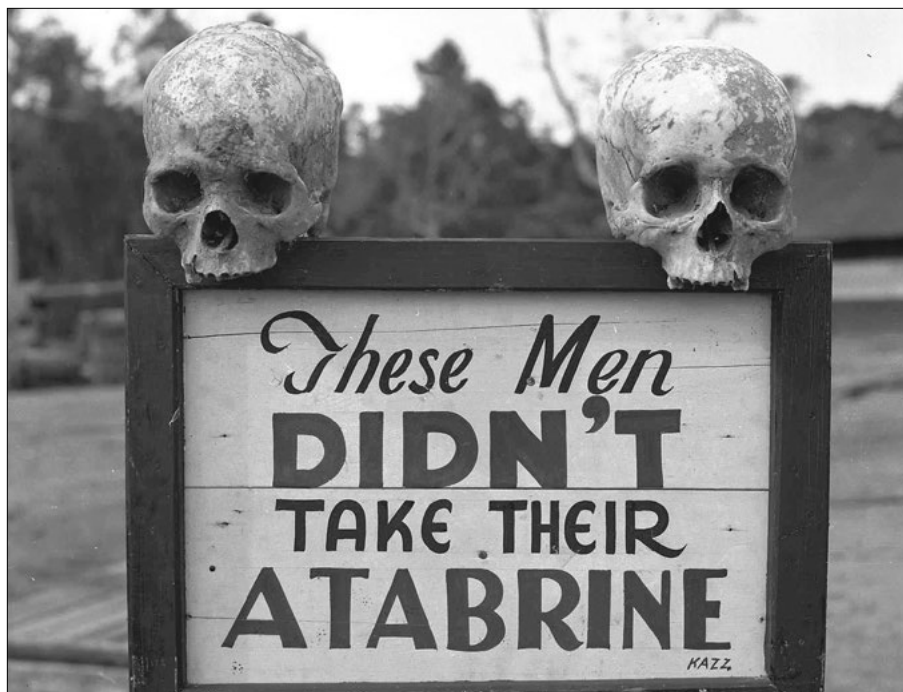
supply contingency contracts will require time to put into motion and move the materiel to the critical points where it is needed. This will introduce logistical sustainment risk that we must mitigate.

Complicating matters further, our ability to move patients in a future contested environment will upend our expectations for medical care that we have grown accustomed to over the last 20 years of counterinsurgency operations. Our greatest challenge is countering the threats represented by the People’s Republic of China in the Pacific. This may unfold in the U.S. Pacific Command (USPACOM) operating environment, which represents 52 percent of the Earth’s surface area and is home to 50 percent of the world’s population.⁷ This is a challenging maritime environment where the tyranny of time and distance will challenge our ability to provide rapid transport to achieve treatment during the “golden hour.” The time and distance problems, coupled with delays expected in a nonpermissive environment, will make it highly likely that we will be conducting prolonged casualty care at our forward-deployed medical units. The simple and terrible fact is this: the longer we delay patient movement, the higher the burn rate of our limited Class VIII (medical) consumables.

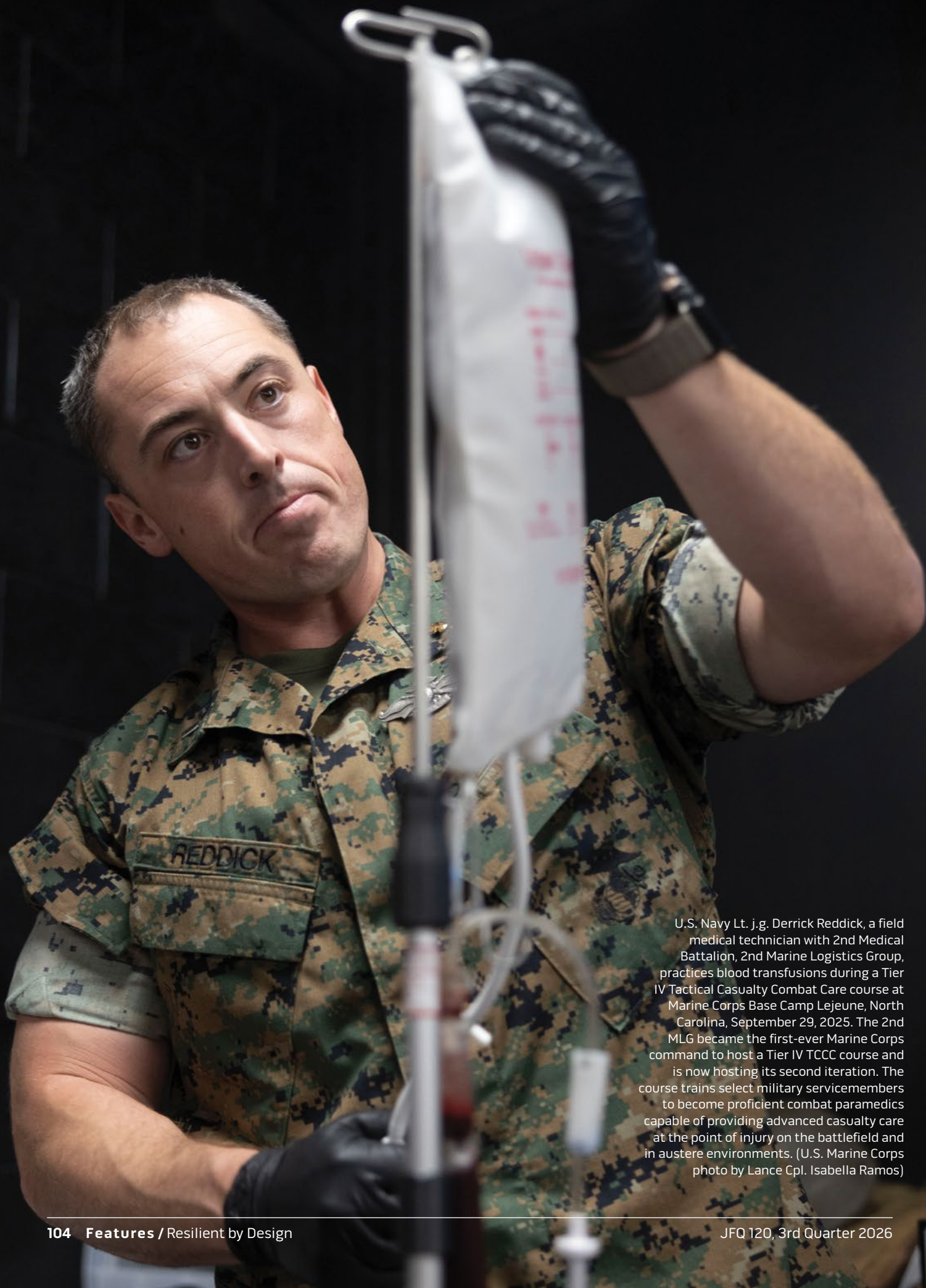
Adding to the complexity of battlefield trauma management, in the future operating environment we will also certainly encounter threats from diseases that have historically had tremendous operational impacts. Malaria, our age-old nemesis from our last war in the Pacific, persists today. The World Health Organization (WHO)’s malaria report in 2019 recorded more than 90 malaria-endemic countries, 228 million infections, and approximately 405,000 deaths.⁸ Dengue fever also remains a key threat that commonly afflicts our operating forces throughout the USPACOM area of operations.⁹

Medical Supplies: A Weak Link in the Supply Chain

Despite all of this, perhaps the largest threat to our ability to meet the demands of large-scale combat operations is the one



Atabrine advertisement in Guinea during World War 2. “These men didn’t take their Atabrine” sign promoting the anti-malaria drug, posted at the 363rd Station Hospital, Port Moresby, Papua New Guinea. 9Wikimedia Commons photo, Otis Historical Archives of National Museum of Health & Medicine [OTIS Archive 1]).



U.S. Navy Lt. j.g. Derrick Reddick, a field medical technician with 2nd Medical Battalion, 2nd Marine Logistics Group, practices blood transfusions during a Tier IV Tactical Casualty Combat Care course at Marine Corps Base Camp Lejeune, North Carolina, September 29, 2025. The 2nd MLG became the first-ever Marine Corps command to host a Tier IV TCCC course and is now hosting its second iteration. The course trains select military servicemembers to become proficient combat paramedics capable of providing advanced casualty care at the point of injury on the battlefield and in austere environments. (U.S. Marine Corps photo by Lance Cpl. Isabella Ramos)

we do not fully appreciate. There are many potential shortfalls of medical consumables that are only one catastrophe away from crippling the global supply. For instance, more than 90 percent of the latex used to manufacture sterile surgical gloves is produced in Malaysia.¹⁰ What would happen to the global supply if that area were hit by a sudden and devastating tsunami, earthquake, or volcanic eruption?

In 2018, in response to reported problems with the pharmaceutical supply chain the U.S. Food and Drug Administration (FDA) created an Agency Drug Shortages Task Force to identify the root causes of drug shortages. In its 2019 report, the FDA found that 70 to 80 percent of registered facilities that manufactured active pharmaceutical ingredients were located outside of the United States, with the largest suppliers being India and, distressingly, China.¹¹ A 2021 report from Duke University's Margolis Center for Health Policy sums up the risk of regional pharmaceuticals as follows: "Supply being concentrated in these areas makes certain supply risks more dire, including geopolitical conflicts. If the countries responsible for much of the U.S. drug supply were to restrict or halt exports, shortages would be inevitable."¹²

In an article titled "Treating Medicine as Ammunition," lead author Major General Paula Lodi—Commanding General of U.S. Army Medical Research and Development Command—and three other senior Army officers argue that we have a "prescription for concern." The authors specifically highlight risks in the pharmaceutical supply chain, stating that the Department of Defense—now the Department of War (DOW)—"maintains a disjointed and fragile supply chain and logistics system that does not ensure a posture of sustainable resilience internally, let alone with allied nations."¹³

Uncertainty is everywhere we turn. Russia is emboldened by its invasion of Ukraine. Unrest continues in the Middle East. China, perhaps the greatest looming threat, is growing its arsenal of ships, missiles, and aircraft and is constantly pushing to expand its influence. Given the challenges we will face from

our capable peer adversaries, we need real solutions to improve our access to global medical resources. The following are several actions we can pursue that would enable our combined and joint forces to operate more efficiently and would effectively mitigate our medical supply chain risks by promoting flexibility and resiliency.

Building a Resilient, Flexible Medical Supply Chain

We have established that medical materiel is essential in the next conflict, but we have a precarious supporting supply chain. One of the hardest problems is addressing the large percentage of active pharmaceutical manufacturing occurring in China, which supports the entire globe. This article will not seek to answer that question directly but will look at the issue of moving medical materiel to the point of conflict and maintaining sufficient stockage.

In a 2022 speech to a Washington think tank, Marine Corps Assistant Commandant General Eric M. Smith used the term *expeditionary foraging* to describe "contracting with local merchants and vendors to supply disaggregated forces with goods and services that cannot be supplied by sealift or stockpiled because of the need to preserve mobility."¹⁴ He emphasized that this is something that the U.S. military currently does in the Philippines to procure vehicles, food, or water for large exercises. While our logistics commands are needed to provide forward support, "[w]e can't build 'iron mountains' [of munitions and supplies] anymore."¹⁵ Although his talk was not focused on medical materiel, the same issues are present. The ability to procure from partner nations reduces our need to build "iron mountains."

Take a Page from the Defense Logistics Agency's Energy Playbook

The Defense Logistics Agency (DLA) has recognized the need for steady and predictable access to fuel resources globally. To meet the demands of the operational forces, DLA—through its

DLA Energy program—has been active in developing contracts that lay the foundation for rapid sourcing of bulk petroleum supplies worldwide. The DLA website describes the program as "the single source for drafting, negotiating, concluding, and amending international fuel agreements with foreign governments supporting worldwide [Department of War] operations."¹⁶

This active engagement has created a network of readily accessible fuel stores that can be quickly contracted to ensure we have the necessary access to Class III supplies (petroleum, oils, and lubricants) to support our deployed units. As we look at global sourcing for Class VIII supplies (medical materiel), we have an opportunity to develop similar support. To that end, DLA should direct a similar effort to identify international medical consumable distributors and establish a network of sourcing solutions for medical consumables as well.

Currently, all of DLA's medical readiness contracting is sourced from FDA-approved companies in the United States. If we suddenly found ourselves at war, DLA would activate Medical Contingency File contracts (joint time-phased contracts to remedy shortfalls in "go-to-war" medical materiel), which require that manufacturers and distributors use existing commercial inventories to support the critical go-to-war requirements. Although this access is wonderful, we may be inadvertently creating a distribution burden by being limited to domestic suppliers. Medical supplies will likely need to compete for lift with other wartime requirements, such as unit deployments and movement of fuel and munitions. Although this is an established process that should still be supported, we should expand the scope and reach of those contingency contracts to include foreign vendors and distributors that could also fill orders for similar supplies, particularly vendors that are already in or near our expected area of operations.

For other classes of supplies, our operating forces have normalized and experimented with the concept of expeditionary foraging.¹⁷ It is

commonplace for units to contract for local food and water (Class I supplies) while conducting operations and exercises. As mentioned earlier, contracts for bulk fuel (Class III supplies) are routinely activated to support exercise execution. Building materials (Class IV supplies) for rapid battlefield repair and construction are typically bought locally. However, medical consumables have some key differences that make this same management strategy more complex. Perishability, regulatory barriers, and patient safety issues all require additional safeguards. That said, although this makes the sourcing of foreign medical materiel more difficult, it does not make it unachievable, and we should still pursue this line of effort to ensure a diverse and flexible sourcing solution for medical materiel. Developing safe and reliable contingency contracting solutions for foreign Class VIII supplies (medical materiel) would provide valuable optionality that we could leverage to support large-scale combat operations.

