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FALL 2026

ARMY SUSTAINMENT

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ON THE COVER

The theme for the fall issue of *Army Sustainment* is Continuous Transformation Within the Army Sustainment Enterprise. SGT Troy Loomis, a motor transport operator assigned to the 16th Sustainment Brigade, 21st Theater Sustainment Command (TSC), inspects salvaged drone components at the 21st TSC's Millrinder Innovation Center on Panzer Kaserne in Kaiserslautern, Germany, July 14, 2026. (Photo by PFC Robert Palmer)

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Is your formation working on new, cutting-edge initiatives or developments that could significantly impact the entire sustainment enterprise? Your work is crucial, and we want to hear from you!

DID YOU KNOW?

Our new "Did You Know?" section is a platform for units and service members to showcase initiatives that enhance formations and operating procedures. By sharing your successes, you're not just highlighting your hard work, but also helping other units avoid duplicating efforts.

Let's make sure no one has to reinvent the wheel.

Modernizing Army Sustainment

Projecting Combat Power and Sustaining Lethality at the Speed of War



■ *By LTG Gavin A. Lawrence*

The Army sustainment enterprise (ASE) must support warfighters and maintain the decisive advantage in a dynamic security environment defined by rapid technological change, contested logistics, and multi-domain threats. This cannot be a future aspiration; it is an active, operational imperative. From the strategic support area to the tactical edge, the ASE is modernizing how we generate, sustain, and project combat power to ensure our warfighters can fight and win anywhere in the world.

At the core of sustaining operational readiness is our pivot to predictive logistics. In high-tempo, contested environments, commanders cannot afford to wait for a failure to occur; they must have real-time visibility into operational readiness, supply chain vulnerabilities, and risk. To achieve this, the ASE is driving targeted, aggressive investments in data-driven sustainment intelligence.

A shining example is Weapon System 360 — a true end-to-end, real-time view of weapon system health. It brings together platform data, supply availability, repair parts, and industrial capacity into a single operational picture. A late component for a radar system or a single failed launcher cable can shift the missile defense posture of an entire region; visibility allows us to act before those failures impact readiness.

Meanwhile, the operational readiness program exemplifies what is possible when we bring depot maintenance support directly to the warfighter. We have built a platform from scratch that uses data and analytics to identify units with the lowest readiness rates and to predict when their equipment will fail. Mobile depot fly-away teams then deploy directly to the field to repair that equipment while conducting side-by-side, over-the-shoulder maintenance training with Soldiers. The results speak for themselves: participating units are seeing a sustained 11% to 14% readiness increase in their brigade platforms and a dramatic reduction of money spent on repair parts.

This is about Soldiers having the equipment they need before they need it. This is about Soldiers spending more time training on their core warfighter tasks than in supply rooms and motor pools. This is about delivering ready combat formations.

We are also breaking down bureaucratic hurdles and supply chain bottlenecks through reverse engineering, digital twins, and accelerated certification of advanced manufactured replacement parts. By fabricating critical parts on demand, we are enhancing supply chain resilience and reducing dependency on single points of failure. Our organic manufacturing of small unmanned aircraft systems (sUASs) components is rapidly maturing; Tobyhanna Army Depot, Pennsylvania, has initiated production of small brushless motors, heading toward an annual capacity of 480,000, and will establish a new circuit card assembly line in summer 2027. These efforts are closing a critical gap in the Army's ability to domestically manufacture sUAS components.

We must never lose sight of our responsibility as sustainers to enhance the Soldier experience. Several herculean efforts are taking place across Army installations to change the way our Soldiers in garrison train, eat, and live. We are driving innovation in military construction by infusing commercial construction best practices, using alternative military construction methods, and leveraging U.S. Army Materiel Command's role as an Army construction agent. At the same time, the Army is overhauling the installation food ecosystem, ensuring Soldiers have consistent access to healthy, affordable food through the expansion of campus-style dining venues, Victory Fresh sites, flexible eating and expanded dining initiatives, kiosks, food trucks, and meal-prep services.

Ensuring future readiness is a continuous process that demands a cultural shift across the entire ASE. I challenge every Soldier, civilian, and contractor within our formations to question legacy processes, embrace data-driven tools, and seek innovative ways to improve operational tempo. Our mission remains constant and clear — to project and sustain combat power at the speed of war. Together, we will ensure that the Army remains the most lethal and ready land force in the world.

LTG Gavin Lawrence currently serves as the acting commander of U.S. Army Materiel Command. He is a graduate of the U.S. Military Academy where he was commissioned as a second lieutenant in the Quartermaster Corps. He has a Master of Arts degree in national security and strategic studies from the U.S. Naval War College, Rhode Island, and a Master of Arts degree in strategic studies from the U.S. Army War College, Pennsylvania, where he successfully completed the Advanced Strategic Arts Program. He has also completed the Massachusetts Institute of Technology Seminar XXI program and the University of North Carolina's Institute for Defense & Business LOGTECH Executive program.

In high-tempo, contested environments, commanders cannot afford to wait for a failure to occur; they must have real-time visibility into operational readiness, supply chain vulnerabilities, and risk.

FORGING THE FUTURE

The Meridian Transformation Surge and the Next Generation of Army Sustainment



■ *By LTG Michelle Donahue*

To succeed in multi-domain operations, the Army sustainment enterprise must transition from a reactive network of legacy systems to a predictive, unified, and super intelligence (SI)-driven common operating picture. Catalyzed by recent Army-industry data interoperability initiatives, the Meridian transformation effort will build an open, integrated software ecosystem. The program targets December 2026 for the initial fielding of capabilities aimed at enabling the seamless flow of data from the strategic support area directly to the tactical edge.

Strategic Imperatives in a Contested Environment

The character of war changes rapidly; our sustainment architecture must evolve at the same pace. Preparing for large-scale combat operations against peer and near-peer adversaries means we can no longer rely on uncontested supply lines or guaranteed network connectivity. The modern battlefield is increasingly transparent, exposing logistics networks instantly to sensors, drones, and cyber threats. In this environment, there is no sanctuary. Adversaries target our sustainment networks, data infrastructure, and industrial capacity constantly, not just during active conflict. To maintain our decisive overmatch, we must fundamentally rethink how we manage logistics data.

The Meridian ecosystem directly answers this threat by hardening our data architecture, using resilient, cloud-to-edge pathways and decentralized data nodes to ensure sustainment operations remain secure, survivable, and continuous even under active disruption. Experience from ongoing conflicts reveals a universal truth: all systems break under stress. Modernizing the Army sustainment enterprise is an active operational mandate; our data must be resilient, adaptable, and as mobile and lethal as our combat formations.

The Vulnerability of Fragmented Legacy Systems

Our logistics architecture was built for a profoundly different era of conflict. During decades of operations in Iraq and Afghanistan, we developed world-class enterprise resource planning systems in isolated silos. We operated in largely permissive environments where we had the luxury of time, bandwidth, and uncontested rear areas. The result is a fragmented digital ecosystem where strategic supply, tactical maintenance, and transportation movement systems do not autonomously communicate with one another.

When distinct platforms operate independently, commanders and sustainment staffs must manually bridge digital gaps, causing unacceptable delays and inaccuracies. This architecture creates proprietary traps where critical readiness data is locked behind vendor-specific walls. As former Secretary of the Army Dan Driscoll states, "We cannot fight from a swivel chair across multiple disaggregated systems anymore." We can no longer tolerate a logistical scenario in which integrating two databases requires years of acquisition and costly patch-and-repair middleware.

The Catalyst: Operation Jailbreak

The urgency to fix data silos, a critical lesson learned from observing rapid, ad-hoc commercial technology integration in Ukraine, drove the historic Operation Jailbreak earlier this year. Held at Fort Carson, Colorado, from May 1 to 19, 2026, the multi-week hackathon represents a profound shift in how the Army approaches software acquisition under the new "Right to Integrate" mandate. Military operators, startup developers, and software engineers from major defense primes — including Palantir, Anduril, Lockheed Martin, and RTX — were brought together with a singular goal: to literally jailbreak our own data from the long-standing, proprietary barriers that have choked our systems for decades.

During this intensive sprint, developers proved that vendor lock-in is a choice, not a technical necessity. By forcing competing hardware, ranging from diverse radars and counter-drone systems to robotic ground units, into the same room and mandating interoperability, participants built and integrated application programming interfaces (APIs) on the fly. They demonstrated that the Army's disparate systems could bypass bespoke configurations and share information instantaneously on a single, shared command and control screen when artificial walls were torn down.

Bypassing the traditional, decade-long procurement cycles that have historically slowed Joint All-Domain Command and Control efforts, these rapid integrations yielded software patches that were pushed directly to operational deployments in U.S. Central Command. Operation Jailbreak was the vital proof-of-concept required to show the force that a unified logistics common operating picture is entirely achievable today.

The Meridian Transformation Surge

Meridian provides an API-first, machine-forward, event-driven ecosystem grounded in modular open systems architecture. Rather than centralizing control into a single, brittle monolithic system, Meridian establishes a resilient ecosystem of independent, mission-focused applications. To achieve the Meridian vision, the Army invited private-sector partners to propose rapid integration approaches. Companies are submitting short proposals outlining exactly how they will operate within this open ecosystem. Selected teams will be invited to participate directly in the transformation surge, a partnership that benefits both the military and the commercial sector through increased competition, transparency, and drastically improved system integration.

Phased Execution; Development, Security, and Operations (DevSecOps); and Delivery

The Meridian effort is not a multi-year acquisition program; it is a rapid, phased-capability delivery initiative designed to yield immediate results. To achieve this speed, Meridian departs from the traditional model of using functional intermediaries. Instead, it mandates a direct alignment model using DevSecOps practices, bringing software developers and end-users into close, continuous contact. Critical capabilities will emerge dynamically through direct engagement with the mechanics, supply clerks, and logistics officers executing the mission.

