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Contested Logistics

A Primer

by LTC Amos C. Fox, USA

Introduction

The term *contested logistics* implies that the U.S. military and its partners grew accustomed to uncontested logistics during the post-9/11 period of armed conflict. Contested logistics is, in fact, nothing new. Rather, it is the standard state of logistics in large-scale armed conflict between industrialized states; the notion that logistics might not be contested is yet another negative impact of the post-9/11 wars on military thinking. To be sure, General William Sherman's evisceration of supply lines across the South during the U.S. Civil War is an example of continental-level contested logistics. On a global scale, the German military used unrestricted submarine warfare, and other methods, during World War I against the United States and its allies to disrupt strategic logistics.¹ Further, during World War II, the battle for control of the Atlantic Ocean—in which personnel and military equipment deployed to North Africa and Europe—played a critical part in contested logistics. Further, the contest between the Allies and the Axis for control of the Mediterranean Sea was an important issue for the ultimate Allied victory in North Africa, Italy and the war as a whole.² Richmond Hammond notes that:

Fundamentally, control of the Mediterranean was vital to both opposing coalitions as an essential route of transit in a global war. For the Allies, it was a vital artery between east and west, allowing a relatively quick and efficient method of transferring men and materiel between the various theaters of war. For the Axis powers, wresting control of the Mediterranean from the Allies, or even merely contesting it . . . the result of Axis victory in the Mediterranean would be to greatly curtail one of the Allies' greatest strengths: their global mobility.³

It is important to understand that contested logistics is not a new wrinkle of modern warfare, but a problem that planners, strategists and industry have wrestled with throughout the depth and breadth of armed conflict. The only significant difference today from the time in which German U-boats prowled the Atlantic Ocean, for instance, are the technologies available to detect the movements of logistics, and correspondingly, the technology available to strike a state's logistics network from extended range. Further, success in the American South, the Atlantic and the Mediterranean Sea should provide the starting point from which to identify the problem that the contemporary concept of contested logistics is attempting to solve. The problem itself—how to conduct logistics over large distances in an environment in which an enemy combatant is actively attempting to deny that endeavor—has both technological solutions and non-technical solutions.

This article does not seek to provide answers to contested logistics, but rather to provide information that spurs like-minded individuals to think about the problem holistically.

The concept of contested logistics presents Army forces with three discrete challenges: a) the threat; b) the environment; and c) oneself. Those three categories have to be addressed in consideration of one another to make operations in contested logistics a reality.

General James E. Rainey, Commanding General, U.S. Army Futures Command, announces the standing up of a Contested Logistics Cross-Functional Team during his keynote address at the Association of the United States Army's Global Force Symposium, 28 March 2023, in Huntsville, AL. "The team will be focused on the division and below aspect of all things that have to do with contested logistics," Rainey said. "We know we've got to get better at [addressing] this problem" (U.S. Army photo by Patrick Hunter).



First, it examines the problems associated with contested logistics. These problems focus on challenges presented by the threat, by the environment and by oneself. In examining this problem, the article uses a notional deployment of the Army's 1st Cavalry Division to help illustrate the ideas therein. Second, the article examines the uniqueness of U.S. military operations in relation to operating on a contested environment. It finds that assured logistics are a byproduct of assured movement, and both of these elements are key considerations when examining contested logistics. Third, this article provides an overview of what the Army's senior leaders are saying are important considerations for operating on future battlefields in which logistics are far from assured. Finally, this article concludes with a general question to help provide a primer for those interested in understanding the challenges of contested logistics and what might be required to overcome them.

Problems: Threat, Environment and Self

The concept of contested logistics attempts to solve a handful of challenges that can be categorized as challenges of threat, environment and self. From a **threat** standpoint, contested logistics attempts to address an enemy combatant's offensive capabilities and unknown intentions. As a result, contested logistics ranges from the safe administration of home station manufacturing to forward distribution to the human-machine integrated tank and infantry teams on the front lines of future battlefields.⁴ Moreover, contested logistics must account for the future of warfare, in which conventional wisdom suggests that rich sensor arrays, long-range fires, precision strike and drones of all kinds and purpose will dominate the battlefield. Or, framing this idea using vogue Army jargon, contested logistics must account for the features and challenges of a transparent battlefield.