Reduce Regulatory Barriers by Creating Operational Exceptions to Restrictions on Medical Procurement

Most units under DOW can legally expend operations and maintenance funding to procure only FDA-approved medical equipment and consumables. DLA, serving as the Medical Materiel Executive Agent for DOW, “will not purchase non-FDA approved products with Defense Working Capital Funds, appropriated funds, or any other government funds,” as stated in DODI 5101.15, *DOD Medical Materiel Management*.¹⁸ Furthermore, DODI 6200.20¹⁹ contains additional provisions that interpret the application of FDA rules to DOW’s Defense Force Health Protection Programs. Both policies impose severe restrictions on the ability of the operational forces to procure foreign medical consumables.

There is good reason for this. Medical care is inherently risky, and robust Federal laws and regulations that protect the quality of care for our Servicemembers

should remain a high priority. However, in austere environments and remote locations, we should expect that resources will be constrained and units may need to leverage local supply chains. Additionally, there are countries that have health care and medical regulating agencies that are on par with U.S. standards. The irony is that although we cannot purchase their medical supplies, nothing restricts us from routinely seeking treatment in their hospitals where our Servicemembers are treated with those same materials.

The WHO maintains a list of countries that have “stringent regulatory authorities” (SRAs), considered to be on par with FDA standards. While the WHO is transitioning to a new framework—WHO-Listed Authorities—the classic SRA definitions remain. In 2022, 36 countries were on the list of SRAs. Our ability to create reciprocal procurement authorities with these trusted allies is a key step in making our supply chains more resilient while reducing the logistical burdens associated with moving and sustaining medical materiel.

The good news is that we have already witnessed a situation where a competing global demand for medical materiel has led to exceptions from FDA procurement restrictions. The COVID-19 pandemic made the public aware of the FDA’s ability to issue emergency use authorizations and expedited the rapid distribution of vaccines. The bad news is that generally there is no ability for units on active deployment during steady-state operations to rehearse this procurement process, identify local vendors, make payment arrangements, and coordinate distribution. Simply put, we are not practicing how we expect to play the big game.

The reality of executing large-scale combat operations in a future contested environment will almost certainly result in logistical constraints that challenge our procurement and distribution of medical supplies. We must strike a balance between wartime readiness and steady-state risk reduction. To maximize the flexibility and optionality for unit commanders, we should consider two possible solutions.

First, we should create limited steady-state exemptions from Federal laws and regulations by establishing reciprocal agreements with countries that meet or exceed FDA standards. By providing this authority in peacetime, we can exercise and validate procurement strategies and conduct the detailed work that will enable this critical access during wartime. By expanding our ability to procure medical consumables with our strongest allies and partners—such as the United Kingdom, France, Germany, Japan, and Australia—we can help to promote resource-sharing for a critical class of supplies. This authority also allows us the ability to build the demand signal now. Because of the cost of holding materiel and concerns with shelf life, much of the world works on “just in time” inventory management. Our demand signal in war would represent an immediate demand that would likely far outstrip the supply of even our largest allies. Having the authority to procure and pre-position *now* would allow us to build demand to ensure that our partners’ supply chain can support us.

Second, we should deliberately “bake in” wartime emergency use authorities into our major wartime operational plans. In 2017, Congress took action by passing an amendment to section 564 of the Federal Food, Drug, and Cosmetics Act.²⁰ This amendment provides specific emergency use authorizations to support wartime operations. However, this authority requires the Secretary of Defense (now the Secretary of War) to formally submit a request to the Secretary of Health and Human Services to officially grant these exemptions. This could be a time-consuming process and may require extensive high-level coordination at a time when our attention may be focused on more pressing matters. The opportunity here lies in pre-coordinating this exemption authority between DOW and the Department of Homeland Security and tying it to the phasing plans for our major operations plans. As we receive indications and warnings of an impending crisis/conflict and our commanders begin to “run the playbook,” we can add this tool to our matrix of authorities and immediately take the handcuffs

off of our logistics managers to allow them to begin procuring from additional global sources of supply.

Support U.S. Efforts to Reduce Dependence on Foreign Pharmaceuticals

Our dependence on foreign medical consumables introduces a tremendous risk to our operational forces and to U.S. public health at large. DOW should encourage lawmakers in Congress and the executive branch to increase our medical supply chain resilience. The aforementioned 2021 report by Duke University's Margolis Center for Health Policy (titled *Supporting Resilient Drug Supply Chains in the United States: Challenges and Potential Solutions*) advocates

for several solutions to increase resilience, such as improving financial incentives (subsidies and tax incentives) for manufacturers, streamlining regulatory pathways to modernize production, and promoting supply chain transparency to enable stronger oversight and market competition.²¹

As manufacturers of medical consumables weigh profits versus losses, and as companies aggressively minimize their expensive on-hand inventories of supplies, the market has understandably lost its elasticity to respond rapidly to changing events. If we desire the ability to quickly respond to unforeseen events, we must make meaningful policy interventions that can increase our domestic supply chain resilience.

Invest in Pre-Positioned Medical Consumables Stocks

Unlike with other classes of supplies, the pre-staging of medical resources in foreign countries is relatively noncontroversial. This could be especially true if that resource were funded in collaboration with the Department of State. The same medical equipment and supplies that can be useful in supporting humanitarian assistance and disaster recovery can also have a dual purpose of serving the requirements for wartime casualty care. By conducting targeted global health engagements and investments in Class VIII supplies (medical materiel) in partnership with the Department of State, we may have an opportunity to invest in foreign pre-positioned stores. Imagine



A U.S. Navy Corpsman with Combat Logistics Battalion 8, Combat Logistics Regiment 2, 2nd Marine Logistics Group, provides medical treatment to a simulated casualty during the Technology Operational Experimentation Event 25.1 at Marine Corps Base Camp Lejeune, North Carolina, May 11, 2025. Office of Naval Research Global Experimentation and Analysis, partnered with Marine Corp Warfighting Lab, planned and executed the event focused on evaluating emerging technologies to enhance battlefield medical response, improve the speed and effectiveness of tactical combat casualty care, and increase survivability in austere environments. (U.S. Marine Corps photo by Cpl. Meshaq Hylton)

a scenario where a typhoon devastates the Northern Luzon area of the Philippines and local hospitals need medical supplies—simply have the Department of State open the warehouse and start issuing. Now imagine that war has broken out and U.S. forces in the same region are taking casualties from missile strikes; similarly, have DOW open the warehouse and start issuing.

Treatment of trauma requires rapid stabilization, surgery, and blood products. Treatment of diseases requires sustained treatment of infections, chronic care, vector-borne illness management, and prevention. Care of trauma and disease will likely strain our supply chains differently, and we expect to face both in the event that we are conducting large-scale combat operations in an austere, forward-deployed environment. As we shape our strategies for global pre-positioning networks, the key is being prepared for both and pre-staging these resources today—in peacetime—to build and strengthen a broadly resilient supply chain that meets the demands of tomorrow. In addition, we should also rehearse the deployment of stocks of global pre-positioning networks during joint and combined exercises with our allies and partners. This would allow us to rehearse distribution under pressure, provide an opportunity to maintain our inventory, and even leverage artificial intelligence and advanced analytics to support predictive logistics. Every pallet of Class VIII supplies (medical materiel) that we can successfully pre-stage forward gives us the opportunity to increase the speed of our medical capability response and results in a lift savings for U.S. Transportation Command at a time when it may need it most.

It should also be noted that we also may derive other benefits from increasing our response capability for humanitarian assistance and disaster recovery. This investment can also increase our future access and collaboration with our allies and partners. The trust and cultural understanding that are produced from this kind of preparedness and response can open doors

to future operational interactions and increase the likelihood of access, basing, and overflight authorizations when needed for crisis or conflict. Global health engagement and investment in Class VIII supplies is not the solution to all our problems, but supporting these efforts yields strategic value, which may be more important than the tactical logistical benefits.

Expand Establishment of Wartime Host Nation Support Programs

Those with experience in the Korean theater may have come across the Wartime Host Nation Support program, which is in effect “during armistice (peacetime), crisis, hostilities, or war.”²² Since the advent of the program in 1992, the Korean theater of war has had a robust policy for how U.S. forces can leverage local resources to support combined operations. This policy includes guidance for a broad range of support and services including communications, engineering, field services, mortuary affairs, ammunition storage, bulk petroleum, and of course Class VIII supplies (medical materiel) and access to hospital beds.

Looking globally, we are lacking Wartime Host Nation Support program agreements that clearly define support and services with our allies and partners. With regard specifically to hospital access, it is crucial to have a formal framework that defines how U.S. forces would access host-nation facilities in wartime. The Royal Darwin Hospital in Australia’s Northern Territory and St. Luke’s Medical Center in downtown Manila both serve as examples of major medical infrastructure that supports our joint forces in steady state. What is not clear is how those same facilities could be utilized in the event of war. Can we openly send our U.S. casualties to either of these facilities? What capacity can we plan to utilize? How can we streamline or standardize the process of obtaining clinical privileges for our medical staff so they can be part of an integrated care team? What about coordination of return to duty for those recovering, or medical evacuation for those needing to return to

the United States? These are the detailed planning questions that can be answered by establishing a formal Wartime Host Nation Support policy.

Prioritize Blood-Sharing Standardization with Partner Nations

For critically wounded patients, receiving blood or blood products is a critical factor in survivability. Blood and blood products are also among the most difficult items to manage from a supply chain perspective, as their shelf life can be measured in days and they are extremely temperature sensitive.²³ Realizing this, DOW has initiated blood-sharing agreements with several of our partners and allies.²⁴

Unscreened blood is obviously very risky and could result in adverse outcomes if there is type incompatibility or transmission of blood-borne pathogens (such as HIV or hepatitis). For this reason, we want to be sure that blood products we use are of the highest quality. To that end, DOW and the FDA are evaluating strategic partner nations’ quality assurance programs, including analysis of their blood transportation and the electric grid that supports storage. This is an important step toward providing alternate sourcing options for these critical Class VIII supplies (medical materiel) to ensure that they are available when needed most.

The advancements of blood-sharing agreements should be utilized as a blueprint for the other side of Class VIII—medical consumable supplies and equipment. If we can study the ability to use an invasive product like blood from our partner nations, we can do the same for less invasive products or potentially look at those countries’ equivalents of our FDA to gain a broader reciprocity between approving agencies. Opening this avenue will allow us to diversify our supply chain and begin to build demand in the partner nations in which we operate, either through routine use during bilateral exercises or via the pre-positioning of medical materiel. It is critical that we build out this process in peace so that these supplies are ready in a potential conflict.



U.S. Marine Corps Cpl. Timothy Dobson takes doxycycline, used to prevent malaria, once a day in accordance with a weekly dosage of mefloquine, also an antimalarial, April 23, 2011, in Toubakouta, Senegal. (U.S. Marine Corps photo by Lance Cpl. Timothy L. Solano)

Conclusion

History has shown us that medical supply chain risk is a real threat that can have a tremendous impact on our operational forces. Our combined and joint forces need to create and enable a Class VIII supply network in partnership with our allies and partners that provides commanders with optionality, flexibility, and resiliency.

Unfortunately, our current status quo is not positioning us to meet the demands of the future fight. Our government leaders in the executive and legislative branches must dedicate time and effort in steady state to increase the authorities, investments, and international agreements that will increase our ability to sustain our forces in the forward operating environment. Although there are promising signs on the horizon, such as our pending blood-sharing agreement

with the United Kingdom, Australia, and Canada, we are not moving at the speed of relevancy. There is simply too much at stake to continue admiring this problem; now is the time for action. The United States must do more to improve this situation now, while there is still time to act. JFQ

Notes

¹ Hunter D. Bechtold et al., "From World War II to COVID-19: A Historical Perspective on the American Medical Supply Chain," *Disaster Medicine and Public Health Preparedness* 16, no. 5 (2021): 1719–20, <https://doi.org/10.1017/dmp.2021.94>.

² Coreen M. Beaumier et al., "United States Military Tropical Medicine: Extraordinary Legacy, Uncertain Future," *PLOS Neglected Tropical Diseases* 7, no. 12 (2013): Table 1, <https://pmc.ncbi.nlm.nih.gov/articles/PMC3873258/>.

³ Quoted in Beaumier et al., "United States Military Tropical Medicine."

⁴ Bechtold et al., "From World War II to COVID-19," 1719–20.

⁵ Ana Faguy, "TV Fluid Supplies in U.S. Disrupted by Hurricane Helene," BBC, October 4, 2024, <https://www.bbc.com/news/articles/cz04nl32e7yo>.

⁶ Seth G. Jones and Riley McCabe, *Russia's Grinding War in Ukraine: Massive Losses and Tiny Gains for a Declining Power* (Washington, DC: Center for Strategic and International Studies, January 2026), <https://www.csis.org/analysis/russias-grinding-war-ukraine>.

⁷ "About U.S. PACOM," U.S. Pacific Command, accessed August 5, 2026, <https://www.pacom.mil/About-US-PACOM/>.

⁸ Eric Halsey, ed., *CDC Yellow Book 2026: Health Information for International Travel* (New York: Oxford University Press, 2025), <https://www.cdc.gov/yellow-book/hcp/travel-associated-infections-diseases/malaria.html>.

⁹ WHO, "Dengue: Global Situation," December 21, 2023, <https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON498>; WHO, "Western Pacific: Latest Situation Reports [on Dengue]," accessed April 27, 2026, <https://www.who.int/westernpacific/wpro-emergencies/surveillance/dengue>.

¹⁰ "Gaps in the Global Medical Supply

Chain,” in *Impact of the Global Medical Supply Chain on SNS Operations and Communications: Proceedings of a Workshop* (Washington, DC: National Academies Press, 2018), <https://www.ncbi.nlm.nih.gov/books/NBK525655/>.