From late August through October 2026, Headquarters, Department of the Army G-4, will lock in the integration standards. In November, a collaborative transformation jailbreak surge event will take place at Joint Base Lewis-McChord, where developers and warfighters will build solutions side-by-side. To prove end-to-end interoperability, the initial minimally viable product will prioritize deploying the foundational platform and integrating the sustainment S-4/support operations decision support tools already proven across a number of divisions. By December 2026, data teams across the Army will aggressively integrate these newly developed capabilities, delivering a viable sustainment warfighting replacement to our legacy monolithic business systems.

The Paradigm Shift to Predictive and Precision Sustainment

The Meridian ecosystem will enable a necessary shift toward precision sustainment, where supplies are pulled to the exact point of need

based on real-time, integrated data. We can no longer afford reactive repair, waiting for components to fail before initiating a supply request and a maintenance work order. By integrating the data liberated during the jailbreak initiatives into an advanced modular open systems architecture and building systems that collect data correctly from the beginning, we unlock the true operational power of SI and machine learning.

The integration of these algorithms is designed to scale alongside our data maturity. As the enterprise data environment continues to unify, these analytical tools are positioned to constantly analyze our unified data environment, identifying supply chain bottlenecks before they impact the tactical edge and predicting equipment failures long before they occur on the battlefield. This predictive capability allows our maintainers to order parts and schedule services proactively, effectively conducting maintenance on our terms rather than the enemy's.

Resiliency and Data Operations at the Tactical Edge

As we build this capability through the Meridian surge, we are designing for the harsh realities of the modern battlefield. While adversaries continuously target our networks, Meridian is purpose-built to maintain continuous operational capability and demonstrate resilience under active cyber and electronic warfare threats. This resilience is driven by a decentralized, edge-centric architecture that uses local data caching and store-and-forward protocols. When connectivity is degraded or severed by electronic warfare, Meridian nodes continue to operate independently at the tactical edge. Once pathways are restored, the system automatically synchronizes and updates the enterprise common operating picture asynchronously. Tactical units, from the brigade support battalion down to the forward support company, will process logistics data locally using ruggedized edge computing nodes. They will maintain their logistics common operating picture integrated with Army command control initiatives, automatically packaging data and synchronizing with the strategic enterprise in rapid bursts the moment network connectivity is restored.

Defending the Data: Zero-Trust and Supply Chain Security

Our adversaries understand that disrupting our logistics data is just as effective as physically destroying a supply convoy. Protecting the integrity of the Army sustainment enterprise is a non-negotiable warfighting requirement. Meridian leverages embedded compliance services that actively police architectural boundaries in real time. As commercial partners are onboarded through the transformation surge, the Meridian modernization effort strictly enforces zero-trust identity and access management, ensuring that every human operator and machine-to-machine exchange is continuously authenticated.

The Path Forward for the Sustainment Professional

The Meridian transformation surge is a decisive step toward building a sustainment enterprise that is integrated, adaptable, and ready for the extreme demands of modern war. We have successfully used the jailbreak events to free our data from the systems of the past; now we must secure it, integrate it, and weaponize it for the future.

Transforming the enterprise requires every sustainment professional to treat data discipline as a core warfighting competency. We must cultivate a culture of data literacy across the force, fully embracing the Meridian initiative. As we surge toward our December 2026 milestone, the G-4 remains fully committed to delivering the unified tools and resilient systems that will allow our logisticians to anticipate requirements, extend operational reach, and guarantee victory on any battlefield.

This We'll Defend!

LTG Michelle K. Donahue serves as the Deputy Chief of Staff of U.S. Army G-4. She served as the as the commander of the U.S. Army Combined Arms Support Command/ Sustainment Center of Excellence, and as a sustainment brigade commander, support squadron commander, battalion executive officer, battalion support operations officer, battalion S-4, battalion S-2/S-3, and battalion and brigade S-1. She also served as the 56th Quartermaster General and Commandant of the U.S. Army Quartermaster School at the Sustainment Center of Excellence; Deputy Director for Readiness, Strategy and Operations for the Army's Deputy Chief of Staff/G-4; and Special Assistant to the Director, Army Staff for the 2023 Army Transition Team. A Distinguished Military Graduate, she received her commission in the Quartermaster Corps from Duke University in 1996. She also holds advanced degrees from Georgetown University and National Defense University.

DELIVERING WARFIGHTING ADVANTAGE

THROUGH CONTINUOUS TRANSFORMATION



■ *By LTG Robert M. Collins*

The modern battlefield has erased the line between tactical operations and strategic logistics. From Ukraine to the Indo-Pacific, our depots, supply chains, and production lines are active targets. Adversaries understand that military advantage depends on our capacity to generate and sustain combat power. The bottom line is simple: if we cannot surge production, move parts across contested space, and repair systems forward, we will lose. Sustainment is not a supporting capability; it is a decisive warfighting function.

Delivering this advantage requires the Army sustainment enterprise to change how it operates. For two decades, we operated a system optimized for a predictable, peacetime environment — rewarding efficiency, minimizing inventory, and routing decisions through multiple layers of staff. That model is no longer sufficient. Continuous transformation cannot be a temporary milestone we check off; it must become our operational baseline, from a program office writing a contract to a mechanic on a depot floor.

Empowering Decision Makers and Cutting Bureaucracy

Achieving this agility requires addressing our slowest transition point: the speed of our decisions. Our administrative and acquisition cycles take too long because we allow risk-averse processes to dictate our pace. Requiring redundant signatures for routine sustainment actions drains operational momentum.

We must push authority down to the level of execution. When we trust portfolio acquisition executives, program managers, and depot commanders to make decisions in real time, the entire enterprise moves at the speed of the fight. Leaders must not wait for headquarters for routine approvals they are fully capable of executing themselves. What matters is that Soldiers have equipment and parts before the tempo outruns our ability to sustain them.

Operationalizing Agile Sustainment

Putting this mindset into practice requires concrete operational shifts, not academic frameworks. We are transitioning from centralized, vulnerable logistics hubs toward three direct operational imperatives.

First, we must predict rather than react. We must use data to identify parts shortages and maintenance trends before they deadline a system. Better data is about giving commanders decision advantage, not making prettier slides. Second, we must disperse our footprint, trading massive hubs for smaller, mobile, dispersed nodes that are harder to target. Finally, logistics must enable operational tempo, ensuring commanders have freedom of maneuver rather than waiting on logistics to catch up.

We are already seeing this work. During recent exercises, forward-deployed printing crews used 3D printing and right-to-repair authorities to complete critical repairs in hours instead of waiting weeks for parts to cross an ocean. Similarly, we are operationalizing autonomous resupply platforms to move ammunition and medical supplies through contested corridors, reducing risk to our Soldiers while maintaining momentum.

But technology is only an enabler; it requires leaders willing to accept calculated risk to move fast.

Rebuilding and Extending the Industrial Base

This transformation also requires modernizing our physical footprint. At Anniston, Red River, and Letterkenny, legacy infrastructure operates alongside state-of-the-art digital production equipment.

We are modernizing our organic industrial base at a scale not seen in decades. Overhauling depots, arsenals, and ammunition plants is a strategic necessity; if we cannot surge production when conflict begins, we cannot sustain a prolonged fight. We must treat these facilities as warfighting assets.

Because distance remains a challenge — especially across the 12,000-mile Pacific — we cannot rely on American capacity alone. Through the Regional Sustainment Framework, we are partnering directly with allied industrial bases in theater. If a regional partner repairs an American platform on their soil, we turn a massive logistics challenge into a turnaround measured in days rather than weeks. These partnerships deliver raw industrial capacity and give commanders real operational flexibility.

The Leadership Mandate: Make the Call

The hardest part of this transformation is persuading leaders and professionals to actually use the authorities we give them.

Our acquisition professionals, logisticians, engineers, and Army civilians make thousands of decisions every day that dictate readiness. That is where we win or lose — not in a policy memo. My expectations are straightforward:

- Design for Sustainment: Program offices must design sustainment into weapon systems from day one. We cannot afford to bolt it on as an afterthought after life-cycle costs balloon.
- Decide with Imperfect Info: Leaders must stop waiting for perfect information before they decide. We must break the habit of waiting for permission and reward initiative.

If you are closest to the problem, have the data, and possess the authority — make the call. We will accept the calculated risk of moving rapidly over the guarantee of failing slowly. That is how the Army sustainment enterprise delivers a decisive warfighting advantage for the joint force.

LTG Robert M. Collins currently serves as the Principal Military Deputy to the Assistant Secretary of the Army (Acquisition, Logistics and Technology) and as the director of the Army Acquisition Corps. He commissioned as an Armor officer through the Shippensburg University ROTC program in 1992. He previously served as the Army's Product Manager for Warfighter Information Network-Tactical; Army's Project Manager for Distributed Common Ground System-Army; assistant to the Program Executive Officer for Intelligence, Electronic Warfare and Sensors (PEO IEW&S) and later as the PEO IEW&S; Program Executive Officer for Command, Control, Communications-Tactical; and Deputy for Acquisition and Systems Management. He has a Master of Arts degree in computer resources and information management, a Master of Science degree in human relations, and a Master of Science degree in national resource strategy. He is a graduate of the Eisenhower School of Strategic Studies, Combined Arms Services Staff School, Command and General Staff College, the Armor Officer Basic Course, Signal Advanced Course, and Systems Automation Course.

Revolutionizing Army Readiness

The Portfolio Acquisition Executive and the Agile Sustainment and Ammunition Organization



■ *By MG Sean P. Davis*

As the modern battlefield evolves into a highly transparent, contested, and hyper-lethal environment, the Army must transform its approach to fielding and sustaining combat power. Driven by the largest organizational change in decades under Army acquisition reform, the establishment of the Portfolio Acquisition Executive (PAE) marks a fundamental shift in how the military develops, manages, and delivers capabilities. At the forefront of this modernization is the PAE Agile Sustainment and Ammunition (AS&A), an organization dedicated to ensuring our forces can fight, win, and sustain in any future operating environment.

What Is the PAE?