From the **environmental** standpoint, contested logistics seeks to overcome the tyranny of distance and its associated costs.⁵ Shipping an armored division like the 1st Cavalry Division or the 1st Armored Division across the globe is resource intensive, time intensive and slow. Further, such movements provide a watchful enemy combatant with a harbinger of future military activities—and the schema through which U.S. forces mobilize, debark and embark for armed conflict. In short, the enemy receives intelligence that it can use for targeting purposes at any point along the process.

The environment reflects the challenges that pertain to **oneself**. A force deploying under a transparent battlefield in which the threat possesses long-range fires, unblinking surveillance and the ability to precisely strike Army forces at any point along the mobilization to theater embarkation requires many self-contained capabilities. For starters, this force requires protection capabilities not normally found within tactical formations, to include a variety of cyber systems, air defense capabilities and deception tools to help protect, mask and cover its movement along the dangerous path from fort to theater embarkation.

Thought Exercise: The 1st Cavalry Division Deploys to Ukraine

How might this play out in a real-world scenario? Let's say that in 20 years—roughly 2044—Russia has rebuilt its military after being devastated by Ukraine in its war that began in February 2022. Yet the desire to denationalize Ukraine never went away, and Vladimir Putin's successor finds that the time is right to set out once again for Kyiv. In the interim, the United States and Ukraine strengthened their security guarantees, and, during that process, the United States promised to provide combat forces to support Ukraine in the event of future conflicts with Russia. Moscow, well aware of this agreement, and armed with the latest sensors, global sensor network, long-range fires, precision strike and medium-altitude long-endurance (MALE) drones, is intent on disrupting the deployment of U.S. forces—and even, if possible, disrupting the deployment process so much so that none of the promised forces can arrive. Put another way, Russia's goal would be to turn the conflict into one of internal protection rather than force projection. Given the potential impact of future technology and an overly aggressive Russia, this could play out in the following process:

- Step 1: Attack mobilizing personnel and military equipment at Fort Cavazos to disrupt the deployment process and generally to strike fear into the heart of the military and civilian population.
- Step 2: Trace-bomb the rail lines that link Fort Cavazos to the Port of Beaumont with long-range precision strike and MALE drones to deny the 1st Cavalry Division's heavy equipment from making a timely arrival at the port.
- Step 3: Hunt the road network that links Fort Cavazos to the Port of Beaumont with precision strike-enabled MALE drones to deny the 1st Cavalry Division's line haul equipment from arriving at the port.
- Step 4: Attack the fleet at Beaumont to prevent the loading and deployment of vessels marked for Europe.
- Step 5: Destroy the Port of Beaumont's infrastructure to prevent the loading of equipment onto the remaining sea-worthy vessels.
- Step 6: Use a combination of space, cyber, airborne and underwater sensors to identify the direction of travel for those vessels that are capable of making it out of the port. Target those vessels with drone swarms—airborne and seaborne—to sink U.S. vessels en route to Europe.
- Step 7: Identify real and potential port locations, and allocate long-range fires, precision strike and drone swarms to prevent U.S. vessels from making it ashore at those locations.

This scenario could easily be applied to the aerial deployment of personnel and equipment too, with slight modifications made for aircraft and airports. Consequently, an adversary's potential to penetrate to the heart of the U.S. homeland and to attrit the deployment of U.S. personnel, equipment and logistics is a legitimate concern for policymakers, military practitioners, the defense industry, domestic commercial partners and ultimately the average American citizen.

Reflecting on the challenge of contested logistics, we might ask: *How do the U.S. military and partnered state military forces assure logistics in an adversarial environment dominated by the omnipresent ability to globally target-identify, and then attack those targets in near-real time from protected and/or an adversary's sovereign territory, thus making counterattack strategically problematic?*

Elements of U.S. Military Operations

When considering this question, it is important to reflect on how U.S. military operations are conducted (i.e., how the state engages in armed conflict). This, in turn, will help illuminate the link between the concept of contested logistics and U.S. military operations. First, the U.S. military is an expeditious military, meaning that it engages in armed conflicts on other states' territory, and generally not on U.S. sovereign territory. As a result of this expeditious character, the U.S. military must be capable of (a) generating combat power state-side; (b) deploying combat power from the continental United States to forward locations; (c) conducting inter-theater movement of combat power, to include logistics; (d) establishing footholds in non-U.S. theaters of conflict; and (e) conducting inter-theater logistics to support itself.