¹¹ *Drug Shortages: Root Causes and Potential Solutions* (Silver Spring, MD: U.S. Food and Drug Administration, 2019), <https://www.fda.gov/drugs/drug-shortages/report-drug-shortages-root-causes-and-potential-solutions>.

¹² Stephen Colvill et al., *Supporting Resilient Drug Supply Chains in the United States: Challenges and Potential Solutions* (Durham, NC: Duke University Margolis Institute of Health Policy, 2021), <https://healthpolicy.duke.edu/publications/supporting-resilient-drug-supply-chains-united-states>.

¹³ Paula C. Lodi et al., “Treating Medicine as Ammunition: Enhancing Medical Logistics for Large-Scale Combat Operations,” *Military Review*, July 2025, <https://www.armyupress.army.mil/Journals/Military-Review/Online-Exclusive/2025-OLE/Medicine-as-Ammunition/>.

¹⁴ Richard R. Burgess, “Marine Gen. Smith: ‘Expeditionary Foraging’ a Component of Light, Mobile Logistics,” *Seapower*, June 15, 2022, <https://seapowermagazine.org/marine-gen-smith-expeditionary-foraging-a-component-of-light-mobile-logistics/>.

¹⁵ Burgess, “Marine Gen. Smith,”

¹⁶ Defense Logistics Agency, “Bulk Petroleum Services,” accessed April 27, 2026, <https://www.dla.mil/Energy/Services/Bulk-Petroleum-Services/>.

¹⁷ Peter Thermos and Angel Maldonado, “21st Century Foraging,” *Marine Corps Gazette*, March 2021, <https://www.mca-marines.org/wp-content/uploads/50-21st-Century-Foraging.pdf>.

¹⁸ Department of Defense Instruction 5101.15, *DOD Medical Materiel Management* (Washington, DC: Department of Defense, 2023), <https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/510115p.pdf>.

¹⁹ Department of Defense Instruction 6200.02, *Application of Food and Drug Administration (FDA) Rules to Department of Defense Force Health Protection Programs* (Washington, DC: Department of Defense, 2008), <https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/620002p.pdf>.

²⁰ *An Act to Amend the Federal Food, Drug, and Cosmetic Act to Authorize Additional Emergency Uses for Medical Products to Reduce Deaths and Severity of Injuries Caused by Agents of War, and for Other Purposes*, Pub. L. No. 115-92 (2017), <https://www.congress.gov/115/plaws/publ92/PLAW-115publ92.pdf>.

²¹ Colvill et al., *Supporting Resilient Drug Supply Chains in the United States*.

²² United States Forces Korea Regulation 550-52, December 2, 2008, <https://www.usfk.mil/Portals/105/Documents/Publications/Regulations/USFK-Reg-550-52-Wartime-Host-Nation-Support.pdf>.

²³ “Blood Components,” American Red

Cross, accessed April 27, 2026, <https://www.redcrossblood.org/donate-blood/how-to-donate/types-of-blood-donations/blood-components.html>.

²⁴ Patty Nieberg, “Blood Brothers: In the Pacific, U.S. Medics May Soon Use Blood from Allies,” *Task & Purpose*, November 6, 2023, <https://taskandpurpose.com/history/blood-agreements-china-allies/>.



U.S. Army Soldiers assigned to the 62nd Medical Brigade participate in a field training exercise, coordinating the movement of blood supplies during medical operations at Joint Base Lewis-McChord, Washington, Jan. 30, 2026. (U.S. Army photo by Spc. Fabian Jones)

Advancing Blood Production and Distribution

Leveraging AI in the Expeditionary Care Environment

By Andrew Hall, Michael Carrillo, Garrion Jackson, Jennifer H. Hall, and Ryan Comes

Blood is critical to casualty care, and managing the blood supply chain in expeditionary environments

presents unique logistic challenges, especially in nonpermissive environments. Ensuring the availability of blood

in resource-limited, remote settings far from established medical infrastructure requires sophisticated coordination.

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Unique aspects of its supply chain include the acquisition of blood, precise identification of the blood needed, and the viability of the product over time. Since blood must be donated rather than manufactured, it requires a dedicated effort to replenish existing supplies. Recipients have varied blood types, and only a few are universally compatible, which increases the need for precise metrics on expected use. Given that blood is subject to strict temperature requirements and a limited shelf life, time becomes a vital component to the supply chain. While the combatant commands each manage blood in distinct environments, they share a common goal of ensuring that they have sufficient supply on hand delivered rapidly to personnel in the field who require it. This common goal demands that each combatant command be able to maximize product availability and remaining shelf life within the expeditionary environment.

The blood supply chain is an interagency effort in which the synchronization of various agencies can affect the speed and accuracy of delivery. The production, transportation, and delivery of blood involve multiple agencies, all prioritizing successful delivery in expeditionary settings. For example, the U.S. Food and Drug Administration approves blood products collected by the Armed Services Blood Program at federal installations. Once approved, the blood is transported to various locations worldwide and used by the Department of War (DOW), Department of State, and other agencies to treat eligible hemorrhaging patients.

The most in-demand blood product in military settings is low-titer type O whole blood (LTOWB) because of its near-universal compatibility with potential recipients. Whole blood is generally preferred for trauma-related resuscitation because it reduces the volume of blood needed for treatment and leads to better clinical outcomes.¹ LTOWB is especially valuable because it is universally compatible, meaning it can be given to any patient regardless of the patient's blood type. In contrast, other types of whole blood are type-specific and must be matched to the recipient's blood type

(for example, type A blood can be given only to a patient with type A blood). Currently, LTOWB has a maximum shelf life of 35 days from collection. Delivery of the product takes time, and any delays in delivery can reduce the remaining shelf life at the point of use, which increases the need for precise and efficient delivery.

Given blood's critical importance and limited supply, it must be allocated judiciously to areas of potential need. Currently, at a time of relative peace, there is a twofold timing problem. First, as lack of continuous need in the field has resulted in sporadic use, the amount of blood expiring on shelves has increased. Second, at the same time, combatant commands have faced unmet requests because of supply shortfalls. Second, combatant commands have faced unmet requests because of supply shortfalls.² This amplifies the need to have increases in precision and accuracy in the timing of the acquisition of blood (donations) relative to the delivery at the point of need in the field. Because a blood donor can safely donate only every 56 days, donations made during periods of surplus are at risk of being wasted. As donations decrease because of a perceived surplus, by the time donations resume, the

product has expired—placing the supply in a deficit. These challenges highlight opportunities for improvement as the military prepares for future conflicts.

Combatant Command Portion of the Blood Supply Chain

In conjunction with the challenges of acquisition and shelf life, the blood supply chain is further complicated by the nature of the point of delivery: austere, contested environments. Delivery from the United States to combatant command areas of responsibilities is relatively simple compared to delivery *within* an area of responsibility. The expeditionary medical environment is characterized by austerity. In the expeditionary environment, limited resources are available, and all actions support the operational mission.³ At forward positions, the resources to care for both traumatic and nontraumatic injuries are limited in comparison to in-garrison environments. Additionally, medical supplies compete for space with other essential military supplies like ammunition and food, adding another layer of logistic complexity.

Blood products hold a special status in supply prioritization because of their



A U.S. Army HH-60M Black Hawk MEDEVAC helicopter and aircrew assigned to C Company, 2nd Battalion, 4th General Support Aviation Battalion, conduct a medical evacuation flight to retrieve blood within the U.S. Central Command area of responsibility, December 21, 2025. (U.S. Air Force photo by Tech. Sgt. Drew Schumann)

Table 1. Summary of key applications and benefits in blood management

Application	Description	Potential Use Case in Blood Management
Supply Chain and Logistics	AI enhances the supply chain by predicting demand, managing inventory, and optimizing logistics.	Digital twins simulate blood distribution to optimize delivery based on predictive needs.
Automation and Efficiency	AI automates tasks, reducing manual efforts and improving accuracy in blood management.	UAVs** autonomously deliver blood to remote or high-risk areas, guided by real-time data from digital twins.
Tracking and Monitoring	RFID* and digital twins enable real-time tracking of blood supplies, monitoring location, temperature, and other critical parameters.	RFID tags integrated with digital twins allow real-time blood storage and transport monitoring, reducing spoilage.

*RFID = radio-frequency identification.

**UAV = unmanned aerial vehicle.

Source: Compiled by the authors.

critical role in resuscitating hemorrhaging patients. Unlike other war reserve materiel, blood cannot be forward-staged far in advance of a crisis or conflict and must therefore be constantly transported into theater. The process of collection, testing, and shipment to a distribution point in an area of responsibility takes time and consumes usable shelf life outside the utilization area. Ideally, handling time before delivery would be minimized to maximize the remaining shelf life at the point of use. Yet even with special status, blood must compete for transportation resources that could be used for other military operations.

During the conflicts in Iraq and Afghanistan, the blood supply chain

flowed when the United States maintained air supremacy, allowing direct access to forces in any location. In addition, there were long periods of relatively low-intensity combat operations where the simultaneous need for blood supply was limited. In the future, the military is expected to operate in nonpermissive environments where aerial access is limited and even at times denied. Under the operating concept of agile combat employment in large-scale combat operations (LSCO), the forces are more distributed and operate out of more austere base conditions. With fewer fixed locations that have the requisite facilities and equipment needed to store blood, the resiliency of the blood chain is

uncertain compared to the experiences in Iraq and Afghanistan.⁴ The introduction of mobility into the supply chain can saturate mental models with data, resulting in human errors. Improved information processing would minimize handling time and maximize remaining shelf life at the point of usage.

Innovative solutions are needed to address the unpredictability of demand and the logistic challenges of storing and transporting blood to combat zones. One promising innovation is artificial intelligence (AI). AI has already transformed industries such as healthcare, pharmaceuticals, and food logistics, and its potential application in blood management is gaining attention.⁵ This article explores how AI can help create a more efficient blood production and distribution system, improve utilization, and extend shelf life in expeditionary settings (see table 1).

Artificial Intelligence

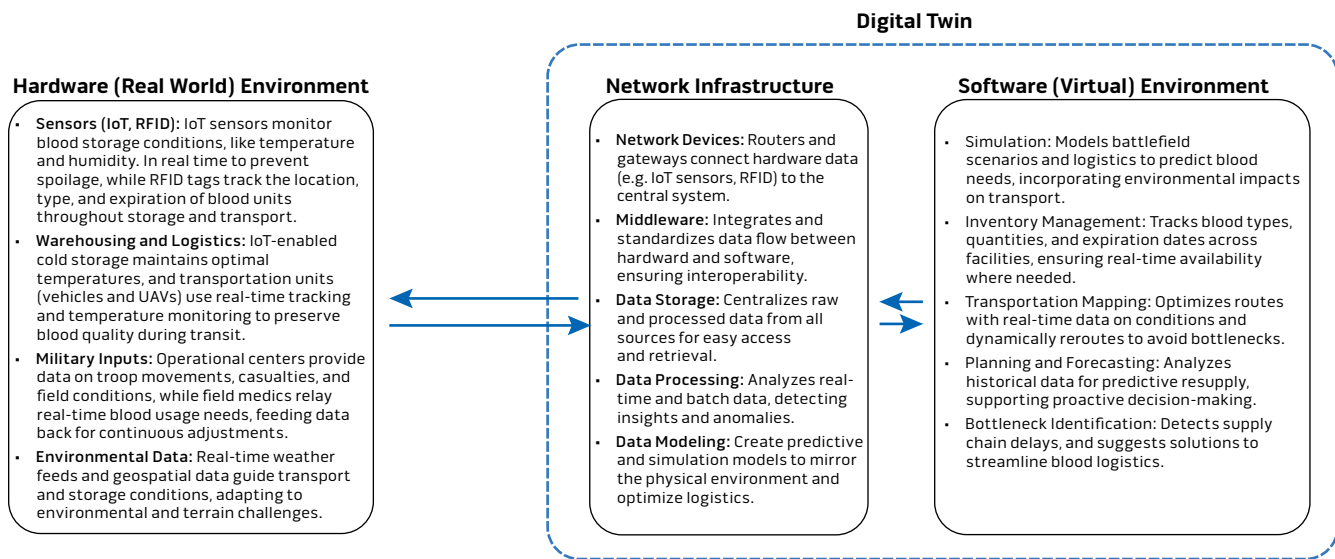
AI refers to the science and engineering of creating machines capable of intelligent processes.⁶ In this context, intelligence involves the computational aspect of achieving objectives in the physical world. Because there are multiple forms of intelligence, various types of AI and underlying technologies are required to make them function effectively (see table 2). Different types of AI can be applied to address discrete problems. At the core of AI is

Table 2. Examples of types of artificial intelligence technologies in blood management

AI Technology	Purpose	Areas of Use	Potential Use Case in Blood Management
Machine Learning (ML)	Automate the learning process by enabling systems to learn from data without explicit programming.	Predictive analytics, demand forecasting, and supply chain optimization	ML predicts blood supply needs based on casualty rates, troop movements, and historical data.
Deep Learning	Utilize neural networks with multiple layers to analyze complex data sets, such as images, speech, and text.	Image and voice recognition, pattern detection, and medical diagnostics	Deep learning helps predict optimal blood usage during emergencies.
Reinforcement Learning (RL)	AI learns from feedback to optimize actions over time through trial and error.	Autonomous vehicles, decisionmaking, robotics	RL can continuously improve blood distribution strategies based on battlefield feedback.
Edge AI	AI processes data at the network's edge, close to data sources, for real-time decisionmaking.	Real-time monitoring and remote sensing	Edge AI processes data from sensors on blood storage units, ensuring real-time alerts for temperature changes.
Generative AI	AI systems generate new data or content based on learned patterns.	Content creation, simulation, and training models	Generative AI simulates battlefield scenarios to optimize blood logistics strategies before deployment.