The PAE is a specialized fusion of acquisition and Center of Excellence mutually supporting leadership roles, established to serve as a single point of visibility and accountability for all acquisition activities within a capability portfolio. A PAE is fully accountable for prioritizing and synchronizing disparate acquisition functions across the enterprise, which includes managing capability gaps and requirements, system centers, programming, acquisition, sustainment, testing, and contracting. By reporting to the U.S. Army Transformation and Training Command (T2COM) for requirements generation, and by reporting to the Assistant Secretary of the Army for Acquisition, Logistics, and Technology for acquisition and materiel development, the PAE operates with unity of command. Crucially, the PAE has the authority to make critical trade-offs and apply flexible funding, streamlining decision cycles and rapidly delivering vital capabilities directly to the warfighter.

What Is the PAE AS&A?

The PAE AS&A is the portfolio tasked with developing, fielding, and sustaining priority sustainment capabilities for Army warfighting formations and with managing armaments and ammunition for joint and partner forces. Recognizing that legacy logistical operations and predictable supply lines are no longer viable in large-scale combat operations (LSCO), the PAE AS&A aims to modernize logistics for a transparent and contested global environment.

By leveraging cutting-edge technologies like super intelligence (SI), advanced manufacturing, autonomy, and robotics, the PAE AS&A seeks to create networks of smaller, dispersed, and highly mobile logistics nodes. Additionally, as the single manager for conventional ammunition, the PAE AS&A holds complete authority over the

For battalion commanders operating at the tactical edge, establishing the PAE AS&A represents a fundamental upgrade to their operational freedom and combat endurance.

ammunition development and production enterprise, working to improve the industrial base's responsiveness, reduce production costs, and rebuild the "Arsenal of Freedom."

Project Orion: Unifying the Enterprise

With so many diverse programs and initiatives under the AS&A portfolio, getting the entire acquisition and T2COM enterprise on the same page is complex but essential. This synchronization for PAE AS&A will be achieved through Project Orion. Project Orion is a unified strategic plan designed to move the enterprise from tactical, piecemeal problem solving to a cohesive portfolio-wide strategy. It nests directly within our operational concepts (how we fight and sustain) to prioritize requirements, manage materiel solutions, and integrate science and technology efforts, underpinned by approved Army warfighting gaps, the Modular Open Systems Approach, and the characteristics of need (CON).

The CON Under AS&A

To clearly message its top-tier gaps to industry and internal developers, the PAE AS&A uses CON statements. These living documents outline the capabilities needed to establish a resilient, decentralized sustainment ecosystem. The primary CON falling under AS&A includes the characteristics discussed below.

Assured Distribution

The Army is reshaping how it moves supplies on the future battlefield. As modern conflicts become more dispersed, digital, and contested, traditional supply lines are increasingly vulnerable to attacks from drones, cyber threats, and electronic warfare. Assured distribution is the Army's push for a smarter, faster, and more resilient logistics network, one that uses manned and unmanned vehicles, advanced autonomy, SI, and flexible routing to keep Soldiers supplied anywhere and anytime.

The concept focuses on building a distribution system that can operate under constant pressure, adapt to sudden changes, and continue delivering fuel, ammunition, medical aid, and critical equipment across land, sea, and air. This approach combines autonomous ground vehicles, modern Army watercraft, cargo drones, and automated loading modules into a unified, multi-domain network designed to outpace enemy disruption.

Assured distribution invites industry to help deliver scalable, cyber-secure, and easy-to-maintain systems capable of mass production. The Army must sustain dispersed forces during LSCO, regenerate combat power quickly, and maintain an uninterrupted flow of supplies in the most demanding environments.

Maintenance and Advanced Manufacturing

This CON addresses the critical vulnerability of centralized logistics by pushing repair and fabrication to the tactical edge. It focuses on five critical pillars:

- Advanced Manufacturing: Enables responsive, point-of-need fabrication through additive/subtractive manufacturing, robotic welding, and reverse engineering. It empowers units to produce essential parts, including circuit cards, in denied or degraded environments.
- Ground Maintenance Platforms and Tool Sets: Replaces heavy, aging tool kits with highly mobile, modular, and self-contained repair nodes capable of keeping pace with maneuver forces.
- Recovery: Modernizes extraction and battle damage assessment with assets capable of unassisted recovery operations, paving the way for semi-autonomous and autonomous evacuation.
- Predictive Sustainment: Leverages total asset visibility, autonomous data collection, and digital maintenance workflows (like automated data off-loads and tele-maintenance) to forecast supply consumption and replace parts before failure.
- Test, Measurement, and Diagnostic Equipment: Provides expeditionary, ruggedized, and SI-assisted diagnostic tools for forward testing and repair of electronic and mechanical parts.

Energy, Supply, and Services

This CON ensures formations have continuous access to vital life-support and operational necessities without relying on predictable, vulnerable distribution patterns. To achieve this, it modernizes energy and fuel, focusing on exportable on-board power, energy harvesting, and localized energy storage and distribution to drastically reduce reliance on generators and the fuel-distribution burden associated with them. Power storage will significantly reduce the thermal and acoustic signatures that make generators a target. Additionally, the framework focuses on agile delivery and storage of necessary classes of supply using scalable shelters that Soldiers work in, containers for storage, and environmental control units.

This CON also modernizes water production by reducing the number of massive purification hubs by providing scalable, more dispersed water purification, even down to the platoon level for tactical-edge generation by trained general purpose users. It also overhauls field feeding to provide quality nutrition with minimal footprint and ensures that essential services like fatality management, hygiene services (laundry and showers), personnel services (mail and finance), and religious services are maintained for dispersed units.

What the PAE Means for Battalion Commanders

For battalion commanders operating at the tactical edge, establishing the PAE AS&A represents a fundamental upgrade to their operational freedom and combat endurance. Historically, tactical commanders have had to burden themselves with protecting long, vulnerable logistical tails and wait on sluggish bureaucratic processes for critical capability upgrades.

With the PAE empowered to make immediate funding trade-offs and streamline decision cycles, battalion commanders will see relevant, modernized equipment — such as tactical 3D printers, autonomous resupply drones, and mobile power generators — fielded at the speed of need. The shift toward predictive sustainment and point-of-need manufacturing means commanders can build and regenerate combat power forward, without waiting for parts to ship from the continental U.S. Ultimately, the PAE AS&A provides battalion commanders with a more agile, self-sufficient force, allowing them to focus on maneuver and lethality rather than being anchored by their supply lines.

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Innovation at the Point of Friction

The Platoon as an Innovation Driver

■ *By 2LT Carter R. Evans*

Continuous transformation has become a defining priority across the Army sustainment enterprise. Discussions often center on super intelligence (SI), predictive maintenance, digital modernization, and the next generation of enterprise capabilities. These initiatives are essential, but they represent only one direction of transformation. Another source of innovation already exists throughout the force: the Soldiers and junior leaders solving practical problems inside platoons, maintenance bays, and motor pools.

The sustainment enterprise must view platoons not only as recipients of innovation but also as sources of innovation. Platoon leaders and platoon sergeants understand which routine processes consume unnecessary time, where information flows break down, and what administrative requirements create friction within their organizations. When empowered to solve those problems, platoons become laboratories for continuous transformation.

As a transportation platoon leader, I found that one of the greatest constraints on readiness is not a shortage of motivated Soldiers or capable equipment but the accumulation of small administrative tasks that compete for leaders' attention. Tracking appointments, monitoring awards, reviewing personnel actions, updating readiness trackers, and maintaining visibility of training requirements are all necessary responsibilities. Making those processes more efficient gives leaders more time to train Soldiers, maintain equipment, and prepare for missions.

The Army has never lacked innovative Soldiers. Mechanics fabricate specialized tools. Supply sergeants refine accountability systems. Maintenance sections improve local processes to solve recurring problems. Today's Soldiers simply possess a different set of tools. Many of them entered the Army having grown up with cloud-based software, smartphones, and increasingly, SI. The instinct to improve inefficient processes has not changed. What has changed is how quickly a Soldier can now turn an idea into a practical digital solution.





Innovation Begins with Friction

Every platoon develops local systems to manage information. Some rely on spreadsheets, while others use whiteboards, notebooks, shared calendars, or messaging applications. These systems exist because leaders adapt to recurring administrative demands. The challenge is not that platoons create these products but that successful solutions rarely move beyond the organizations that develop them.

Within my platoon, Soldiers have already begun solving problems independently. Shared digital calendars replaced handwritten appointment trackers. Leaders developed shared spreadsheets to monitor awards, personnel actions, and administrative requirements. These are simple improvements, but they reflect a broader truth: Soldiers naturally seek ways to eliminate repetitive work.

The question is not whether innovation exists at the platoon level. The question is whether the Army identifies, validates, and shares those innovations across the force.

A Soldier's Solution to a Platoon Problem

One example came from a junior Soldier in my platoon who independently developed a web application to simplify vehicle readiness reporting. Previously, our platoon relied on paper maintenance forms and a whiteboard maintained inside the platoon office to track vehicle readiness. While effective, the process limited visibility and required leaders or Soldiers to physically reference the board for the most current information.

The Soldier's application displays vehicles assigned to the platoon and allows users to update each vehicle's full-mission capable or non-mission capable status while recording maintenance faults in a comment field. Leaders can filter the fleet by readiness status, determine when a vehicle was last updated, and access that information from a phone while standing in the motor pool or preparing for a mission.

The application does not replace disciplined maintenance reporting. Soldiers still must perform preventive maintenance checks and services correctly and update information accurately on Department of the Army Forms 5988-E, Equipment Maintenance and Inspection Worksheet (EGA). Instead, it makes existing information more accessible while reducing unnecessary steps.

More importantly, no one directed the project. A Soldier recognized a recurring problem, built a practical solution, and improved how the platoon shared operational information. While the application solves a local challenge, it illustrates a broader opportunity: Soldiers closest to day-to-day operations are often best positioned to identify inefficient workflows and improve them.

Leaders as Innovators

Innovation is equally evident among junior leaders. A platoon sergeant in another maintenance formation recognized that routine administrative requirements were consuming leaders' time. Rather than accepting those inefficiencies, he taught himself to code and developed a digital platform tailored specifically to his formation.