Second, once in theater, this expeditious character means that it must maintain its logistics pipeline—from the states to whatever theaters of conflict in which it finds itself. Three factors must be considered when thinking about U.S. military operations and contested logistics. First, maintaining the logistics pipeline is clearly more challenging in areas in which lodgment is heavily contested. Second, it is also more challenging in situations where the distance to be traversed is great. Third, it is more challenging when an adversary possesses the capabilities and intentions to deny and disrupt the operations that are intended to maintain the pipeline.

Therefore, it is prudent for the U.S. military to find both ways and means to circumvent adversarial actions to disrupt the logistics pipeline process. Cutting the logistics tail is perhaps the most logical path to address this challenge. Developing methods to self-generate basic supplies—food, water, fuel, ammunition, medical supplies, repair parts—is the first step in this process. Further, developing non-fossil fuel to power military equipment is another rational step. In addition to alternative fuel sources, developing renewable and rechargeable fuel sources is another way to evade fossil fuel-oriented challenges. Regardless of how rational many of these ideas are, the challenges of turning ideas into capabilities, i.e., things that can make the ideas a reality, are not insignificant.

Elements of Assured Logistics

In essence, assured logistics assumes that industry can stay abreast of demand, and therefore, the elemental problem is one of movement. The U.S. military therefore needs assured movement from the continental United States, along the air, land and sea lines of supply. This is inter-theater movement. Within a theater of conflict, assured movement is the ability to move at operational and tactical distances, and it is also dependent on air, land and sea lines of supply. This is intra-theater movement.

Further, considering that the U.S. military is expeditious, it is important to keep the logistics continuum's tail as close to the head as risk allows. Tight coupling of the logistics pipeline, i.e., removing the physical distance and time between the tail and main body, allows for more efficient and coordinated movement of military forces. In turn, tight coupling of the logistics pipeline allows military forces to maintain tempo and direct pressure against an adversary. However, the loose coupling of the logistics pipeline, i.e., large distances of physical space and time between the logistics pipeline's tail and main body, creates a slinky effect in a force's movement. The tail, in loosely coupled logistics pipelines, becomes an anchor that slows the advance of a force. For an expeditious army, like the U.S. Army, this is a non-starter. As a result, Army forces must strive to reduce the slinky effect in their logistics pipeline, while the joint force should focus on reducing anchor-like effects that get in the way of unfettered movement of supplies. In a contested environment, the slinky and anchoring effects are significant military targets—in other words, they are strategic vulnerabilities.

U.S. Army operations are almost always expeditious, and therefore, the U.S. Army should look to build a force structure that allows for intra-theater transport across not only land, but also air and water.

Soldiers from the 4th Infantry Division offload vehicles from their European deployment at Fort Carson, CO. The use of civilian infrastructure, such as railroads, during deployments leaves the Army vulnerable to disruption from enemy cyberattacks on railroad control centers, track switches or the locomotives themselves (U.S. Army photo by Specialist Mark Bowman).



Therefore, the U.S. military—to include the Army—requires systems that can conduct strategic movement of supplies, which may well include additional heavy fleet weapon systems, such as tanks and heavy artillery. At the same time, for Army forces to fully contribute to the joint force, they require their own aircraft and watercraft. These additional capabilities will untether Army force logistics from their dependency on U.S. Air Force and U.S. Navy transportation craft, thereby allowing Army forces to conduct operational and tactical movement to ensure that their theater-level to division-level logistics flow in such a way that assures logistics.

Movement in a contested environment cannot be conducted in isolation. In terms of capabilities (i.e., tangible things), movement in contested environments requires protection and redundancy to ensure safe transport from Point A to Point B. In theory, protection remains constant between inter- and infra-theater movement; however, in practice, they differ. For inter-theater movement, long lines of supply—and the vessels hauling cargo—must be protected from multidomain attacks. Specifically, these supply lines must be protected against cyber-attacks, the cumulative effects of a vast multimodal, multidomain sensor-shooter network and against attrition-oriented attacks from the land, sea and air, regardless of the actual platform delivering the strike.