Source: Compiled by the authors.

Figure 1.



Source: Authors.

the data it relies on to make initial decisions and learn over time. While AI is not expected to make decisions independently, it serves as decision support for humans. AI can quickly analyze vast amounts of data without emotional bias, enhancing human decisionmaking through improved information processing.

Key AI Applications in Blood Management

1. Predictive Analytics for Blood Supply Needs

One of AI's most promising applications in blood management is its ability to predict blood needs by analyzing troop movements, historical casualty data, and other operational conditions. Traditional supply chain management is often reactive, responding to immediate demands, or, when anticipatory, highly inefficient because of the excessive supply allocated to account for uncertain needs in remote areas. AI can transform this approach by analyzing vast datasets to forecast where and how much blood will be required. This ensures that appropriate quantities of blood are positioned at suitable locations, optimizing allocation and improving utilization rates.

A critical emerging concept to enhance predictive capabilities is the

digital twin (figure 1).⁷ In military blood management, a digital twin could simulate the real-world environment of battlefields, bases, or medical facilities in real time.⁸ It is a live virtual model of the physical environment, kept synchronized through a continuous stream of real-time data, that planners can use to test decisions before acting. The model captures variables such as weather, troop movements, casualty rates, and resource availability. A digital twin can predict blood needs at various locations under different conditions by modeling different operational scenarios. For example, if a military unit prepares for a major operation in a remote area, the digital twin could simulate expected casualty rates, operational tempo, and environmental challenges, such as difficult terrain or severe weather. AI would then use this simulation to forecast blood demand, determine where it should be stored, and identify the optimal supply routes for timely delivery.

AI-driven predictive models have already shown success in health care and pharmaceutical supply chains, forecasting the need for medical supplies, medications, and equipment. By learning from historical patterns and integrating real-time data, AI can reduce the risk of shortages or overstocking,

enhancing the overall efficiency of supply chains.⁹ These models optimize inventory by ensuring that resources are available when and where needed, an approach that can be seamlessly applied to military blood logistics.

2. Managing Blood Transportation

AI can quickly and continuously analyze data that a human would find difficult to process. In military blood logistics, AI systems can optimize transport routes by considering environmental and logistical factors while accounting for blood products' temperature and shelf life. In food and health care logistics industries, AI-powered solutions dynamically adjust routes based on real-time traffic, weather, and operational constraints, significantly reducing delays.¹⁰ Similarly, AI can prevent blood spoilage in military settings by adjusting routes in response to road conditions, geographical challenges, or hostile activity. When integrated with technologies such as RFID and UAVs, AI-driven route optimization can ensure safe and timely delivery of blood products. This integration is expected to minimize delays, preserving more of the blood's shelf life at forward locations.

Radio-frequency identification (RFID) is a technology that provides real-time data to support AI-driven



U.S. Soldiers assigned to the 703rd Brigade Support Battalion, 2nd Armored Brigade Combat Team, 3rd Infantry Division conduct a blood transport exercise as part of Spartan Focus at Fort Stewart, Georgia, February 14, 2026. (U.S. Army photo by Staff Sgt. Anthony Herrera)

decisionmaking. When combined with passive RFID tagging for each unit of blood, AI systems can track blood type, expiration date, and location in real time.¹¹ By analyzing data from RFID systems, AI can further enhance efficiency by predicting usage patterns and dynamically reallocating blood supplies to areas of higher demand, especially during kinetic events.¹² This approach reduces waste, streamlines the supply chain, and ensures that blood reaches the areas of greatest need with minimal delay.¹³

Unmanned aerial vehicles (UAVs) have demonstrated their potential to quickly deliver medical supplies to remote or hard-to-reach areas, overcoming logistic challenges posed by damaged infrastructure or hostile environments. By integrating AI into UAV operations, frontline medical providers can receive accurate delivery estimates. At the same time, logisticians can increase delivery frequency and maximize the shelf life of supplies at forward locations. Small UAVs, as well as unmanned surface vehicles (USVs) or autonomous surface vehicles (ASVs), may also be able to penetrate complex air defense systems, giving them access to locations otherwise cut off from traditional mobility platforms from air and sea. Efficient unmanned vehicle management will be even more critical

during LSCO, when traditional resupply routes may be more limited.

Finally, integrating AI into military supply chain management can optimize route planning and resource allocation by factoring in troop movements, casualty risks, and available infrastructure. This real-time adaptability reduces logistic bottlenecks and delays, ensuring that blood and other medical supplies reach the units with the greatest need.¹⁴ By combining RFID, unmanned vehicles, and AI, the military can develop a fully optimized, data-driven blood logistics system that maximizes blood viability, minimizes waste, and delivers life-saving supplies precisely where and when they are needed most.

3. Improving Blood Storage Logistics

Blood storage logistics in dynamic environments, such as combat zones, require constant monitoring of inventory levels, expiration dates, and storage conditions. Manually managing these variables is inefficient and prone to error, often resulting in blood wastage and unmet demand. AI can improve the efficiency of blood storage logistics by tracking real-time inventory and predicting when supplies need replenishment. Logisticians and blood producers can then use AI-driven

decision support to optimize production and delivery, maximizing blood utilization in expeditionary settings.

The pharmaceutical industry has successfully implemented AI-driven logistics systems to track the expiration of sensitive products and optimize distribution channels. AI and automation in pharmaceutical logistics have proven essential in delivering medications before expiration, reducing waste, and improving overall reliability.¹⁵ These same principles can be applied to military blood management. AI can monitor inventory in real time, minimizing wastage by ensuring blood products are distributed to areas of high demand before expiration.

Blockchain technology and RFID can be integrated with AI systems to enhance transparency and traceability in blood supply chains, though they serve different roles. As an Internet of Things (IoT) device, RFID tracks each blood unit's real-time physical movement and status, while blockchain provides a secure, decentralized system for recording and verifying this data. By analyzing RFID data with AI, every unit of blood can be monitored from donor to end use, reducing the risk of mismanagement or loss. Blockchain and AI have already improved traceability in industries such as food and pharmaceuticals, enhancing transparency

and operational efficiency.¹⁶ In military operations, integrating AI with real-time storage data and blockchain ensures complete visibility over blood inventory, preventing losses due to miscommunication or logistic errors.

Real-time tracking and AI-based predictive algorithms can forecast blood demand and align production accordingly. By integrating data from various locations, considering historical trends, and factoring in logistic constraints, AI can recommend optimal production targets for blood producers. AI's role in predictive analytics has already been proven in other sectors, such as organ transplantation, where it has improved the forecasting of organ demand based on patient data and environmental factors. Applying this approach to military blood logistics could ensure the right amount of blood is available at the

right time and place, reducing shortages and excess inventory.

4. Expanding the Donor Pool and Optimizing Donations

AI has significant potential to optimize donor recruitment and expand the pool of eligible donors, thereby maximizing blood production. Blood donation is typically managed by local leadership teams at donor centers, with limited incentives offered to encourage participation. AI can revolutionize this process by analyzing donor data to identify patterns in donation behavior, optimizing donation windows, and personalizing incentives to boost turnout. By predicting the best times and locations for blood drives, AI can ensure that donation rates align more closely with demand, leading to more efficient blood production.

AI can help maximize donations of the most in-demand blood types. In organ donation systems, AI has successfully optimized donor recruitment by analyzing medical histories, geographic locations, and behavioral data to match donors with recipients.¹⁷ Similar applications can be adapted to blood donation systems. For example, AI could identify populations most likely to donate low-titer type O whole blood (LTOWB), the preferred blood type for military trauma resuscitation, and offer personalized incentives based on demographic and behavioral data. By leveraging predictive models and real-time data, AI can anticipate when and where eligible donors will be available, further optimizing donation campaigns.¹⁸

AI can improve the blood donor experience and encourage repeat donations by personalizing engagement strategies.

Sailors assigned to Naval Health Clinic Oak Harbor and tenant commands aboard Naval Air Station Whidbey Island participate in the culminating practical exercise of Tactical Combat Casualty Care (TCCC) training. (Defense Health Agency photo by Matthew D. Williams/Released)



Currently, incentives such as T-shirts, snacks, and patches are common but often follow a one-size-fits-all approach. AI can analyze past interactions and tailor incentives to specific populations, boosting donor engagement by offering rewards that align with individual motivations.¹⁹ For example, younger donors might respond better to social media recognition, while older donors may prefer health-related rewards like fitness trackers. Additionally, AI can analyze traffic patterns, donor wait times, and geographic factors to recommend optimal locations and times for blood drives, minimizing disruptions to donors' schedules. This technology has already proven successful in other sectors, such as organ donation and health care supply chains.²⁰

AI's ability to track and predict donor behavior over time enables the anticipation of fluctuations in blood donation rates and the adjustment of recruitment efforts accordingly. By leveraging big-data analytics to predict seasonal donation patterns, holidays, and other events that affect donor availability, AI can help military blood centers maintain a stable supply year-round.²¹ This reduces the risk of shortages during critical periods, ensuring that military units are always equipped with necessary blood supplies.

Limitations of AI

Despite AI's many potential benefits in logistics and supply chain management, its application in tactical decisionmaking within expeditionary environments remains limited. These environments are often chaotic, unpredictable, and marked by a wide range of injuries, making it difficult for AI to provide reliable clinical inputs in real time. In such settings, AI systems may struggle to match human medics' adaptability and nuanced judgment. Human intuition, adaptability, and experience often outperform AI in chaotic, resource-limited environments, particularly when quick and flexible responses are required.

Combat scenarios often involve complex wounds and medical conditions that require immediate, context-sensitive decisionmaking. While AI excels at analyzing large datasets and predicting

trends, it may struggle to process the wide range of unpredictable factors encountered in real-world combat. For example, AI's response to trauma and battlefield injuries may be limited because it cannot fully account for the environmental, emotional, and situational variables a human medic can assess. This limitation in clinical decisionmaking is further compounded by the extreme time pressures combat medics face, where the ability to assess and adapt quickly is critical to survival.

The lack of reliable infrastructure, such as internet connectivity and computational resources, may limit AI's effectiveness in these environments. Combat operations often occur in remote areas where medics and personnel may not have access to the technology or connectivity required to efficiently operate AI systems.²² While IoT and AI-driven health care systems have made significant strides in more stable settings, their dependence on connectivity and real-time data streams becomes challenging in combat zones, where such infrastructure cannot be guaranteed. AI programs may also be susceptible to cyber attacks either by disabling the capability or by corrupting data.

In resource-limited environments where conditions change rapidly, AI systems may struggle to provide the nuanced judgment and real-time adaptability required. This is particularly true in expeditionary settings, where medical conditions can deteriorate quickly, and preprogrammed AI responses may fall short. For example, AI systems trained on historical data might be unable to adjust to unforeseen combat injuries, environmental hazards, or shifting supply conditions in real time. In such situations, the human ability to make quick, informed decisions will likely remain superior to AI, mainly when rapid changes occur on the battlefield.

Finally, privacy and security concerns must also be addressed. While integrating blockchain and AI can enhance security and traceability in logistics systems, operational security in combat zones may still limit the deployment of these technologies. In military environments, the need for secure and protected

data is paramount, and the risk of AI systems being compromised in these settings is an ongoing challenge that must be carefully considered.

Conclusion

AI offers significant potential to enhance blood production and distribution as a decision-support tool for human decision-makers. Its proven success in health care and pharmaceutical supply chains demonstrates its ability to improve resource allocation and reduce inefficiencies. In the expeditionary environment, AI can help maximize blood product availability, optimize distribution, and extend shelf life. However, the limitations of AI in chaotic and unpredictable settings mean that human adaptability will remain crucial. Integrating AI into the blood production and distribution supply chain will better prepare the expeditionary force for future large-scale conflicts. **JFQ**

Notes

¹ Jonathan P. Meizoso et al., "Whole Blood Resuscitation for Injured Patients Requiring Transfusion: A Systematic Review, Meta-analysis, and Practice Management Guideline from the Eastern Association for the Surgery of Trauma," *Journal of Trauma and Acute Care Surgery*, no. 3 (2024): 460–70, <https://doi.org/10.1097/TA.0000000000004327>.

² Andrew B. Hall et al., "U.S. Central Command Military Blood Utilization Practices 2011 to 2020," *Journal of Trauma and Acute Care Surgery* 93, no. 2S Suppl 1 (2022): S30–S34, <https://doi.org/10.1097/TA.0000000000003628>.

³ Joint Publication 4-02, *Joint Health Services* (Washington, DC: Joint Chiefs of Staff, 2023), <https://www.jcs.mil/Doctrine/Joint-Doctrine-Pubs/4-0-Logistics-Series/>.

⁴ Brent Thomas et al., "Toward Resiliency in the Joint Blood Supply Chain," *RAND Health Quarterly* 8, no. 3 (2019), <https://www.rand.org/pubs/periodicals/health-quarterly/issues/v8/n3/09.html>.

⁵ Andrea Peloso et al., "Artificial Intelligence: Present and Future Potential for Solid Organ Transplantation," *Transplant International*, no. 35 (2022): 10640, <https://doi.org/10.3389/ti.2022.10640>; Brikash Pradhan et al., "IoT-Based Applications in Healthcare Devices," *Journal of Healthcare Engineering* (2021), <https://doi.org/10.1155/2021/6632599>.