The platform maintains Soldier profiles that contain accomplishments, appointments, projected permanent change of station dates, and administrative milestones. It alerts leaders when awards or evaluations should begin, while SI assists with organizing information and drafting administrative products like NCO evaluation report bullets. User permissions allow leaders to tailor access throughout the organization while maintaining appropriate oversight.

The objective is not to automate leadership. It is to automate routine administrative work so leaders can spend more time planning missions and developing Soldiers. When used appropriately, SI enhances leader efficiency without replacing leader judgment.

Like the junior Soldier's web application, this platform began with a simple observation: there had to be a better way. Both examples demonstrate that innovation rarely



Soldier assigned to 35th Maintenance Surge Team–Stryker, 542nd Support Maintenance Company, 13th Combat Sustainment Support Battalion, conducts scheduled maintenance checks on a Stryker at 542nd Support Maintenance Company motor pool on Joint Base Lewis-McChord, Washington, Jan. 12, 2026. (Photo by SPC Sar Paw)

starts with a requirement from higher headquarters. More often, it begins when Soldiers closest to the problem decide to solve it themselves.

Building Better Systems

My platoon adopted a simple philosophy: if a recurring administrative process can be standardized, tracked, or automated without reducing leader oversight, we must improve it.

That philosophy led to practical systems for tracking awards, Army Fitness Test (AFT) requirements, weapons qualifications, personnel actions, and leave requests. These systems were never intended to be revolutionary. They simply solve recurring problems that consume leader time.

One example is an awards tracker that identifies Soldiers approaching permanent change of station timelines while also highlighting upcoming AFT and weapons qualification expirations. The tracker gives leaders earlier visibility, allowing them to address requirements before they become overdue.

Another improvement required no new software at all. By obtaining intermediate approval authority within the Integrated Personnel and Pay System–Army, leave requests now route through platoon leadership before reaching the company commander. The commander retains approval authority, but platoon leadership gains awareness earlier in the process, improving communication and reducing unnecessary surprises.

None of these systems are individually significant. Collectively, they create a platoon that spends less time managing information and more time training Soldiers, maintaining equipment, and preparing for missions.

The same philosophy also shapes how I think about future innovation. Property accountability, for example, remains one of the Army's most time-intensive administrative requirements. Leaders routinely conduct inventories using hundreds of pages of bills of materials while cross-referencing technical manuals and manually recording shortages. A secure digital application capable of displaying component photographs, linking directly to technical manuals, and synchronizing inventory updates from a tablet would significantly reduce the administrative burden while improving accountability. The technology to make this happen already exists. The opportunity lies in applying it to property accountability.

Capturing Innovation Across the Enterprise

The examples in this article were developed independently by a junior Soldier, a platoon sergeant, and a platoon leader. None were directed by higher headquarters. None required dedicated funding or formal acquisition programs. Each began with the same observation: there had to be a better way.

That observation raises an important question: if these innovations are already occurring within individual platoons, how many others remain confined to the formations that created them? Successful platoon innovations often remain local.

Platoons occupy a unique position within the Army. They are large enough to experience the administrative demands of the institution, yet small enough to adapt quickly. Leaders receive immediate feedback from the Soldiers using their systems and can refine ideas in days rather than months. A recurring problem identified during one week of operations can become a tested solution the next. Few organizations possess that combination of proximity, agility, and immediate feedback.

This is where platoon-level innovation contributes to continuous transformation. Enterprise modernization delivers capabilities across the force, while platoon innovation identifies practical problems that enterprise solutions alone cannot anticipate. The relationship is complementary, not competitive.

The Army must establish mechanisms to identify, evaluate, and share successful platoon-developed digital tools across formations. Whether through a sustainment innovation repository, a digital solution exchange, or another formal process, leaders must be able to discover, adapt, and improve successful ideas developed elsewhere. Not every local solution should become an Army program of record, but every promising solution must have the opportunity to be shared.

Conclusion

Continuous transformation is often associated with major modernization initiatives, emerging technologies, and enterprise capabilities. Those efforts remain essential to the future of Army sustainment.

Yet transformation also occurs every day in platoons across the force. Soldiers and junior leaders identify problems, develop practical solutions, and improve how their organizations operate.

The Army has never lacked innovative Soldiers. What it needs is a better way to identify, validate, and share the ideas already emerging from the tactical edge. Continuous transformation will not be driven solely by the systems the Army acquires. It will also be driven by the systems its Soldiers create.

2LT Carter Evans is a transportation platoon leader with Charlie Company, 194th Division Sustainment Support Battalion, 2nd Infantry Division Sustainment Brigade, at Camp Casey, Republic of Korea. He is a graduate of the University of Illinois Urbana–Champaign and the Logistics Basic Officer Leader Course.

Featured Photos
Left: SPC Jose Esquivel, a wheeled vehicle mechanic assigned to Headquarters and Headquarters Battalion, 1st Armored Division, tightens a lug nut on a military vehicle during maintenance operations at Fort Bliss, Texas, May 18, 2026. (Photo by SPC Halani Broderick)

Right: SGT Ezekiel Ordonez, a wheeled vehicle mechanic assigned to Headquarters and Headquarters Battalion, 1st Armored Division, changes a transmission on a Humvee during maintenance operations at Fort Bliss, Texas, May 18, 2026. (Photo by SPC Halani Broderick)



The **Architects** of Adaptability

How Lessons Learned Managers Shape the Future Force

By COL Paul W. Smith and CPT Uniqwa S. Cartagena Hammonds

The Army Transformation Initiative (ATI) has challenged the force to modernize at a pace not seen since the days of World War II. Headquarters have been eliminated; unit structures are being reworked; and sustainment concepts are undergoing significant change to match the needs of the battlefields of tomorrow. One element of this effort is the creation of the Transformation and Lessons Learned Managers (TLLMs). At the U.S. Army Combined Arms Support Command (CASCOM), this means standing up three organizations aligned with the tactical and operational sustainment formations: division sustainment brigades (DSBs), corps sustainment commands, and theater sustainment commands.

Each TLLM is led by a colonel tasked with leveraging their team to actively partner with units, combat training centers (CTCs), the Sustainment Future Capability Directorate, and the CASCOM Transformation Integration Directorate. Together they capture learning demands on force-design updates, doctrinal changes, new material, and more; they then participate in training events and actively bring back lessons learned to the CASCOM sustainment enterprise. This helps ensure that lessons are not only captured but integrated into iterative design changes to drive modernization more quickly. The TLLMs are change agents integrated into CASCOM but with an outward focus. They serve as CASCOM's face to the field, developing the relationships and trust needed to surface deeper, and at times less polished, observations — the kind that enable the change needed to put our sustainers in a better position to fight and win the next war. What follows is a brief history of one of these TLLMs and the work being done to effect change across sustainment's tactical edge.

History of TLLM

TLLMs exist because of a problem the Army had lived with for years — units learned hard lessons at CTCs and command post exercises, but too often those lessons stayed with the unit instead of reaching the people who write doctrine, redesign formations, and field new equipment. The TLLM-DSB operates as the institutional eyes forward for that effort, connecting real-world operational insight directly to CASCOM. TLLM-DSB's core purpose, and the purpose of every TLLM, is to make sure the voice of the Soldier in the field directly shapes the future of sustainment. TLLM-DSB carries out that purpose through four core functions: collect, validate, assess, and communicate. The team collects learning demands from across CASCOM and observations directly from units and CTCs, validates their accuracy and relevance, assesses root causes and potential solutions, and communicates validated findings back to the sustainment enterprise, where it can shape doctrine, force design, and materiel requirements. This work begins months before a unit ever reaches a training center, partnering with the rotational training unit (RTU) to translate and understand their training objectives and layer in applicable learning demands. This partnership ensures that the RTU views TLLM-DSB as a partner in their rotation and understands how their actions provide critical insights back to CASCOM.

Initial Focus

Much of TLLM-DSB's work over the past year has centered on validating the Army's Next Generation Command and Control (NGC2) architecture. NGC2 is replacing sustainment's legacy manual data input and fragmented spreadsheets with real-time dashboards that

fuse maintenance, supply, personnel, and operational data from enterprise resource planning (ERP) systems and tactical sensors. TLLM-DSB sits at the bridge between the developers building these tools and the Soldiers who have to trust them at the tactical edge — and two recent exercises show what that bridge looks like in practice.

Ivy Sting V

4th Infantry Division (ID) was selected as one of the two prototype divisions for NGC2. They tested a full redesign of the command-and-control architecture across all warfighting functions, evaluating new technologies and applications, and TLLM-DSB's embedded observers validated the headline result: sustainment-focused super intelligence (SI) reduced a complex three-hour sustainment planning task to 10 minutes. The division also validated sustainment applications across several nodes in a denied, degraded, intermittent, and limited communications environment, maintaining operational capacity while disconnected from the cloud and synchronizing seamlessly across nodes on reconnection.

TLLM-DSB sits at the bridge between the developers building these tools and the Soldiers who have to trust them at the tactical edge.

But Ivy Sting V also exposed the limits of the current system: TLLM-DSB assessors watched application accuracy suffer as data moved from ERP ingestion to the application's front end, and those mismatches cost the system its users' trust, pushing operators back to inefficient but familiar swivel-chair manual workarounds. TLLM-DSB documented those pain points in detail and fed them back to its partners in the Sustainment Data, Analytics, and Transport Directorate and Headquarters, Department of the Army G-46 (Logistics Information Management), giving these subject matter experts a field-tested list of what had to change before the platform could be trusted at scale.

Lightning Surge 4

Concurrently, 25th ID's Lightning Surge 4 was fielded to most mobile brigade combat teams. Lightning Surge 4 is an iterative experimentation series built to test whether NGC2 applications and data layer would be effective on top of the C2 Fix architecture. Months before the exercise, TLLM-DSB co-chaired the learning demand in-brief with 25th ID, nesting its data collection plan inside the unit's own training objectives and securing the commander's formal concurrence. That groundwork ensured that TLLM-DSB's assessment of the SI-enabled sustainment applications would generate real insight without disrupting the exercise. TLLM-DSB mixed on-the-ground observations with pulls from key leaders on automated casualty notifications, so Soldier duty-status changes populated directly into the personnel status news feed and to the chain of command in real time.