For intra-theater movement, supply lines might well still be long, but, as a rule, they are significantly shorter than those at the inter-theater level. Moreover, exquisite munitions are expensive and often in short supply. Therefore, they are less likely to reside with tactical formations. As a result, maintaining assured logistics through movement requires multi-domain systems, but those specifically geared toward operating in tighter spaces. For instance, Army forces require their own watercraft that facilitate the movement of logistics within a joint area of operations, or within a land component command's area of operation. As a hypothetical example, in a Russia scenario, if Army forces had a large logistics node (Logistics Node A) in Constanta, Romania, but operations had overextended the ability of Logistics Node A to maintained assured logistics, they would have to relocate it. If Russian land forces had been pushed back from the “Land Bridge to Crimea” and had maintained a faltering hold on the Donetsk and Luhansk oblasts, and Army forces needed to maintain their operational tempo and Russian disequilibrium, then their advancing the logistics epicenter from Logistics Node A to Mykolaiv or Stanislav, Ukraine (Logistics Node B), would make sense. Army forces tempo and their ability to capitalize on an adversary's faltering state should not be upheld by waiting on joint service partners to allocate movement capabilities such as watercraft and aircraft. As a result, Army forces should be outfitted with watercraft and aircraft to support their own intra-theater logistics, which will enhance the joint force's ability to fight and win by reducing the diversion of critical capabilities from the joint force to Army forces when time is critical.

In terms of forms of operating, movement in contested environments requires reconnaissance, deception and interference. These ideas are not new—they have been fundamentals of military operations in contested environments for as long as military forces have fought against other military forces. Nonetheless, the technology and methods used must evolve to keep pace with the imprint that multi-domain operations have on modern (and future) military activities. Reconnaissance and interference, for instance, is no longer a cavalry formation operating ahead of a land force and attempting to identify safe routes, locate adversary formations and conducting harassing fires and feints to interfere with an enemy’s plan. Today, reconnaissance, deception and interference must work its way into, and through, an adversary’s vast sensor network. It must work cohesively along a pathway through the enemy’s sensor network to generate corrupted and wrong information to cause the adversary to doubt the data that they receive from their network. In turn, this doubt will help slow an adversary’s decisionmaking and associated operations, thereby protecting logistics movement.

To conclude this section, it is important to examine “red flags” before moving on. Red flags here are any ideas outlined above that might not be feasible, acceptable or suitable. The biggest red flag might well be the high costs associated with redundancy. Therefore, technology and other methods should be explored to meet the need that redundancy exists to solve, while doing so with lower costs and more efficiency in mind. The same holds true for movement.

If the movement element can be either removed or reduced from the equation, then an adversary’s ability to contest logistics decreases, while an Army force’s ability to operate unincumbered increases, making their operations more efficient and more valuable to the commanders for whom they serve. Removing or reducing the requirement for moving logistics from node to node can be overcome by developing methods to create logistical needs on-site, or at least closer to the point of need. Therefore, research should focus on how to make that a reality. Aside from completely new weapon systems—i.e., tanks, Bradley fighting vehicles, etc.—many types of supplies could theoretically be able to be manufactured at the tactical edge of conflict, thus reducing the requirement to move them.

Lastly, the comments on reconnaissance, deception and interference are very “broad brushstroke.” This is intentional. This space—how to conduct reconnaissance, deception and interference, simultaneously, across the breadth and depth of the multidomain spectrum—is an immature area of research. Nonetheless, this is where policymakers, military practitioners and scholars should focus their attention to better prepare for contested logistics in sensor-rich, long-range, precision-strike governed battlespaces.

Setting aside these considerations, it is instructive to examine senior military leader thoughts on contested logistics, before making a few recommendations for addressing the problem.

Senior Military Leader Thoughts on Contested Logistics

Many Army leaders have categorized contested logistics as one of the biggest warfighting challenges that the U.S. Army will face in future armed conflict.⁶ Before continuing, an important caveat to consider is that although a lot of the dialogue concerning contested logistics is focused on China, the challenge applies to any threat that is capable of simultaneously: (a) striking into the United States; (b) disrupting the movement of personnel, equipment and other logistics across air, sea and land; (c) denying the U.S. ability to operate ports and airfields; (d) denying the U.S. ability to conduct joint forceable entry; and (e) targeting U.S. logistics nodes and lines of communication when in theater. Thus, contested logistics

Protection, deception and masking are key investments that the U.S. Army must take seriously to get contested logistics off the drawing board and into the field.

is not just a China problem, or indeed any theater-actor specific challenge. On the contrary, it is a capabilities- and intentions-based challenge.