⁶ Greg Allen, *Understanding AI Technology* (Washington, DC: Department of Defense Joint

- Artificial Intelligence Center), 2020, <https://apps.dtic.mil/sti/citations/AD1099286>.
- ⁷Yanhui Wei, “Machine Learning Applications for Prediction of Blood Transfusion and Survival in Acute Myeloid Leukemia,” *Blood*, no. 140 (2022): 2831–32, <https://doi.org/10.1182/blood-2022-164949>; Hi Jeong Kwon et al., “Development of Blood Demand Prediction Model Using Artificial Intelligence Based on National Public Big Data,” *Digital Health*, no. 10 (2024), <https://doi.org/10.1177/20552076231224245>; Ashini Pushmika, “Predictive Analytics for Blood Supply Chain Management and Data Security in Healthcare System,” in *2023 5th International Conference on Advancements in Computing (ICAC)* (Colombo, Sri Lanka: IEEE, 2023), 292–97, <https://doi.org/10.1109/ICAC60630.2023.10417194>; Walid Ben Elmir et al., “Smart Platform for Data Blood Bank Management: Forecasting Demand in Blood Supply Chain Using Machine Learning,” *Information* 14, no. 1 (2023), <https://doi.org/10.3390/info14010031>; Iqbal H. Sarker, “Deep Learning: A Comprehensive Overview on Techniques, Taxonomy, Applications, and Research Directions,” *SN Computer Science*, no. 2 (2021): 420, <https://doi.org/10.1007/s42979-021-00815-1>; V.B. Kovač et al., “The Why, What and How of Deep Learning: Critical Analysis and Additional Concerns,” *Education Inquiry* 16, no. 2 (2025), <https://doi.org/10.1080/20004508.2023.2194502>; Xiangkun He and Chen Lv, “Towards Safe Autonomous Driving: Decision Making with Observation-Robust Reinforcement Learning,” *Automotive Innovation*, no. 6 (2023): 509–50, <https://doi.org/10.1007/s42154-023-00256-x>; Qi Liu et al., “Decision-Making Technology for Autonomous Vehicles: Learning-Based Methods, Applications, and Future Outlook,” in *IEEE International Conference on Intelligent Transportation Systems* (Indianapolis, Indiana: IEEE, 2021), <https://doi.org/10.1109/ITSC48978.2021.9564580>; Jyothi Hariharan et al., “Real-Time Driver Monitoring Systems on Edge AI Device,” *ArXiv*, April 2023, <https://doi.org/10.48550/arXiv.2304.01555>; Robert A. Coombs, “AI Integration for Scenario Development: Training the Whole-of-Force,” *Military Review*, May 2024, <https://www.armyupress.army.mil/Journals/Military-Review/Online-Exclusive/2024-OLE/AI-Integration-for-Scenario-Development/>; Ping Yu, “Leveraging Generative AI and Large Language Models: A Comprehensive Roadmap for Healthcare Integration” *Healthcare* (Basel) 11, no. 20 (2023): 2776, <https://doi.org/10.3390/healthcare11202776>.
- ⁸Michael Grieves and John Vickers, “Digital Twin: Mitigating Unpredictable, Undesirable Emergent Behavior in Complex Systems,” in *Transdisciplinary Perspectives on Complex Systems*, ed. Franz-Josef Kahlen et al. (Cham, Switzerland: Springer, 2017), 85–113, https://doi.org/10.1007/978-3-319-38756-7_4; Fei Tao et al., “Digital Twin-Driven Product Design, Manufacturing and Service with Big Data,” *International Journal of Advanced Manufacturing Technology*, no. 94 (2018): 3563–76, <https://doi.org/10.1007/s00170-017-0233-1>; Aiden Fuller, “Digital Twin: Enabling Technologies, Challenges and Open Research,” *IEEE Access*, no. 8 (2020): 108952–71, <https://doi.org/10.1109/ACCESS.2020.2998358>.
- ⁹Jonas L. Vilas-Boas et al., “Convergence of Distributed Ledger Technologies with Digital Twins, IoT, and AI for Fresh Food Logistics: Challenges and Opportunities,” *Journal of Industrial Information Integration*, no. 31 (2023): 100393, <https://doi.org/10.1016/j.jii.2022.100393>; Peloso et al., “Artificial Intelligence,” 10640.
- ¹⁰Ashwani Kumar, “Managing Healthcare Supply Chain through Artificial Intelligence (AI): A Study of Critical Success Factors,” *Computers & Industrial Engineering*, no. 175 (January 2023): 108815, <https://doi.org/10.1016/j.cie.2022.108815>.
- ¹¹Grazia M. Speranza, “Trends in Transportation and Logistics,” *European Journal of Operational Research* 264, no. 2 (2018): 830–36, <https://doi.org/10.1016/j.ejor.2016.08.032>; Sai-Ho Chung, “Applications of Smart Technologies in Logistics and Transport: A Review,” *Transportation Research Part E: Logistics and Transportation Review*, no. 153 (2021): 102455, <https://doi.org/10.1016/j.tre.2021.102455>.
- ¹²Linda W. Dusseljee-Peute et al., “The Value of Radio Frequency Identification in Quality Management of the Blood Transfusion Chain in an Academic Hospital Setting,” *JMIR Medical Informatics* 7, no. 3 (2019): e9510, <https://doi.org/10.2196/medinform.9510>.
- ¹³Yusuff Hakeem and Zochios Vasileois, “Con: Artificial Intelligence-Derived Algorithms to Guide Perioperative Blood Management Decision Making,” *Journal of Cardiothoracic and Vascular Anesthesia* 37, no. 10 (October 2023): 2145–47, <https://doi.org/10.1053/j.jvca.2023.04.021>.
- ¹⁴Jonathan Braun et al., “The Promising Future of Drones in Prehospital Medical Care and Its Application to Battlefield Medicine,” *Journal of Trauma and Acute Care Surgery* 87, no. 1S Suppl 1 (July 2019): S28–S34, <https://doi.org/10.1097/TA.0000000000002221>; Sudipta Chowdhury et al., “Drones for Disaster Response and Relief Operations: A Continuous Approximation Model,” *International Journal of Production Economics*, no. 188 (2017): 167–84, <https://doi.org/10.1016/j.ijpe.2017.03.024>.
- ¹⁵Rohit Sharma et al., “The Role of Artificial Intelligence in Supply Chain Management: Mapping the Territory,” *International Journal of Production Research* 60, no. 24 (2022): 7527–50, <https://doi.org/10.1080/00207543.2022.2029611>.
- ¹⁶Lalithkumar K. Vora et al., “Artificial Intelligence in Pharmaceutical Technology and Drug Delivery Design,” *Pharmaceutics* 15, no. 7 (July 2023): 1916, <https://doi.org/10.3390/pharmaceutics15071916>.
- ¹⁷Peloso et al., “Artificial Intelligence,” 10640.
- ¹⁸Badi Rawashdeh, “Artificial Intelligence in Organ Transplantation: Surveying Current Applications, Addressing Challenges and Exploring Frontiers,” in *Artificial Intelligence in Medicine and Surgery: An Exploration of Current Trends, Potential Opportunities, and Evolving Threats*, vol. 2, ed. Stanislaw P. Stawicki and Andries Engelbrecht (London: IntechOpen, 2024), <https://doi.org/10.5772/intechopen.114356>.
- ¹⁹Peloso et al., “Artificial Intelligence,” 10640.
- ²⁰Pradhan et al., “IoT-Based Applications in Healthcare Devices.”
- ²¹Charles et al., “A Critical Analysis of the Integration of Blockchain and Artificial Intelligence for Supply Chain,” 7–47.
- ²²Saurabh Sharma et al., “Sustainable Innovations in the Food Industry through Artificial Intelligence and Big Data Analytics,” *Logistics* 5, no. 4 (2021): 66, <https://doi.org/10.3390/logistics5040066>.
- ²³Pradhan et al., “IoT-Based Applications in Healthcare Devices,” 6632599.



USS *Kitty Hawk* (CV 63) steams in formation during a joint photo exercise during exercise Valiant Shield 2007 while at sea, August 14, 2007. (U.S. Navy/Mass Communication Specialist Seaman Stephen W. Rowe)

“Creating the Point of the Spear”

The Deployment of *Kitty Hawk* (CV-63) as an Afloat Forward Staging Base During Operation *Enduring Freedom*

By Justin B. Blanton

Within a month of the September 11, 2001, attacks on New York and Washington, DC, the United States began a military offensive

against al-Qaeda’s center of operations in Afghanistan and the country’s ruling Taliban regime, which had harbored the terrorist organization since the mid-1990s. The objectives of the offensive, codenamed Operation *Enduring Freedom*, were to topple the Taliban, destroy al-Qaeda’s primary base structure, and apprehend Osama bin Laden, using

a minimum number of conventional ground forces. The projection of U.S. naval power was indispensable to the execution of Operation *Enduring Freedom*. Because Afghanistan is landlocked and located nearly 400 miles from the nearest coastline at its southernmost border, U.S. and coalition forces had to prosecute much of the war from naval vessels armed

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with Tomahawk Land Attack Missiles (TLAMs), aircraft carriers, and bases positioned far from combat zones. Air Force heavy bombers flying from outside the theater of operations delivered the vast majority of munitions, but U.S. carrier-based aircraft flew 75 percent of all strike missions, effectively substituting for land-based air forces to compensate for the lack of forward operating sites.

Grappling with the challenges of reaching targets deep inside one of the most remote parts of Southwest Asia and hundreds of miles from regional U.S. bases and allied installations, U.S. Central Command (CENTCOM) began devising plans to stage Special Operations Forces (SOF) of U.S. Special Operations Command (SOCOM) from positions close enough to southern Afghanistan to strike al-Qaeda in its mountainous strongholds. While studying maps of the region, CENTCOM planners noticed that several Taliban and al-Qaeda targets were located within the range of shipborne helicopters flying from the North Arabian Sea. However, the Navy's helicopter carriers, from which Marine Expeditionary Units deployed, were not big enough for the composite force that CENTCOM envisioned. Thus, the solution was to position a large deck aircraft carrier off the coast of Pakistan to serve as an afloat forward staging base for SOF elements, in a manner similar to the Navy's use of *America* (CV-66) during the U.S. intervention in Haiti in 1994.

In mid-September 2001, CENTCOM directed Naval Forces Central Command (NAVCENT) to prepare to fly *Carl Vinson's* (CVN-70) air wing to Qatar to use the carrier as an afloat forward staging base for SOF personnel and their helicopters. After issuing these directives, however, planners realized that the lack of readily available tankers in the area of responsibility meant that removing *Carl Vinson's* air wing to make room for SOF components would effectively eliminate the carrier's most potent asset for the entirety of the planned combat operation. The specter of such a consequential decision sparked intense deliberations among CENTCOM; NAVCENT; the Chief

of Naval Operations, Admiral Vernon E. Clark; and other fleet commanders regarding which additional carriers to commit to the region, if any, and which to deploy as an afloat forward staging base. Nearly all the potential options would have upended the precisely scheduled carrier deployments. In the end, because the SOF components tasked with serving in the mission were not yet ready to embark, CENTCOM planners chose to deploy the aging *Kitty Hawk* (CV-63) as an afloat forward staging base, thereby allowing *Carl Vinson* to keep her air wing. Based in Yokosuka, Japan, as part of the Forward Deployed Naval Force, *Kitty Hawk* was a conventional, large-deck carrier that had served in Vietnam, Somalia, and Iraq. Other than *Carl Vinson* and *Enterprise* (CVN-65), it was the carrier operating closest to Afghanistan on September 11.

After further deliberations, the Navy chose to surge several aircraft carriers to the North Arabian Sea in an effort to—in the absence of land bases—maximize expeditionary air power during Operation *Enduring Freedom's* critical opening phase. At first, *Enterprise* and *Carl Vinson* were the only carriers on station when strike operations began, but *Theodore Roosevelt* (CVN-71) arrived on October 15. *John C. Stennis* (CVN-74) would arrive several weeks later to relieve *Enterprise*, which had already been on deployment for nearly 7 months. Each carrier would deploy with its embarked air wing, made up of several squadrons and detachments of both rotary- and fixed-wing aircraft, the latter composed primarily of F-14 Tomcats and F/A-18 Hornets. This surge of carriers into the Arabian Sea demonstrated the Navy's ability to adapt to the lack of access to land bases. It also demonstrated the versatility of sea-based forces equipped with a flexible doctrine for littoral warfare. Among the most salient demonstrations of this versatility was the deployment of the *Kitty Hawk* as an afloat forward staging base for special operations forces.

On September 27, *Kitty Hawk* received orders to deploy to the North Arabian Sea. To accommodate SOF elements, the carrier deployed with

fewer than 20 aircraft from Carrier Air Wing Five (CVW-5): eight F/A-18C Hornets, three S-3B Vikings, two C-2A Greyhounds, and two SH-60F/HH-60H Seahawks. On October 1, a reconfigured *Kitty Hawk* departed Yokosuka for the CENTCOM area of operations in company with cruisers *Vincennes* (CG-49) and *Chancellorsville* (CG-63, now the *Robert Smalls*), destroyers *Curtis Wilbur* (DDG-54) and *Cushing* (DD-985), the frigate *Gary* (FFG-51), and the oiler USNS *Rappahannock* (T-AO-204).

During the first few days of Operation *Enduring Freedom*, Navy surface combatants and submarines armed with TLAMs conducted many of the initial strikes. Combat operations formally began on the evening of October 7, when destroyers *McFaul* (DDG-74), *John Paul Jones* (DDG-53), and *O'Brien* (DD-975); the cruiser *Philippine Sea* (CG-58); the submarine *Providence* (SSN-719); and the British submarines HMS *Triumph* and HMS *Trafalgar* launched a barrage of some 50 TLAMs against fixed targets inside Afghanistan. These TLAM strikes were followed up by bombings carried out by 25 Navy carrier aircraft launched from *Enterprise* and *Carl Vinson* and 17 U.S. Air Force heavy bombers. The primary targets for the Navy aircraft included Taliban and al-Qaeda command and control installations, early warning radars, airfields, and major air defenses—principally, Soviet-built SA-2 and SA-3 surface-to-air missiles. The objective of the opening strikes was to achieve air supremacy, thus allowing U.S. aircraft to operate over Afghanistan with complete freedom for the duration of the campaign.