Additionally, the sustainment brigade successfully ingested the intelligence map layers from their geographic server. Once validated, this intelligence data provided the routing logic for mission planning, automatically calculating road networks, bridge capacities, and delivery platform parameters directly on the sustainment common operating picture. Those were the wins.

The more important finding was the friction. In some instances, policy is not adapting quickly enough to empower experimentation. It took months for 25th ID to get approval to ingest enterprise logistics data from Army Vantage, and once that administrative hurdle was cleared, engineers integrated the data almost immediately. TLLM-DSB captured that observation, ran a root-cause analysis, and presented it to the TLLM validation board at CASCOM, turning one unit's frustration into an enterprise-level lesson: policy and data-sharing authorities, not technology, are the real obstacles to scaling SI-enabled sustainment.

Force Design Update

NGC2 is an Army-wide initiative, but it is not the only significant change in reshaping sustainment formations. TLLM-DSB is again in the mix, representing CASCOM and the Soldier's user experience. TLLM-DSB's validated lessons feed the Army's formal force design process, giving the force management office at CASCOM the evidence it needs to develop, initiate, and defend force design updates. The DSB force design update (FDU) 2.0 shows what that looks like in practice, built around tailored organizations for mechanization, Stryker, and light IDs. TLLM-DSB validated that design firsthand at 1st Cavalry Division's Warfighter 26-4 exercise. The DSB split its division sustainment support battalion (DSSB) — one of the new formations created under FDU 2.0 — and combat sustainment support battalion (CSSB), standing up a forward logistics element to support maneuver brigades forward while holding the division support area. The design held. The 553rd DSSB ran at 85% committed, and the 143rd CSSB ran between 80% and 85%. TLLM-DSB's assessment was direct: without both battalions present, the formation would have culminated. That is the kind of finding that turns a paper design into a validated one.

This is the work TLLM was built to do. The ATI set a pace of change the sustainment enterprise has not faced since World War II, and pace alone does not produce good change. It takes someone positioned to catch what units learn and carry it back before the next rotation repeats the same mistake. The TLLM-DSB team was on the ground for both Lightning Surge 4 and Ivy Sting V, capturing not just the wins but the friction too, bringing both home to CASCOM to inform the next design update. That same feedback loop is what FDU 2.0, with its doubled palletized load system fleet and new counter-unmanned aircraft system formations, is meant to keep closing. As the Army keeps restructuring formations, rewriting doctrine, and fielding new technology at speed, the demand for that work will only grow. If our sustainers are going to out-think and out-maneuver tomorrow's enemy, the lessons captured today must keep finding their way home.

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CPT Uniqwa S. Cartagena Hammonds currently serves as a sustainment capability developer and functional analyst at Fort Lee, Virginia. She began her military service in 2013 with the North Carolina Army National Guard before commissioning as an Ordnance officer in 2016. Her tactical and staff leadership includes serving as platoon leader and executive officer with 1st Battalion, 62nd Air Defense Artillery Regiment; support operations officer for Eighth Army G-4; and commander of Echo Company, 71st Transportation Battalion. Her military education includes the Logistics Captains Career Course and the Marine Corps Advanced Expeditionary Logistics Course. Her military decorations include the Meritorious Service Medal, the Army Superior Unit Award, and multiple campaign medals. She has a Bachelor of Arts degree in psychology from North Carolina A&T State University.

Featured Photo
LTC Bryan Swift, director, Command and Control Transformation Lessons Learned Manager, conducts a post-assessment brief during Ivy Sting 5 at the Mission Training Complex, Fort Carson, Colorado, March 11, 2026. (Photo by SPC Wilfred Salters, Jr.)

WINNING TIME IN THE KILL WEB

Reframing Sustainment Metrics for a Time-Compressed Battlespace

By MAJ Stephanie Torres

In the opening phase of modern conflict in 2026, actions observed at locations like the Strait of Hormuz, Naval Support Activity Bahrain, Port of Ash Shuaiba, Camps Arifjan and Buehring in Kuwait, and Prince Sultan Air Base in Saudi Arabia shifted the character of warfare from theoretical projection to observable reality. The long-debated vulnerability of sustainment formations to persistent surveillance and rapid strike is no longer a conceptual concern; it is a confirmed reality across multiple operational environments and contested maritime domains.

Modern operational requirements dictate that forces operate under constant observation and the threat of long-range precision fires. The proliferation of unmanned aerial systems, precision munitions, and networked intelligence, surveillance, and reconnaissance (ISR) have extended threat envelopes across depth and distance. These capabilities compress the time between detection and engagement to minutes or less, eliminating the traditional distinction between forward and rear areas. This paradigm shift exposes the frontline fallacy: the dangerous and outdated assumption that a linear battlefield still exists and that geographic depth provides sanctuary. In reality, there is no true front line; every player and asset within a hostile theater is equally exposed to enemy surveillance and attack. Sustainment nodes, once positioned for efficiency and protection in sprawling support areas, now exist within continuous observation and become vulnerable the moment they become identifiable.

Today's conditions demand a fundamental reframing of sustainment survival. Forces no longer achieve survival through mass, redundancy, or static protection, nor do leaders measure operational effectiveness solely by throughput. Instead, units must achieve survival through speed, measured by how quickly they reduce their signature, displace before confirmation, and reestablish support before the enemy completes the kill chain.

Time as the New Sustainment Metric

In a time-compressed battlespace, time itself has become the decisive sustainment variable. Operational imperatives require sustainment forces to be as agile and survivable as the maneuver elements they support. Leaders must evaluate every action for effectiveness and for how it exposes units inside the enemy's targeting cycle.

Modern ISR architectures, especially ones that rely on super intelligence (SI), reduce the time required to detect, classify, and engage targets. Sustainment formations that remain static or predictable for even short periods create opportunities for adversary targeting. Conversely, formations that operate with speed, dispersion, and disciplined signatures can disrupt that process and force the enemy to continuously reacquire targets. These complexities, especially when multiple units synchronize actions across the terrain, overwhelm enemy ISR and make the find, fix, track, target, engage, and assess aspects of the kill chain significantly harder to sustain.

Winning time means acting inside the enemy's decision cycle. It requires sustainment units to operate with the same tempo, adaptability, and survivability mindset as maneuver forces. This shift is not conceptual; it establishes the conditions under which the force must now measure sustainment performance. The metrics that follow assume a force that is already dispersed. Speed, displacement, and reduced signatures are only achievable from a distributed posture, whether through mobile sustainment teams or internally dispersed formations operating with decentralized execution.

Dispersion as a Deliberate Defensive Maneuver

Observations from recent events consistently demonstrate a stark reality: near-peer fires routinely identify and destroy traditional, static support areas within 48 hours of establishment. Commanders must treat dispersion as a planned and continuous action, not as a reaction to contact. This mindset allows units to operate on their terms versus reacting to the enemy. Therefore, training must condition sustainment formations to execute rapid displacement, reestablish operations quickly, and operate in distributed formations without degrading support.

The metrics establishing these displacement standards derive directly from battlefield observations of paired reconnaissance and strike assets, specifically the integration of spotter drones with loitering munitions. In current operational theaters, persistent ISR platforms like the Russian Orlan-10 drone identify targets and feed coordinates directly to linked strike systems. Under legacy analog procedures, human-in-the-loop processing, manual coordinate verification, and voice-relayed clearances typically created a 15- to 30-minute window between initial detection and munition impact. However,

the introduction of SI-assisted target recognition and automated digital sensor-to-shooter networks has drastically compressed this kill chain. Recent observations indicate that a fully digitized, SI-enabled targeting cycle can execute a Lancet strike or precision artillery barrage within three to five minutes of initial detection. Consequently, the prescribed metric of a two-minute displacement reaction time and a five-minute full clearance window is not an arbitrary training goal; it is the mathematical baseline required to sever the sensor-to-shooter link and vacate a position before munitions arrive.

Emission Discipline and Signature Management

Electronic emissions often precede physical engagement. Every transmission contributes to a detectable signature that adversary signals intelligence (SIGINT) can exploit. Command posts and logistics nodes emitting strong Wi-Fi, radio, or cellular signals serve as beacons for enemy electronic warfare (EW) assets, rapidly drawing artillery or loitering munitions. Training must enforce disciplined communication through brevity, preformatted reporting, and strict emission control (EMCON). Units must remain capable of operating with minimal or no transmissions when required, relying on shared understanding and pre-planned triggers.

Today, the content of the transmission is largely irrelevant to the kill chain; the mere presence, density, and pattern of the emission are enough to trigger automated fire missions.

The automation of modern near-peer EW complexes drives the urgency of these metrics. Adversaries employ layered, multidomain sensor networks, often pairing ground-based direction-finding systems with drone-mounted EW payloads, which can triangulate standard military very high frequency/ultra-high frequency radios, satellite communication links, and commercial cellular signals in seconds. This capability is critical because legacy SIGINT targeting cycles were primarily content driven; analysts had to intercept, decrypt, and translate communications before authorizing a strike. Today, the content of the transmission is largely irrelevant to the kill chain; the mere presence, density, and pattern of the emission are enough to trigger automated fire missions.

When a logistics node establishes a localized network, or a convoy halts and executes routine radio checks, they create radio frequency clusters that automated threat systems can immediately classify as targets. Consequently, traditional ad-ministrative radio traffic is a lethal vulnerability. Achieving the stated metrics — such as an 80% success rate for zero-transmit missions and strict adherence to abbreviated time-on-air limits — requires a paradigm shift. Sustainment units must master mission command, maximizing the use of execution checklists for routine actions, physical communication, analog visual triggers, and strict pre-coordinated windows to execute logistics actions without illuminating themselves on the electromagnetic spectrum.