In perhaps putting the cart of technology before the horse of problem identification, senior military leaders have asserted that the U.S. Army's sustainment enterprise must do five things "to provide future readiness" in situations in which contested logistics are considered.⁷ First, the sustainment enterprise must leverage data analytics and invest in predictive logistics systems.⁸ Second, the sustainment enterprise must use autonomous technology to extend operational reach and ensure freedom of action.⁹ Third, the sustainment enterprise must reduce the Army's logistics pipeline. Fourth, the sustainment enterprise must move away from fossil fuels, electrify its fleet and use alternative fuels to power its fleet.¹⁰ Fifth, the sustainment enterprise must identify a solution to its deficiency in Army watercraft.¹¹

Conclusion

The U.S. military—to include the Army—is expeditionary. Therefore, it inherently possesses long supply pipelines. These pipelines—from manufacturing sites to tactical units on the front line of combat—are critical vulnerabilities in a contested environment. Smart adversaries, especially moving into the future, will make use of global sensor networks to identify logistics manufacturing locations, nodal shipping positions, routes to and from those nodes and theater-specific embarkation locations. Moreover, adversaries possessing the capabilities and intentions might well attack anywhere, or perhaps even everywhere, along that long logistics pipeline. Thus, Army forces, as well as policymakers, other military practitioners and scholars must continue to experiment with ideas, as well as notional forces and potential materials, to reduce the critical vulnerabilities that exist within the logistics pipeline.

As noted previously, Army leaders are already working to develop technology-related solutions to some of the challenges of contested logistics. For those not directly engaged in the Army's ongoing work on contested logistics, thinking about how to address contested logistics remains a viable mechanism for "bottom-up" or perhaps even lateral assistance. The following question, as noted above, is helpful in this endeavor: *How do the U.S. military and partnered state military forces assure logistics in an adversarial environment dominated by the omnipresent ability to globally target-identify, and then attack those targets in near-real time from protected and/or an adversary's sovereign territory, thus making counterattack strategically problematic?*

While the Army focuses on technological solutions, the rest of the defense studies establishment should devote time and mental energy to develop rational theories to account for the ways in which Army forces can operate and then organize to address the challenge of contested logistics.



Amos Fox is a PhD candidate at the University of Reading and a freelance writer and conflict scholar writing for the Association of the United States Army. His research and writing focus on the theory of war and warfare, proxy war, future armed conflict, urban warfare, armored warfare and the Russo-Ukrainian War. Amos has published in RUSI Journal and Small Wars and Insurgencies among many other publications, and he has been a guest on numerous podcasts, including Royal United Services Institute's Western Way of War, This Means War, the Dead Prussian Podcast and the Voices of War.

Notes

- ¹ “American Entry into World War I, 1917,” *U.S. Department of State*, accessed 16 December 2023.
- ² Richard Hammond, “Sinking Feelings: The Cause of Allied Victory in the Mediterranean During the Second World War,” *Cambridge University Press*, 24 June 2020.
- ³ Hammond, “Sinking Feelings.”
- ⁴ Anastasia Obis, “Army Leaders Say Data is Key to Tackling Contested Logistics,” *GOVCIO*, 2 August 2023.
- ⁵ Beth Reece, “Managing Logistics in Contested Areas is Key to Military Success,” *U.S. Department of Defense*, 1 September 2023.
- ⁶ Marian Accardi, “Army Futures Command Exploring Contested Logistics,” *Redstone Rocket*, 16 August 2023.
- ⁷ Megan Gully, “Army Focuses on Contested Logistics – A Threat to Enemy,” *Army New Service*, 3 April 2023.
- ⁸ Gully, “Army Focuses on Contested Logistics.”
- ⁹ Gully, “Army Focuses on Contested Logistics.”
- ¹⁰ Gully, “Army Focuses on Contested Logistics.”
- ¹¹ Gully, “Army Focuses on Contested Logistics.”

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