After transiting the Strait of Malacca on October 7, *Kitty Hawk* arrived off the island of Masirah, Oman, on October 12, steaming more than 5,000 nautical miles in 12 days. In the weeks following the September 11 attacks, CENTCOM had made strong diplomatic efforts to gain access to Masirah in preparation for launching military campaigns into Afghanistan. By September 20, Oman had granted permission to stage SOF elements from the island; SOCOM established a forward headquarters there just



U.S. Air Force Tech. Sgt. Joshua McIntosh, 48th Operations Support Squadron complex air traffic controller, Capt. Kate Evans, 48th OSS airfield operations flight commander, and Senior Airman Justin Wood, 48th OSS radar airfield and weather systems technician, utilize a measuring wheel during a landing zone night operation near Fakenham, England, December 10, 2025. (U.S. Air Force/Airman 1st Class Rilynn Jacobs)

a few days before *Kitty Hawk*'s arrival. At Masirah, *Kitty Hawk* embarked a composite Army command. Consisting of more than 600 personnel, this command included a Special Forces Operational Detachment, the 2nd Battalion of the 160th Special Operations Aviation Regiment, and a team of Navy SEALs. Second Battalion embarked 20 helicopters, including MH-47D and MH-47E Chinooks, MH-60K and MH60L Black Hawks, and Hughes Little Birds. Once the SOF elements were in place aboard *Kitty Hawk*, the carrier commenced mission tasking in support of the critical overland strike operations that had already begun. To preserve the operational security of the embarked special operations forces, *Kitty Hawk* maintained a 5-mile exclusion zone for the duration of the operation, blacked out personal emails from the ship, and prohibited all press access.

The decision to convert *Kitty Hawk* into an afloat forward staging base for SOF missions was inspired by the use of *America* in the 1994 intervention in Haiti. During that operation, the Navy removed all of the aircraft from *America*, thereby turning the carrier into a floating platform for the exclusive use of SOCOM. During Operation *Enduring Freedom*, however, *Kitty Hawk* retained a small portion of her air wing, including the eight F/A-18C Hornets, which competed for limited space with 2nd Battalion's Black Hawks and Chinooks. The carrier's few remaining strike fighters flew missions over Afghanistan around the clock, interrupting the delicate battle rhythm of the embarked SOF elements who operated on a reverse cycle. After staging missions from the carrier at night, personnel from the composite Army command attempted to sleep through the incessant roar of strike fighters launching

off the deck during the day. While on station in the Arabian Sea, pilots from *Kitty Hawk*'s embarked Carrier Air Wing 5 flew some 600 missions over Afghanistan, including more than 100 combat sorties.

During the first week of the Operation *Enduring Freedom* air campaign, CENTCOM made multiple unsuccessful attempts to bring SOF teams into Afghanistan to collaborate with the Northern Alliance in their offensive against Taliban forces and provide targeting coordinates to Air Force and Navy aircraft. The initial obstacle was the slow process of political negotiations with the sovereign states neighboring Afghanistan to gain the use of airfields from which to launch missions. The most logical positions for staging such missions were located in Pakistan along its border with Afghanistan. However, because of domestic political concerns,

Pakistan agreed only to allow the staging of support flights from its territory and prohibited the launching of direct-action missions by SOCOM personnel. CENTCOM planners, therefore, turned to negotiating with Uzbekistan and Tajikistan for the use of their airfields. Unfortunately, once those countries eventually granted approval, SOF insertions were further thwarted by adverse weather conditions and heavy ground fire at predetermined landing zones marked by Central Intelligence Agency teams that had operated inside Afghanistan since September 26.

Finally, after weeks of frustration, on the night of October 19 the composite Army command staged the first major SOF mission into southern Afghanistan from *Kitty Hawk*. Four MH-47 Chinook helicopters carrying more than a squadron of Army Special Forces operators took off from the carrier in complete radio silence, launching from the flight deck in an exact sequence based solely on timing. The primary target of the mission was a residential compound near Kandahar belonging to the Taliban leader Mullah Mohammed Omar. The purpose of the raid was to gather intelligence, capture key enemy personnel, and disrupt the Taliban's command and control systems.

Before seizing the compound, Army Special Forces from Masirah were tasked with securing a dirt airstrip approximately 80 miles southwest of Kandahar for SOCOM to use as a temporary forward arming and refueling point for follow-on missions. This airstrip had been built for the United Arab Emirates' military chief of staff, Sheikh Mohammed bin Zayed, an avid falconer who flew in by private aircraft to access a nearby hunting camp. Originally planned to be a minimal helicopter assault staged from *Kitty Hawk* in support of the raid on Mullah Omar's compound, this mission slowly grew into a much more substantial airborne operation that had to be launched from Masirah to accommodate the large number of aircraft involved. The mission was to be led by Army Special Forces, and Army Special Forces were responsible for the raid on the compound.

Both missions were initiated by the insertion of a small Army pathfinder team at the airstrip that confirmed it was clear of Taliban forces. After the pathfinders completed their reconnaissance efforts, Air Force pilots flying B-2 Spirit stealth bombers and AC-130 gunships delivered pre-assault fires. Then, at 11:15 p.m. local time, approximately 200 soldiers from Army Special Forces parachuted in from four Lockheed MC-130 Combat Talons of the Air Force 16th Special Operations Wing flying from Masirah. One Army Special Forces company set up a perimeter and blocking positions while another cleared buildings. MC-130 support aircraft arrived 14 minutes later and dropped off a fuel bladder for the forward arming and refueling point. Shortly thereafter, the four Chinooks carrying the Army Special Forces team from *Kitty Hawk* approached the airstrip.

After refueling at the newly established forward arming and refueling point, the primary raid force departed for Mullah Omar's compound, located about 100 miles to the northeast of the airstrip. The compound included a brick house used by the Taliban leader and several outbuildings for accommodating his small security force. After AC-130 Spectre gunships and Black Hawk helicopters delivered preparatory fires, Army Special Forces personnel disembarked from the four Chinook helicopters.

While some Army Special Forces personnel entered compound buildings, others established a perimeter. Although they faced no resistance initially and never encountered Mullah Omar, they set about conducting sensitive site exploitation and intelligence-gathering. Approximately an hour after initiating the raid on the compound, the Army Special Forces ground elements called for the helicopters to pick them up. Under the protection of circling AC-130s, the four Chinooks successfully extracted the Army Special Forces team, but one of the helicopters struck the edge of a compound wall while lifting out of the landing zone. The accident ripped away the landing gear and caused a hydraulic fuel leak, but the aircraft managed to take off. The

outbound force for the assault on the compound then flew to the forward arming and refueling point at the airstrip to refuel before returning to *Kitty Hawk* at sunrise. Once the helicopters had departed the airstrip, the Army Special Forces boarded two Combat Talons that had landed there and left for Masirah.

During the raid on Mullah Omar's compound, a third company of Army Special Forces flew from the *Kitty Hawk* on Black Hawk helicopters to a site at Dalbandin, Pakistan, known as Objective Hondo, 26 miles south of the Afghanistan border, to set up another forward arming and refueling point for the night's outbound missions. After the Army Special Forces had secured the site, one of the Black Hawks attempted to reposition, creating a billowing dust cloud or "brownout" that obscured the landing zone. The disoriented pilots crashed the helicopter, which rolled onto its side, killing two Army Special Forces personnel and injuring three more.

Early on the morning of October 24, the 15th Marine Expeditionary Unit (Special Operations Capable) launched a reinforced tactical recovery force from the amphibious assault ship *Pelee* (LHA-5), stationed in the North Arabian Sea, to recover the downed Black Hawk. Working in conjunction with Pakistani security forces, the Marines successfully retrieved the helicopter and delivered it to the *Kitty Hawk* without further incident.

Back aboard the *Kitty Hawk*, the composite Army command spent the first few days after the missions at the airstrip and Mullah Omar's compound completing after-action reviews and preparing for the arrival of CENTCOM Commander General Tommy Franks, who secretly visited the carrier on October 23. During this time, the Army Special Forces operators returned to Masirah, but 2nd Battalion, the SEAL team, and other Army Special Forces elements remained on board. On October 30, a week after General Franks's visit, Secretary of the Navy Gordon England boarded *Kitty Hawk* to express his appreciation for the crew's role in the nontraditional mission and to encourage them to understand



Marine Raiders with 1st Marine Raider Battalion near the completion of one of their and Special Patrol Insertion and Extraction (SPIE) exercises near Hurlbert Field, Florida, February 6, 2015. (Marine Forces, Special Operations Command/Sgt. Steven Fox)

their service as “creating the point of the spear” during Operation *Enduring Freedom*’s opening operations.

Helicopters from the composite Army command deployed from *Kitty Hawk* again on November 18 and inserted SOF into the Shin Narai Valley, near the Pakistani border, where it linked up with the anti-Taliban Pashtun leader and former Kandahar governor Gul Agha Sherzai. These SOF personnel worked with Sherzai’s forces to block the main road between Kandahar and Quetta, Pakistan, and seal the border crossing near Spin Boldak to cut off the Taliban supply route.

On November 21, a detachment of approximately 20 SEALs flew from *Kitty Hawk* to the airstrip in the composite Army command’s helicopters. The SEALs were charged with conducting ground surveillance and reconnaissance over the airstrip in advance of Operation *Swift Freedom*, a forthcoming Marine mission

to reoccupy the airstrip and build it into a forward base of operations for an offensive against Taliban forces near Kandahar.

At the end of November 2001, SOCOM began to draw down special operations forces in Afghanistan after the Taliban front in the north collapsed in several key locations, including Mazar-e-Sharif. The drawdown diminished the need for *Kitty Hawk*’s role as an afloat forward staging base for Special Forces, and the carrier began preparations to end her combat deployment. After flying off all remaining SOF helicopters to Masirah, the carrier departed the Arabian Sea on December 16, 2001, and returned to Yokosuka. During *Kitty Hawk*’s 83 days at sea in support of Operation *Enduring Freedom*, more than 1,000 SOF personnel from various Services staged from the carrier to conduct a range of critical missions including direct action raids, combat search and rescue, airstrike coordination, and intelligence gathering.

Conclusion

The aircraft carrier is one useful piece of a large force that can be used innovatively to augment the whole. This article’s brief overview of the deployment of *Kitty Hawk* in Operation *Enduring Freedom* is intended to provide context for how a carrier has been employed in a successful, nontraditional mission in the recent past. It demonstrates the flexibility of the Navy’s most expensive platform, which boasts capabilities well beyond the air superiority and strike roles traditionally associated with carriers, and it may offer a helpful data point for subsequent research projects seeking to address the anticipated challenges of potential nontraditional missions in the future.

The use of *Kitty Hawk* as an afloat forward staging base suggests that important nontraditional roles may become available to carriers as they approach the end of their service lives. While some of

these roles may require older carriers to reconfigure or even undergo modifications to make them more suitable for specific alternative missions, doing so could extend the ships' useful service by several years. Amid the resurgence of Great Power competition, the U.S. military as a whole and the Navy in particular will likely encounter nontraditional challenges. Maximizing the aircraft carrier's flexibility and lifespan and exploiting the platform's range of alternative capabilities will, therefore, improve the readiness of the entire joint force and increase the options available to military and civilian decisionmakers.³⁸ JFQ

Notes

¹ Gregory Bereiter, *The U.S. Navy in Operation Enduring Freedom, 2001–2002* (Washington, DC: Naval History and Heritage Command, 2016), 3–4, <https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/u/us-navy-operation-enduring-freedom-2001-2002.html>.

² Benjamin S. Lambeth, *The New Face of Naval Strike Warfare: U.S. Carrier Air Operations and Capability Improvements Since Desert Storm* (Santa Monica, CA: RAND, 2004), 1, https://www.rand.org/pubs/research_briefs/RB9137.html.

³ Sean Naylor, *Relentless Strike: The Secret History of Joint Special Operations Command* (New York: St. Martin's Press, 2015), 96.

⁴ Tommy Franks, *American Soldier* (New York: Regan Books/Harper Collins, 2004), 265.

⁵ Sam Cox, "H065.1: Operation Enduring Freedom—September to December 2001," Naval Intelligence Professionals, September 8, 2021, 7, 9, <https://www.navintpro.org/professional-articles/2021/09/08/h065.1-operation-enduring-freedom-september-to-december-2001/>; Loren Thompson, *Killing Al Qaeda: The Navy's Role* (Arlington, VA: Lexington Institute, 2002), 13, <https://lexingtoninstitute.org/wp-content/uploads/killing-al-qaeda-the-navys-role.pdf>.

⁶ Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 4–5.

⁷ Thompson, *Killing Al Qaeda*, 13.

⁸ Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 30; Mark L. Evans and Roy A. Grossnick, *United States Naval Aviation, 1910–2010*, vol. I, *Chronology* (Washington, DC: Naval History and Heritage Command, 2015), 540, <https://www.history.navy.mil/research/publications/publications-by-subject/naval-aviation-1910-2010.html>.

⁹ Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 6, 33.

¹⁰ Evans and Grossnick, *United States Naval Aviation, 1910–2010*, 541.

¹¹ Naylor, *Relentless Strike*, 97.

¹² Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 36–37.

¹³ Naylor, *Relentless Strike*, 106.

¹⁴ Naylor, *Relentless Strike*, 106.

¹⁵ Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 79.

¹⁶ Cox, "H065.1," 19.

¹⁷ Naylor, *Relentless Strike*, 86–89.

¹⁸ Nathan S. Lowrey, *U.S. Marines in Afghanistan, 2001–2002: From the Sea* (Washington, DC: Marine Corps University, History Division, 2011), 59, <https://www.usmcu.edu/Portals/218/from%20the%20sea.pdf>.

¹⁹ Naylor, *Relentless Strike*, 107–8.

²⁰ Lowrey, *U.S. Marines in Afghanistan*, 59.