Compressing Sustainment Timelines

While disciplined dispersion and strict EMCON allow sustainment formations to navigate the battlespace undetected, the physical act of resupply forces units to halt. This moment of transition, where vehicles stop, elements consolidate, and material is transferred, represents the single highest point of vulnerability in the kill web. Static time is exposure. The traditional logistics halt, where large formations congregate for hours to conduct piece-by-piece supply transfers, is a fatal error in today's high-intensity warfare.

To survive, forces must shift the operational focus entirely to rapid actions on the resupply point. This necessitates a fundamental change in distribution methods, pushing sustainment to smaller, decentralized echelons rather than massing at company or larger echelons. Resupplying at the platoon or squad equivalent levels reduces the physical footprint and drastically limits the time spent on target. In current operational environments, adversarial ISR platforms are programmed to identify the visual signatures of traditional supply transfers, such as clustered vehicles, cross-loading activities, and materials handling equipment in operation. Once this visual confirmation occurs, precision fires or loitering munitions may arrive in just minutes.

Sustainment training must relentlessly focus on safely compressing all timelines to act inside that strike window. Configured, mission-specific loads (push packages), load exchanges, or vehicle exchange systems must replace manual downloads. The objective is to achieve a pitstop mentality, where the transfer occurs in a matter of minutes, allowing sustainment elements and supported units to seamlessly integrate back into their planned dispersion cycle before the enemy closes the sensor-to-shooter loop.

Conclusion

The observations of warfare in 2026 have stripped away the comfort of the rear echelon and have exposed the frontline fallacy for what it is: a lethal misunderstanding of modern warfare. In a battlespace where SI-enabled sensor-to-shooter links can close in under five minutes, the luxury of static efficiency is gone. The mathematical reality of the modern kill web is unforgiving; survival is no longer a matter of chance or armor, but of beating a digital clock. When an Orlan-10 drone spots a signature, the countdown to a strike begins. If the sustainment formation cannot move, mask, and reestablish within that window, the mission ends before it begins.

Adapting to this environment does not require a breakthrough in technology, but a fundamental revolution in sustainment culture. We must move away from the logistics halt and embrace the pitstop mentality, where speed is the primary survival metric. Every training exercise, from local unit movements to major theater rotations, must be graded against these time-compressed benchmarks. By institutionalizing dispersion as a maneuver and emission discipline as a survival skill, we force the enemy into a cycle of constant reacquisition, effectively jamming their kill chain through sheer tempo and signature management.

The force that masters the art of speed is the force that will preserve its combat power. In an era of total visibility and precision strike, the question is no longer where the front line is, but whether our sustainment formations can move quickly enough to stay invisible within it. The force that wins time survives the fight, enabling the commander to preserve the initiative.

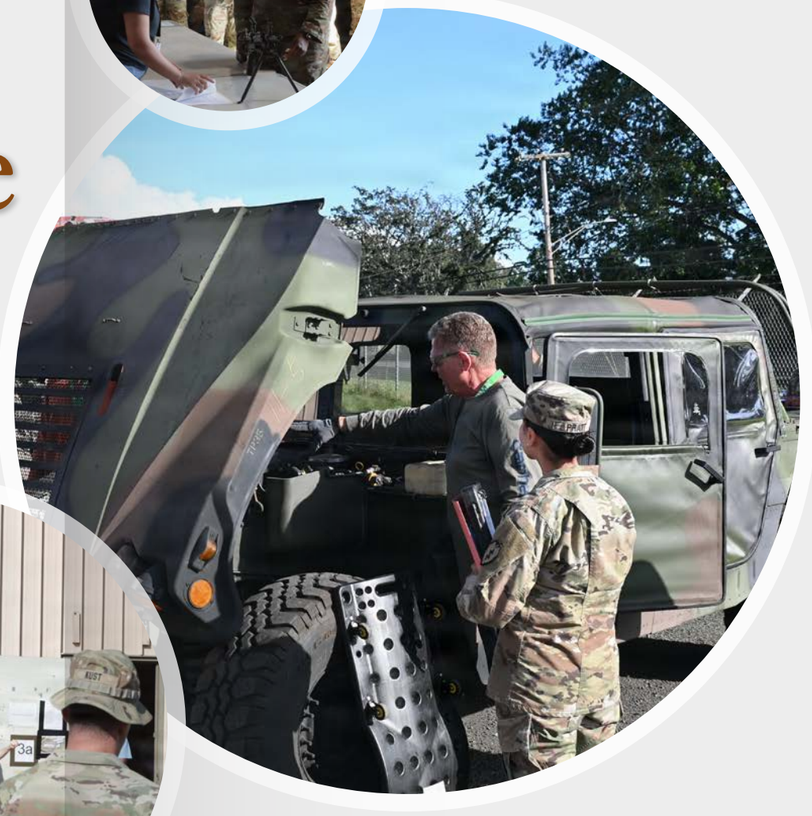
MAJ Stephanie Torres currently serves as a Command and General Staff College student. Her previous assignments include secretary to the general staff, aide-de-camp, First Army Division West; operations officer, 15th Brigade Support Battalion; commander, H Forward Support Company, 1st Battalion, 8th Cavalry Regiment; support operations plans officer, 2nd Armored Brigade Combat Team, 1st Cavalry Division; and logistics officer, United Nations Command Security Battalion–Joint Security Area in Panmunjom, South Korea. She has served in sustainment, armor, and infantry formations, deployed to Iraq and Afghanistan in 2007 and 2009, and has conducted two Regionally Aligned Forces missions to U.S. Pacific Command and U.S. European Command. She holds a Master of Business Administration degree in Supply Chain Management from the Florida Institute of Technology.

Clearing the Past to Win the Future

How Synchronized Divestiture Builds Combat Power in the Pacific

■ *By MAJ Kenneth F. Coleman*







For years, the most expensive equipment in the Pacific was the equipment no one was using.

It sat in motor pool stalls and shipping containers across the theater: legacy rolling stock, excess Class IX (repair parts), and systems a generation past their relevance. It consumed maintenance hours, storage the theater could not afford, and funds the Army needed elsewhere. And it did so quietly, because for too long there was no fast, reliable, theater-wide way to move it off the books.

The cost was real. It was paid by the people who could least afford it: the warfighter, the taxpayer, and the Army's modernization timeline.

The Problem Was Visibility, Not Will

It would be easy to assume units simply held onto equipment they did not need. That is not what was happening. Units across U.S. Army Pacific Command, active duty and Reserve alike, have always

understood readiness. The problem was structural. There was no synchronized way to see and move equipment across a theater the size of an ocean.

"We are solving the lack of synchronized theater-wide equipment visibility and redistribution, which previously caused delays, excess stockage in some areas, and shortages in others, limiting readiness and responsiveness," said CW2 Damawi M. McGhee of the 402nd Army Field Support Brigade.

That is the heart of it. When you cannot see equipment across the theater, you cannot move it where it is needed. One formation drowns in excess while another goes short, and both lose readiness. The old modernization displacement and repair site (MDRS) model was static, bulk-processed, and reliant on fixed staffing. It was never built for the velocity or the geography of today's Pacific.

The result was friction disguised as routine. As LTC Stephen Neppl, commander of Army Field Support Battalion–Hawaii (AFSBn-Hawaii) put it, "A turn-in event is just pushing gear over a fence. The Equipment Redistribution Divestiture Site is a highly synchronized logistics operation."

Who Pays, and How

That friction has a price, and it lands in three places.

It lands on the warfighter in lost time. Every hour a Soldier spends inventorying parts or components the unit does not need is an hour stolen from training for the fight. "Units are no longer wasting countless man-hours inventorying parts they don't need," said Jason Henry, Chief of the Installation Supply Division at AFSBn-Hawaii. "They are reinvesting that time directly into warfighting readiness."

It lands on the taxpayer in dollars. Storing obsolete equipment is not free, especially where land itself is a scarce resource. "Oahu is an island," Henry noted. "We don't have endless acreage like a mainland installation." When the Army moves excess equipment instead of warehousing it, the savings are concrete. He added that the accelerated retrograde his team executed generated "significant cost savings for the Army."

Failure to divest excess impacts the Army's modernization timeline. You cannot field next-generation platforms into space occupied by the last generation. Not only does excess equipment cost money, but it also physically blocks modernization efforts.

The Root Cause: A Legacy System and a Legacy Habit

If the problem was not unit will, what was it? Two things: one lived in the system, the other lived in the culture.

The first was the system itself. The MDRS model processed equipment in bulk, on fixed timelines, without the data backbone to match supply to demand across components (COMPOs). "In a geographically constrained theater like the Pacific, you can't just wing logistics," Neppl said. "We can't just build another motor pool to hold excess equipment." A model that works on a mainland installation simply cannot survive the tyranny of distance.

The second cause was harder to see, because it lived in habit rather than policy. "It's shifting the culture," Henry explained. "We are breaking the old habit of holding onto it just in case." That instinct, to retain equipment against an uncertain future, made sense in an era of slow, unreliable resupply. In an era of synchronized theater sustainment, it is a liability. It keeps property books heavy when the fight demands they be lean.

This is not a new lesson. The Army learned it painfully during the retrograde from Iraq and Afghanistan, where excess equipment became a chokepoint that consumed years and billions of dollars to unwind. The cause then was the same as the cause now: the absence of a synchronized, demand-driven system to move materiel at the speed of need. As the Army postures for large-scale combat operations (LSCO) in the Pacific, the high-intensity, peer-level fight at the center of current Army doctrine, it cannot afford to relearn that lesson under fire.

The Solution: Synchronization, Scale, and Trust

The Equipment Redistribution and Divestiture Site (ERDS) attacks both root causes at once. Against the system gap, it brings synchronization and data. ERDS shifts "from a static redistribution model to a data-driven, demand-based, and theater-synchronized process," McGhee said, "integrating Vantage (the Army's logistics data and analytics platform), real-time requirements, and cross-component visibility to drive precision redistribution instead of bulk processing." The discipline behind that shift came from deliberate planning. The rehearsal-of-concept drill, Neppl said, "was the forcing function that synchronized the tactical units with the strategic enterprise," allowing leaders to "see ourselves, identify friction points like storage limits and sealift timing, and align our scalable contracted teams."