²¹ Cox, "H065.1," 20.

²² Lowrey, *U.S. Marines in Afghanistan*, 59.

²³ Cox, "H065.1," 21.

²⁴ Lowrey, *U.S. Marines in Afghanistan*, 60.

²⁵ Naylor, *Relentless Strike*, 117.

²⁶ Naylor, *Relentless Strike*, 117.

²⁷ Naylor, *Relentless Strike*, 117–18.

²⁸ Naylor, *Relentless Strike*, 118.

²⁹ Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 42–43; Lowrey, *U.S. Marines in Afghanistan*, 60.

³⁰ Naylor, *Relentless Strike*, 121–22.

³¹ Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 45–46; Thomas A. Hejl, *USS Kitty Hawk (CV-63) Command History for Calendar Year 2001* (Washington, DC: Naval History and Heritage Command Archives, 2001), 8, <https://www.history.navy.mil/content/dam/nhhc/research/archives/command-operation-reports/ship-command-operation-reports/k/kitty-hawk-cv-63-ii/2001.pdf>.

³² Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 58; Donald P. Wright, *A Different Kind of War: The United States Army in Operation Enduring Freedom (OEF), October 2001–September 2005* (Fort Leavenworth, KS: Combat Studies Institute Press, 2010), 106–7, <https://www.armyupress.army.mil/Portals/7/combat-studies-institute/csi-books/DifferentKindofWar.pdf>.

³³ Lowrey, *U.S. Marines in Afghanistan*, 111.

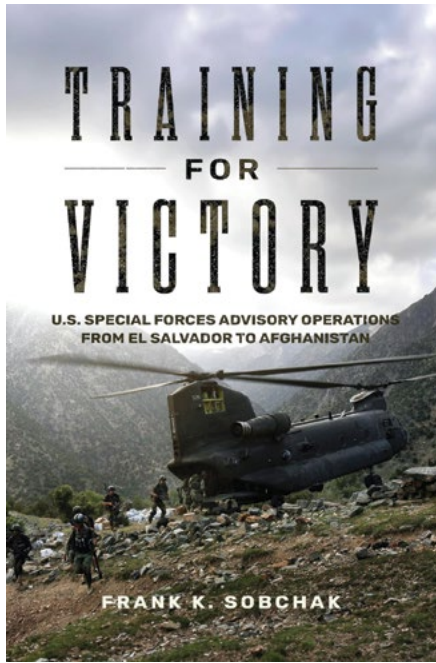
³⁴ Naylor, *Relentless Strike*, 154.

³⁵ Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 79; Thompson, *Killing Al Qaeda*, 13.

³⁶ Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 35.

³⁷ Bereiter, *The U.S. Navy in Operation Enduring Freedom*, xvi, 35.

³⁸ Bereiter, *The U.S. Navy in Operation Enduring Freedom*, 62.



Training for Victory: U.S. Special Forces Advisory Operations from El Salvador to Afghanistan

Frank K. Sobchak
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Reviewed by Tobias Bernard Switzer

After nearly 25 years of security force assistance as a pillar of national security strategy, U.S. strategists and practitioners still struggle to predict when the tool will succeed in building up a partner nation's military and security apparatus to confront its threats. To date, the ability of any model of security force assistance to predict the results of an engagement has as much fidelity as a Magic 8 Ball.

Enter Frank Sobchak, the Chair of Irregular Warfare Studies at the Modern War Institute, with his book *Training for Victory*. In his research, a study of U.S. Special Forces advisory missions, Sobchak seeks to find the most important success factors for building capable host-nation special operations units.

Though Special Forces have advised in dozens of countries, *Training*

for *Victory* studies only five cases: El Salvador, Colombia, the Philippines, Iraq, and Afghanistan. To focus on the link between the advisory missions and outcomes, Sobchak tries to hold contextual factors constant by selecting cases where Special Forces built foreign special operations units from scratch to help the host nation deal with an insurgency.

Of the five, Colombia and Iraq stand out as exemplars, while the rest had mixed or poor results. To find out why, Sobchak looks at data about Special Forces missions and advisors and incorporates research interviews to measure five advising factors to see which were most critical in creating effective partners in combat: consistency in advisor pairing, language skills, partner-to-advisor ratio, the ability to organize the host-nation unit, and combat advising.

Training for Victory finds that the fourth factor—the ability to organize the host-nation special operations unit—is the one most strongly linked to combat effectiveness. In Iraq, Special Forces advisors had the latitude to choose the host-nation unit's leadership, screen out unsuitable candidates, and set training and deployment schedules. While the Colombians retained decisionmaking authority, they went along with most of their advisors' suggestions, ceding de facto control over many aspects of their special operations organization.

Surprisingly, Sobchak finds that high levels of language ability are not as important as the Special Forces community has believed. A lack of Arabic fluency did not prevent Special Forces from achieving spectacular results in Iraq. Special Forces advisors relied on just a handful of their teammates who could speak Arabic at a basic level, a few Iraqis who spoke English, and interpreters. Still, Iraqi special operations forces created after the 2003 invasion became a highly proficient counterterrorism unit.

In contrast, many Special Forces soldiers sent to advise Salvadoran special operations forces in the 1980s spoke fluent, if not native, Spanish, yet the units' performance was mediocre. Sobchak concludes that—counterintuitively—learning any language helps advisors understand

how to navigate other cultures and communicate with sensitivity, even if they have to speak through interpreters.

Crucially, *Training for Victory* hints at but does not fully develop a major point—that Special Forces advisors are soldiers who have been carefully screened and assessed for personality traits that thrive in unfamiliar cultures. Before they learn a language, Special Forces advisors already possess critical yet rare attributes, such as humility, curiosity, adaptability, and patience, among others.

The implication for the military Services is that they should screen candidates for military advisor, foreign area officer, and exchange roles based on personalities before sending them abroad. Matching language training with a military member who has suitable personality traits will give them the ability to flourish in many cultural contexts. No amount of time at the Defense Language Institute can fix inflexibility and impatience.

Sobchak's five advising factors can be read differently, however. None of them are independent variables; instead, they are indirect and partial measurements of two elusive variables that are the most important in advisor missions: influence and control. Four of the book's factors measure the advisors' influence—the extent to which advisors can persuade and shape the ideas and behaviors of the host nation's soldiers. These four—consistency in advisors, low partner-to-advisor ratios, language fluency, and combat advising—are factors that the United States can control, to an extent, and that yield greater influence over the host-nation unit.

The degree of sovereignty that the host nation yields to the United States—manifested in Sobchak's model as the ability of advisors to organize the unit—is control over key decisions. Although the United States can determine how much influence it wants to exert, the host nation alone decides how much sovereignty it will cede to advisors, and whether that will include the ability to determine the unit's commanders and leaders, selection standards, equipment, strategy, and operations.

Reading Sobchak's evidence in this light, it becomes clear that U.S. advisors

need both influence and control to create combat-effective units. The host nation can offer up decisionmaking authority to the United States, but if the Services frequently rotate culturally unprepared advisors, the mission will not be able to use its leverage. Conversely, well-trained advisors that spend a lot of time with the host-nation unit will not be able to move beyond rapport without control over key decisions.

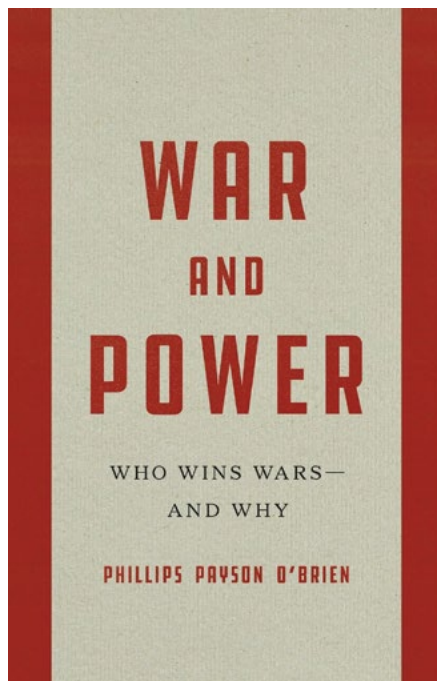
On the surface, *Training for Victory* appears relevant only to the special operations community, but a closer reading offers broader lessons to the larger security force assistance community and combatant commanders. Sobchak's framing of influence and control applies across the board. When building a foreign military capability—Special Operations Forces or otherwise—defense leaders must soberly assess how much influence and control they can assert in the advising mission.

Commanders should not wait for the outcome—the book's five cases averaged over 10 years, and in most, the work was left incomplete. However, influence and control are leading indicators of the mission's viability. Each of *Training for Victory*'s five advising factors was visible at the outset, or in the case of organizational control, emerged soon thereafter.

When the United States finds itself without the necessary influence and control of partner forces to reach its objectives, it should scale back its advising goals instead of accepting the physical and political risk that comes with combat advising and assisting. In those instances, more responsible alternatives are sending noncombat advisors to seek access and information about the host nation or withdrawing altogether.

Security force assistance is not a reliable strategy; it is a long-term relationship rife with uncertainty. Understanding the importance of influence, control, and time horizons can help the United States consider partners with forecasts better than "Ask again later."

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War and Power: Who Wins Wars—and Why

Phillips Payson O'Brien
PublicAffairs, 2025
288 pp., \$30.00
ISBN-10: 1541606973
ISBN-13: 978-1541606975

Reviewed by Frank Hoffman

In the run-up to the start of the Russo-Ukraine War in February 2022, numerous analysts from the U.S. Government and academic sources assessed whether Vladimir Putin would invade and, if so, what the likely outcome of a Russian invasion would be. The U.S. intelligence community accurately projected that Putin would invade, but the predictions about the war's outcome turned out to be wrong. Russia *did* invade, but Ukraine successfully deflected the brunt of Russia's aggression.

Why were the assessments about Russia's prospects for a quick victory so far off? Was it an analytic failure stemming from faulty knowledge or flawed metrics? Do we need to develop a more holistic methodology for comparing the power of protagonists? *War and Power* develops and applies such a methodology or framework.

Phillips Payson O'Brien, the author of this relevant and timely book, is a

professor of history at the University of St. Andrews in Scotland. In addition, O'Brien writes a provocative Substack newsletter and does podcasts on contemporary security issues. His previous works on World War II—*How the War Was Won* (2015) and *The Strategists* (2024)—are acclaimed for their serious scholarship. This current project draws on these superb histories for insights.

The central theme in *War and Power* is that God and fortune are not necessarily on the side of the biggest battalions. The war against Ukraine is just the latest example showing that there is more to success in war than having the most troops, tanks, planes, ships, or drones. The book is divided into two parts. The first half lays out a framework of five elements for assessing national power. States that possess these elements and successfully apply them are *Full Spectrum Powers*. O'Brien devotes a chapter to each element or pillar. The second half of the book strives to highlight critical distinctions during warfare. Here, the author employs examples from contemporary conflicts including the Cold War and Kosovo, as well as Iraq and Afghanistan.

O'Brien finds fault with the notion of Great Powers, which he finds places a few states on a pedestal and misrepresents the value of allies. Admittedly, the term "Great Power" comes with hints of hubris and relegates the majority of states to a second tier or worse. But it also relates to the historical impact of powerful states and empires that have shaped history. O'Brien's preferred substitute is Full Spectrum Powers, a concept that suffers from terminological defects and a strange oversight. While the term "Great Powers" connotes a rather exclusive club of major states, it implies scale and reach, not just breadth. Many nation-states have some capacity in most of the various elements of national power—think of capable middle powers today, such as France and the United Kingdom.

The first pillar of the spectrum is economic and technological strength: "The states that have been the most powerful over the past two centuries" and dominated have been "the economically largest and most technologically

advanced.” As Paul Kennedy’s classic *The Rise and Fall of Great Powers* notes, economic and financial potential are important in tracing the transitions of great powers.

As the second pillar, O’Brien’s framework includes leadership and how the personalities of political leaders influence policy. This also includes how political culture and social conditions may restrain critical conditions that lead to war. *War and Power*’s exploration of the intercession of leaders who are all too human is regrettably unique in measures of power. But the study of individuals is rewarding because, as articulated by Hal Brands in *The New Makers of Modern Strategy*, “it is people that formulate and execute strategy, and it is through their ideas and experiences that we can best comprehend the unrelenting demands of those tasks.”

History shows that competition between powerful states often juxtaposes very different societies and enabling structures. This is the author’s third component, and it addresses social values, culture, and beliefs. The reference to structure entails government agencies, bureaucracy, and power centers. The social dimension of strategy is often overlooked, a point that the late Michael Howard made years ago. More recently, researchers have examined the importance of society during periods of strategic competition and renewal. Competitive societies tend to be open, pluralistic, full of intellectual energy, and committed to learning and adapting, and they have a common sense of their own role in the world. This complex mosaic is consistent with O’Brien’s application.

The penultimate factor for the proposed framework is the military, or more accurately the construction of a military. Here, the author offers a bold observation: “[T]he constituent elements of a power tell us more about how effective a military will be than the raw numbers of equipment or doctrine.” In short, the strengths and weaknesses of a military will reflect its country’s political leadership, social system, and its technological capacity. O’Brien contends that if you want to know how a war will develop, “look at the powers involved as possessing

different military systems, and examine the factors that will govern not only how those systems will operate at first, but how they can be regenerated, adapted, and improved as a war goes on.”

While the author grasps the importance of advanced technology, he offers little advice on how to shape a military. For more detail on how Full Spectrum Powers have adapted their armed forces in the face of disruptive technologies, readers should consult *The Origins of Victory* by the defense strategist Andrew Krepinevich.