Against the culture gap, ERDS offers something more valuable than policy. It offers a reliable off-ramp that earns trust. The scalability is the proof. "The speed is a direct result of our ability to scale," Henry said. "Unlike the old model that relied on a fixed staff, we now leverage scalable contracted mobile teams, ensuring we never become the bottleneck." When commanders know the off-ramp is reliable, the just-in-case reflex fades, and property books grow leaner by choice.

The results validate the model. In a focused induction window, AFSBn-Hawaii processed more than 73,000 pieces of excess Class IX. Seizing a G-4 exception to policy, Henry's team moved legacy Humvees and Mine-Resistant Ambush Protected All-Terrain Vehicles "directly onto an opportune vessel for immediate retrograde off the island," working shoulder-to-shoulder with the 25th Infantry Division at the port.

Transformation Is a Reserve Mission, Too

For COMPO 3 (Army Reserve) formations, divestiture is not a supporting task to transformation. It is transformation. 9th Mission Support Command's (MSC's) commanding general stated, "A Reserve force cannot become lighter, more lethal, and more deployable while anchored to legacy equipment." The 9th MSC is proving that the operational Reserve transforms at the same speed as the active-duty force when it is synchronized into the theater enterprise. This is the heart of our Commanding General's "Focus 26/Ready 27" vision. Units set conditions now to ensure that we are ready when Pacific COMPO 3 assets are called upon.

That is what Reserve transformation looks like in practice: not a future aspiration, but measurable change in a single training cycle. And the math matters more for us than for anyone. The Reserve fights against the clock. We do not have the continuous training calendar of the active-duty force. Every battle assembly and annual training period spent wrestling with outdated equipment in the motor pool is a period not spent building deployable capability. ERDS gives that time back.

Clearing the Past

The point of continuous divestiture is not tidier motor pools. It is combat power. For the 9th MSC, clearing the past is how a part-time force builds full-time readiness. Every stall we empty and every container we clear is the operational Reserve transforming itself for the Pacific fight. It is proof that COMPO 3 is not a follower in this effort, but a full partner in it.

That is what transformation looks like on the ground. It is not a slogan, but an empty stall where a 20-year-old truck used to sit, and thousands of maintenance hours returning to the formation. In a theater defined by distance, the ability to convert excess into readiness is not a convenience. It is a requirement for the next fight.

MAJ Kenneth F. Coleman serves as the G-4 Supply and Services Officer for the 9th Mission Support Command. He now serves as the Deputy Chief of Operations for the 9th Mission Support Command.

Featured Photos
Top: CW2 Damawi McGhee, assigned to the 402nd Army Field Support Brigade, instructs Soldiers and logisticians on sensitive item turn-in procedures during an Equipment Redistribution and Divestiture Site rehearsal-of-concept drill at East Range, Schofield Barracks, Hawaii, Jan. 23, 2026. (Photo by Aaron DeCapua)

Middle: Soldiers and logisticians from across the U.S. Army Pacific theater receive instruction on Equipment Redistribution and Divestiture Site procedures during a rehearsal-of-concept drill at East Range, Schofield Barracks, Hawaii, Jan. 23, 2026. (Photo by Aaron DeCapua)

Bottom: Jason Henry, installation supply division chief for Army Field Support Battalion–Hawaii, briefs G-4 representatives and deputy logisticians from commands across the U.S. Army Pacific theater during an Equipment Redistribution and Divestiture Site rehearsal-of-concept drill at East Range, Schofield Barracks, Hawaii, Jan. 23, 2026. (Photo by Aaron DeCapua)







Fort Drum ERDS

Leveraging Enterprise Logistics to Sustain Readiness

■ *By MAJ Daniel McCall and MAJ Rachhyata Dhakal*

Select Army installations across the U.S. host Equipment Redistribution and Divestiture Sites (ERDSs) to accelerate transformation of formations to meet future operational demands. This is a top priority for the Army, and 10th Mountain Division with Army Field Support Battalion (AFSBn)–Drum are working together to drive momentum for this effort. From April to June 2026, 10th Mountain Division rapidly divested 16,426 pieces of excess equipment at the Fort Drum mobile ERDS, culminating in the highest volume achieved through a mobile ERDS team (MET). Other divisions can realize similar results by adopting the systems and processes that drove 10th Mountain Division's success. In coordination with AFSBn-Drum, 10th Mountain Division built on lessons learned from other sites to set conditions for this operation. The planning, preparation, and execution for equipment divestiture at the Fort Drum MET provide a model for how to successfully leverage enterprise logistics solutions like ERDS to enhance unit readiness.

Overview

ERDS is an enterprise logistics solution by U.S. Army Materiel Command (AMC) to build readiness for the tactical force in support of the Army Transformation Initiative. Throughout fiscal year 2026, ERDS enabled rapid reduction of Class VII (end items), secondary items, and other select supply categories to provide immediate property accountability relief for units undergoing force structure optimization or Army Structure (ARSTRUC) memorandum for 2028–2032 transformation. This accelerated removal of legacy equipment enabled formations affected by ARSTRUC changes to modernize more quickly while maintaining readiness. ERDS provided support from permanent sites located at Fort Bragg, Fort Carson, and Fort Hood, and from METs that visited major installations across the Army. National Guard and Reserve units within 150 miles could also take advantage of ERDS, with several turning in equipment through the Fort Drum MET.

Through ERDS, 10th Mountain Division sought to divest excess and legacy equipment while minimizing disruption to training and operations. Key tasks included the requirement to increase the velocity of divestiture and redistribution. Accordingly, the division established the ambitious goal of divesting 16,550 pieces during its turn-in window from April 1 to June 15. With five participating brigades, including more than 100 companies, effective execution necessitated a high level of synchronized coordination throughout the operations process.

Planning

The high induction volume at the Fort Drum MET was a direct result of 10th Mountain Division, in coordination with AFSBn-Drum, deliberately prioritizing ERDS six months before execution. In October 2025, division G-4 and AFSBn-Drum initially conducted parallel planning. The AFSBn team developed running estimates by reviewing resources such as the AMC operations order (OPORD) and the ERDS contractor's performance work statement to produce an accurate understanding of requirements for hosting a MET. The G-4 developed an estimate of total excess and then produced a feasible timeline that mitigated friction by accounting for brigade events. G-4 supply and services and the AFSBn support operations (SPO) officer then compared running estimates and planning factors to develop an integrated concept of the operation. Abiding by the one-thirds/two-thirds maxim, the division published its ERDS OPORD in December, directing all brigades to immediately generate proposed sourcing decisions (PSDs), stop equipment transfer to external units, and prepare packets for divestiture. This created a sense of urgency that later prevented induction delays from incomplete turn-in packets after operations commenced. The division also halted non-critical new equipment fielding to allow units to focus on ERDS. Weekly in-process reviews (IPRs) began in January and were attended by brigade S-4 (logistics) representatives, the AFSBn team, and Defense Logistics Agency–Disposition Services (DLA-DS) representatives. These IPRs synchronized efforts, identified solutions to friction points, and kept brigades accountable for PSD creation and packet status.

Planning for ERDS was an inherently collaborative effort, with 10th Mountain Division G-4 and AFSBn-Drum gaining valuable insights from best practices validated at other installations. The team at AFSBn-Drum benefited greatly from lessons learned provided by both AFSBn-

Bragg regarding their permanent ERDS program and by AFSBn-Campbell concerning their MET. 10th Mountain Division G-4 visited the Fort Polk MET to learn from their operations. Similarly, 101st Airborne Division (Air Assault) G-4 and Division Sustainment Brigade (DSB) provided 10th Mountain Division G-4 and AFSBn-Drum with a detailed overview of best practices for operationalizing ERDS. Lessons learned from these sites directly informed the Fort Drum layout (e.g., separate rolling stock and non-rolling stock yards). This willingness of units to collaborate in sharing information across organizations was critical to successful planning for the Fort Drum MET.

Preparation

10th Mountain Division designed a multi-phase preparation effort during which units prepared PSD packets for excess items, submitted those packets for approval, and then scheduled induction appointments in accordance with individual priority date ranges allocated to each brigade for divestiture. Units had approximately two months to vet excess equipment and generate PSDs in the Decision Support Tool (DST) to division for routing to XVIII Airborne Corps. Division leadership maintained oversight through periodic briefs to the deputy commanding general–sustainment (DCG-S). This helped ensure brigade command emphasis, addressed issues and concerns, and bolstered progress on packet development. The division also incorporated ERDS touchpoints into logistics readiness reviews. After brigade S-4 inspection, units took completed packets to division G-4 supply and services for final approval. Although an effective process, common errors included packets with incorrect condition codes, mismatched quantities, or missing documents. Digitizing packet submission would have enabled remote reviews, reduced potential for paperwork loss, and improved progress tracking. Nonetheless, the preparation effort was ultimately successful in ensuring that brigades were ready to turn in excess equipment.

Deliberate leader engagement was the decisive factor throughout execution that enabled the MET to process an average turn-in volume of 300 to 400 pieces per day.

AFSBn-Drum and 10th Mountain Division G-4 provided the brigades with resources that mitigated foreseen friction points by assisting in packet generation. The AFSBn team leaned on subject matter experts to publish turn-in procedures and documentation examples. Additionally, the AFSBn-Drum SPO officer and ERDS lead partnered with G-4 supply and services to deliver ERDS training during one of the monthly DSB sustainment academy events. The ERDS training focused on lessons learned from other METs, DST processing, and proper documentation procedures. In retrospect, this was a valuable event that the team should have followed up with additional DST training, since some company-level personnel later demonstrated gaps in knowledge.