The final dimension of Full Spectrum Powers deals with alliances. “An alliance of states that work together,” O’Brien finds, “can be mutually supportive and probably greater than the sum of its parts. Such alliances won World War I, World War II, and the Cold War.” Here the author cites British diplomacy as part of the Entente Cordiale before World War I as “a textbook case” for diplomacy. From London’s point of view surely it was a success, but the British Cabinet’s refusal to publicly commit to Belgian sovereignty and France’s security made a German intervention more likely. London’s desire to retain British freedom of action undercut the Entente’s deterrence against Berlin.

O’Brien’s suite of dimensions appears incomplete. Readers will be surprised by the absence of any mention of information; here, the “I” is missing from the heuristic DIME (diplomatic, informational, military, economic) model. The importance of connectivity, content, and cognition should be noted given today’s fast-paced information environment. The author’s conception of what constitutes power in the “full spectrum” should be extended to account for nonkinetic sources. For a comparative analysis on national power in this enabling dimension in competition, see National Defense University Press’s *Strategic Assessment 2025* (ed. Thomas F. Lynch III).

Despite the author’s holistic approach and examples, the book does not appear to generate definitive solutions to the crucial issue of prediction or foresight. O’Brien’s own case study on Ukraine is revealing. Few observers would have credited the amateur Volodymyr Zelensky with Churchillian qualities in

competition with the experienced and ruthless Vladimir Putin. Few observers would have had a sufficiently strong grasp of military reforms and security assistance to Kyiv since 2014 to judge that it could withstand a conventional invasion from a neighbor with thousands of tanks and a robust air force. In economics, the Russian gross domestic product is 11 times that of Ukraine, and Russia can ramp up manufacturing for armor, missiles, and other materiel. Ukraine’s entrepreneurial ingenuity and adaptability would have been quite hard to assess before the war but are obvious now. It is perhaps only in social cohesion and resilience that analysts might have sensed how Ukrainians would rally to defend their independence, given the Maidan demonstrations of 2014.

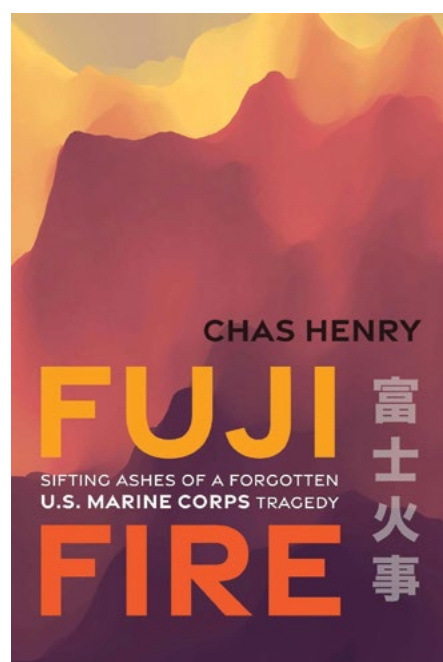
The outcome of any war is difficult to predict. As any good student of Clausewitz realizes, war is inherently nonlinear. *On War* reflects that war is a nonlinear phenomenon, and that “similar causes do not always produce similar effects, and causes interact in ways unforeseeable even by the historically sophisticated”—like our author. Thus, any war may reflect different outcomes that will not be predicted with great accuracy. Much of the uncertainty comes from the unpredictable interaction of states, societies, economics, and military forces that O’Brien depicts over the last century and a half.

We should learn to accept the reality that conflict is the realm of contradiction and paradox, not of rationality or precision analytics. No individual or algorithm will capture all the patterns of the past or eliminate uncertainty in future human affairs. That said, a framework that incorporates more than a military order of battle or static metrics appears extremely useful when formulating policy (or studying it).

While Paul Kennedy will not be retitling his classic *The Rise and Fall of Great Powers* anytime soon, this splendid book is just as important. *War and Power* manifests a nuanced grasp of 20th-century wars, especially the complexities of two world wars. The book has particular utility for top-level joint professional military education students because of its informed exploitation of the past to demonstrate the

dynamic interaction of the instruments of national power. O'Brien reminds us that wars are not necessarily won by the state with the largest army, the biggest missile inventory, or the most exquisite technology. Students of war must evaluate all the elements of power and anticipate their interaction. *War and Power* illuminates the past and guides serious students of war into the future.

Frank Hoffman retired from National Defense University (NDU) in 2024 after 46 years of service in the U.S. Department of Defense (now the Department of War), including a dozen years researching and teaching at NDU.



Fuji Fire: Sifting Ashes of a Forgotten U.S. Marine Corps Tragedy

By Chas Henry
Potomac Books, 2025
297 pp., \$36.95
ISBN-13: 978-1640126459

Reviewed by Colonel Ken Allard, USA
(Ret.)

From the “Old Breed” World War II memoirs of Eugene Sledge and Robert Leckie, Marine grunts with a flair for writing have added immea-

surably to our understanding of war. Their storytelling tends to capture the bottom-up perspectives of warriors suddenly confronted by the imponderables of military history, those unforgettable moments when events smite the best-laid plans of officials far removed from current conflicts. That same perspective frames every chapter of Chas Henry’s superb quest to preserve the memories of the 13 Marines killed and more than 73 injured when a bizarre flash fire erupted on the slopes of Japan’s Mount Fuji in October 1979.

So how bad was it? Henry extensively quotes the Marine Commandant at the time, General Robert Barrow, whose military career began in the grim days of 1942: “Having witnessed a lot of bad things, ugly things, none could compare to that experience.” Although it quickly became known as the “worst-ever peacetime disaster” in Marine Corps history, hospital orderlies remembered something else: “You could smell them as soon as the elevator door opened . . . [the] acrid odor of charred flesh” infused into their uniforms, hair, and skin. Equally upsetting was the constant shivering of the burn victims. As one Marine with second- and third-degree burns explained, “It’s 110 degrees in there but we didn’t have skin to keep our heat in.”

How could such a calamity have occurred? As a former enlisted Camp Fuji Marine, Chas Henry coolly lays bare the roots of the disaster. Although his book includes neither bibliography nor footnotes, his acknowledgments give ample testimony to his exhaustive research across two continents amid the COVID-19 pandemic: “One hundred and thirty individuals . . . shared memories of the incident . . . despite the tears often generated as they did.” Equally important: “Scores of archivists, public affairs officers, librarians, and others” raided their files to assist Henry in assembling the most comprehensive analysis ever attempted of the Fuji fire and its aftermath. Aided by maps, command chronologies, timelines, articles, and even pilot logs, the Fuji Marines at last had a historian capable of telling their unique, heart-rending stories.

Everything else about the base and its mission reflected the primacy of tough operational drilling. Pacific-based Marines typically used Fuji as a training destination after months aboard amphibious vessels, exploiting its hiking, maneuver, and live-firing ranges to sharpen their wartime skills. Since realistic, short-term exercises were their primary mission, Fuji’s bivouac areas were ramshackle, with Quonset huts “put together by infantry carpenters” that seemed “right out of Gomer Pyle.” The only real hazard of the bivouac areas came from a fuel farm improbably located uphill from the Quonset huts housing hundreds of hard-training Marines. These hazards were worsened by the use of rubberized fuel tanks that both the Army and Marines believed represented a quantum improvement in fuel-handling efficiency: “The Amphibious Assault Fuel System unpacked at Camp Fuji in 1979 included 20,000-gallon tanks. . . . When filled to capacity . . . a 20,000-gallon bladder would swell to 5 feet, 9 inches tall.”

An Army Field Manual published in 1977 gave an explicit warning about the location of fuel farms: “[N]ever choose one uphill . . . from other installations which would be in the path of escaping fuel.” Although a succession of training unit commanders seemed startlingly comfortable with the hazards to their troops, Henry cites a 32-year-old Navy chaplain whose “new eyes” enabled him to deliver a prophetic warning only weeks before disaster struck. “It just defies common sense that you would put fuel bladders . . . up above where people are living. . . . You’ve got stoves in there.” The chaplain remembered that a lieutenant colonel at the base camp curtly told him that “that’s the way it had been done for a long time. . . . So [I should] keep my thoughts to myself.”

Unfortunately, the looming menace of what became Typhoon Tip—which remains the largest tropical cyclone on record—made landfall on mainland Japan on October 19, 1979. Registering an astounding 870 millibars of pressure, Tip had gale-force winds that extended 690 miles in every direction. For the Marines at Camp Fuji, the storm was the critical

factor that combined the well-known hazards of volcanic soils, sustained tropical downpours, unpredictable slope, and highly explosive liquids. It is not known precisely when, where, or in what order these hazards ignited the firestorm that rapidly enveloped Marines, their uniforms, belongings, equipment, buildings, and everything else at Fuji that would burn. “Older Marines at the camp that day—veterans of combat in Vietnam—felt ripped back to the war zone. Initially, it was like a rocket or mortar attack, reflected one grizzled sergeant major. ‘It was as ferocious or fierce as any battle.’”

The first half of *Fuji Fire* will be of primary interest to Service schools and war colleges focused on the operational art. Just like viewers of the TV series *Air Disasters*, readers of the book will wonder what corrective actions might have broken the impending failure chain of catastrophe. But it was the disciplined adaptation to those disasters—related in detail throughout the book’s second half—that provided the most satisfaction to this reader: Marines, their doctors, and their entire chain of command struggled to collect, triage, and transport the wounded, often devising unprecedented innovations amid the chaos of the unexpected. How effective were they? Against an expected burn recovery rate of 50 percent, the Fuji fire survivors topped 80 percent—proof positive that Marines are very special people indeed!

But the disturbing counterpoint is the institutional memory lapse that persistently plagued Chas Henry’s research: “Well, what fire was that?” Four decades after the reforms of the Goldwater–Nichols Department of Defense Reorganization Act of 1986, let us hope that those tentative inter-Service nonaggression pacts have been replaced by the entrepreneurial synergies of a joint force where voracious improvement is a way of life. In a strategic environment where ancient verities can be disrupted in nanoseconds, it does little good to strive mightily for innovation unless those breakthroughs spur future improvements.

We should be ever mindful of the stakes. In *Fuji Fire*’s most moving story, Marine Commandant General Barrow,

accompanied by his corps sergeant major, returned to visit his troops: “I went into this one room and this rather strong voice under all these bandages said, ‘It’s a pleasure to see you, sir.’ I replied, ‘I’m sorry it’s under these circumstances.’ To which he said, ‘Sir, it would be a pleasure to see you under any circumstances.’” General Barrow remembered being told later that the Marine had died shortly afterwards.

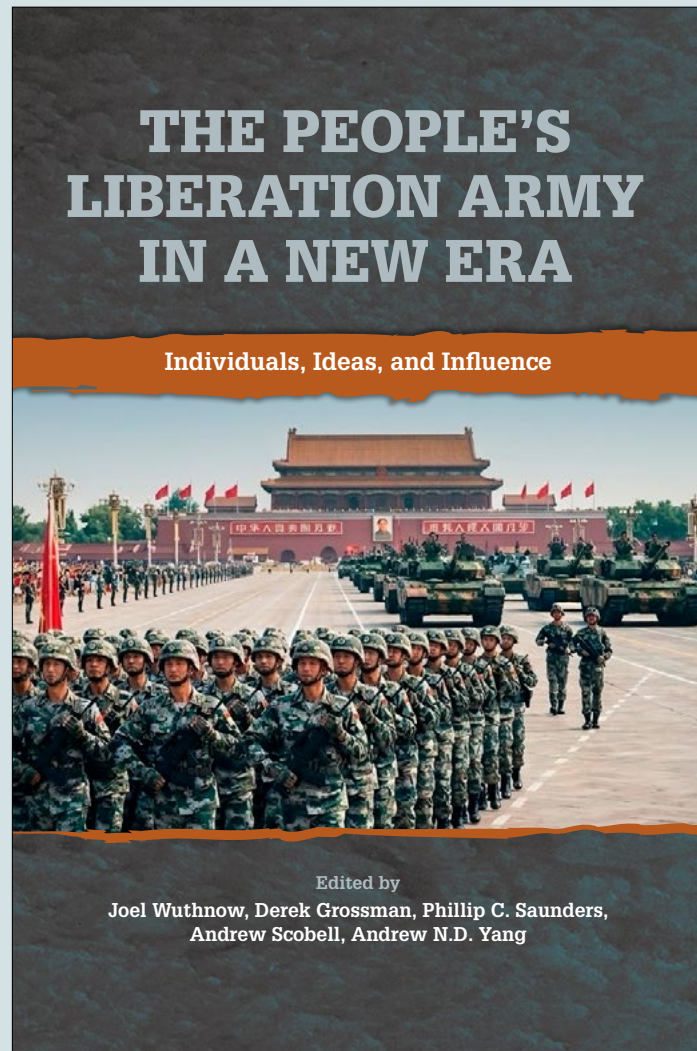
Colonel Ken Allard, USA (Ret.), rose from Army draftee to become a West Point professor, Dean of the National War College, and a military analyst for NBC News.

Coming soon from NDU Press for the
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The People's Liberation Army in a New Era

Individuals, Ideas, and Influence

Edited by Joel Wuthnow, Derek Grossman, Phillip C. Saunders,
Andrew Scobell, and Andrew N.D. Yang



The People's Liberation Army in a New Era: Individuals, Ideas, and Influence examines how China's military has changed under Xi Jinping and how much responsibility he has for these changes. The book argues that Xi's "new era" has brought significant PLA modernization, including organizational reforms, stronger joint-operations ambitions, expanded naval and missile capabilities, greater emphasis on political loyalty, and new thinking about deterrence, multidomain operations, artificial intelligence, and "intelligentization."

At the same time, there is considerable continuity. Many PLA developments under Xi build on earlier reforms, long-standing strategic priorities, and institutional habits rather than representing a complete break from the past. Across chapters on Party-army relations, officer careers, training, Taiwan deterrence, China-Russia exercises, military aid, and overseas security behavior, the book portrays Xi as a powerful but not all-controlling figure.

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