Preparations culminated in the rehearsal-of-concept (ROC) drill executed in late March. The purpose was to synchronize unit efforts by ensuring that all personnel clearly understood the concept of the operation, their assigned roles, and the required procedures. The DCG-S chaired the brief, and it included representatives from division G-4, AFSBn-Drum, brigade executive officers (XOs), S-4s, property book officers (PBOs), Akima ERDS support contractors, and DLA-DS representatives. This level of attendance, especially by the ERDS contractors, was important to define and disseminate responsibilities to ensure efficient unit equipment divestiture. The ROC drill included a terrain walk of the ERDS operations center, the non-rolling stock and sensitive items (SI) turn-in facility, and the rolling stock turn-in location. All brigades briefed their plan to complete PSD processing, packet review, and DLA-DS vehicle inspections in time for their allocated turn-in dates. This event served as the final conditions check to ensure division was postured for execution.

Execution

The Fort Drum ERDS operations cell was a key element during execution that allowed 10th Mountain Division to maintain operational momentum. Its purpose was to synchronize efforts of all units and support elements to ensure an efficient turn-in process. This robust fusion cell served as the command-and-control hub and included the G-4 supply and services officer-in-charge (OIC) and NCOIC, an asset visibility specialist, liaison officers from every brigade, the AFSBn-Drum SPO officer, and ERDS contractor schedulers and packet reviewers. Located adjacent to the non-rolling stock site, the ERDS operations cell received real-time updates through a WickrGov application chat from OICs and NCOICs assigned to the respective turn-in sites for non-rolling stock, and SI and for rolling stock. The G-4 supply and services OIC led daily hot washes, maintained operational oversight, managed the turn-in schedule within unit prioritization, and consolidated reports for division leadership. Units delivered packet binders to the ERDS operations cell no less than 24 to 48 hours before their appointments for ERDS staff to validate documents and build the appointment tracker. This arrangement of co-locating key personnel enabled real-time coordination and remained critical throughout the operation.

After turn-in appointments, daily hot washes to synchronize efforts were the principal battle rhythm event during execution. Broadcasted over Microsoft Teams from the AFSBn headquarters, the ERDS operations cell reviewed friction points (e.g., rejected equipment, missing forms, and capacity shortfalls), adjusted schedules, compiled lessons learned, and ensured that units were prepared for upcoming appointments. All ERDS operations cell members attended, as did the AFSBn commander, G-4, brigade S-4s, and node OICs/NCOICs. Although the hot washes were effective, the information did not always flow to lower echelons at the pace of operations. While company leaders understood the why of ERDS, the division realized that the how and specific standards were sometimes unclear. A helpful refinement to the hot wash would be to require company command representatives to attend a pre-hot wash meeting 48 to 72 hours before their appointment. The daily hot washes allowed 10th Mountain Division to maintain momentum and process nearly zero backlogs during peak weeks.

Deliberate leader engagement was the decisive factor throughout execution that enabled the MET to process an average turn-in volume of 300 to 400 pieces per day. Affirming his prioritization of ERDS, commanding general MG Scott M. Naumann conducted several visits to the turn-in sites. Similarly, the DCG-S conducted multiple site visits, received routine updates from the ERDS operations cell, and attended daily hot washes to reinforce division priorities. Brigade and battalion commanders emulated this example with their own battlefield circulation, and battalion S-3 representatives and XOs were often at the turn-in sites.

Substantial leader presence emphasized to individual Soldiers the importance of their efforts. Leader engagement also resolved issues as they arose. For example, when contractor induction volume briefly declined, the AFSBn-Drum commander and leaders from 406th Army Field Support Brigade discussed these concerns with the ERDS program manager, who resolved the issues so that throughput increased. Without continuous and purposeful leader involvement, the Fort Drum team could not have sustained the high pace of operations for equipment induction.

Lessons Learned

After-action reviews (AARs) conducted throughout inductions at Fort Drum revealed several important lessons. After inspection by ERDS contractors, one area for improvement concerned packet handling. Initially, validated packets returned to the unit, but this increased the risk of lost paperwork on appointment day. As a result, 10th Mountain Division directed that the ERDS operations cell retain all reviewed turn-in packets. Moreover, this enabled the division to maintain a bench of turn-in packets to use for opportunity turn-ins on days when the ERDS contractors completed inductions ahead of schedule. This was key in enabling the team to maintain a high level of throughput.

AARs also revealed the importance of empowering NCOs as subject matter experts at the point of execution to resolve unit-level issues. Their engagement accelerated problem solving and maintained discipline to sustain high turn-in volume.

ERDS induction at Fort Drum also highlighted opportunities for 10th Mountain Division to continue improving its Command Supply Discipline Program. Identifying excess consumed more time than anticipated, resulting in the recommendation to institute a weekly battle rhythm event between the G-4 PBO and select brigade PBOs on a rotational basis to review property book health and identify current and anticipated excess. Additionally, ERDS revealed inconsistent use of derivative unit identification codes (DUICs) for turn-ins, which created tracking challenges. Consequently, the recommendation was for G-4s to establish a division standard operating procedure for managing property divestiture from inactivating units, potentially using a single DUIC with distinct storage locations. Simple measures like these can help divisions manage excess and take advantage of programs like ERDS in the future.

Outcome and Conclusion

AMC delivery of ERDS as an enterprise logistics solution was phenomenally successful in enhancing divisional readiness. The Fort Drum MET processed a total of 16,594 pieces for 10th Mountain Division, other tenant units, and local National Guard and Reserve units. This included 681 rolling stock for 10th Mountain Division, reducing the burden for annual maintenance services by approximately 14,300 work hours. For 16,426 total pieces divested, 10th Mountain Division also saved innumerable hours required for unscheduled services and property book inventories. This allowed the division to devote more time to preparing personnel and equipment. The experience of ERDS at Fort Drum underscored the importance of early planning, leader engagement, disciplined execution, and continuous process improvement. Other units can continue building on these lessons to leverage opportunities like ERDS to enhance readiness.

MAJ Daniel McCall is a logistics officer who serves as the executive officer for Army Field Support Battalion–Drum at Fort Drum, New York. He previously served as the support operations officer for Army Field Support Battalion–Drum, as a force rotations planner with 21st Theater Sustainment Command, and as commander of Forger Forward Support Company, 1-7 Field Artillery, 2/1 Infantry Division. He commissioned in May 2014 as a Transportation officer. His military education includes the Transportation Corps Basic Officer Leader Course, Combined Logistics Captains Career Course, Support Operations Course, Theater Sustainment Planners Course, Operational Contracting Support Course, and Command and General Staff College. He holds a Master of Arts degree in history from Auburn University and a Masters of Operational Studies from the Command and General Staff College.

MAJ Rachhyata Dhakal is a logistics officer currently studying at the Naval War College, attending College of Naval Command and Staff in Newport, Rhode Island. She previously served as the G-4 supply and services chief for 10th Mountain Division. Before that assignment, she commanded Composite Truck Company (Heavy), 4th Division Sustainment Brigade, 4th Infantry Division, at Fort Carson, Colorado. She commissioned in May 2016 as a Chemical officer and attended the Chemical, Biological, Radiological, and Nuclear Basic Officer Course. Following her initial assignments, she transitioned to the Logistics Branch in 2020 upon completion of the Captains Career Course. Her other military education includes the Unit Movement Officer Course and the National Training Center Observer/Controller Course. She holds a Bachelor of Science degree in criminology with concentration in legal studies from Eastern Michigan University.

Featured Photos
Equipment Redistribution and Divestiture Sites are Army Materiel Command's enterprise solution to the growing challenge of maintaining operational readiness in a dynamic environment. Fort Hood, Texas, February 11, 2026. (Photos by Rebecca Teutsch)

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Beyond Legacy
Army Prepositioned Stocks



The New TAP2E Strategy

■ *By Mr. Stacey Lee*

In the Department of War (DOW) memorandum, *Army Transformation and Acquisition Reform*, the Secretary of War challenged the Army "to implement a comprehensive transformation strategy, streamline its force structure, eliminate wasteful spending, reform the acquisition process, modernize inefficient defense contracts, and overcome parochial interests to rebuild our Army, restore the warrior ethos, and reestablish deterrence." What that challenge means in broad strokes is that every aspect of the Army has transformed, is transforming, or will transform to a force that can "move further, faster, and fight harder than any other force on Earth." What that means practically, from the highest echelons to the unit motor pools, is that rapid, deliberate, and focused change is the new norm. The Army today increasingly looks less like the Army of early 2025; nowhere is this becoming more evident than in the Army Force Projection process.

The Pivot from Legacy Processes to Modern, Integrated, and Data-Driven Force Projection

The strategic mobility triad, consisting of airlift, sealift, and prepositioned stocks (APS), is the engine that powers the Army's ability to deploy to support operations around the world. Foundational to the engine's ability to ensure combatant commanders have ready and equipped forces is tailored, prepositioned sets of critical equipment. Pre-Army Transformation Initiative (ATI), APS consisted of "strategically positioned equipment configured for combat and ready for employment" per Army Techniques Publication 3-35.1, Army Prepositioned Operations. The stocks included a mix of ground-based and afloat sets, some configured for specific theaters, some more for general purpose use, in operations ranging from conflict to humanitarian relief.

Legacy APS equipment was notorious for being out of date and continually plagued by readiness issues. The old way cannot support the transformation the Army is undergoing. ATI is changing the paradigm significantly and rapidly, and Total Army Power Projection Equipment (TAP2E) is guiding the paradigm shift for APS.

The Army's transformation began in earnest with the release of the April 30, 2025, DOW memorandum, *Army Transformation and Acquisition Reform*. For the APS-to-TAP2E transformation, the TAP2E strategy is the strategy to lead the effort, bringing myriad operations and actions together into an actionable whole that is a modern, integrated, and data-driven ecosystem. The strategic framework is organized around three lines of effort (LOEs) — LOE 1: Posture, Structure, and Facilities; LOE 2: Readiness and Maintenance; LOE 3: Governance and Business Rules — which will guide the multi-year process.

The transformed strategic priorities are built around four overarching changes:

- Maintain Western Hemisphere posture: Importantly, maintain, in this priority, does not mean static, passive, or inactive. All aspects of TAP2E in the homeland are being assessed to ensure focused purpose, with the right equipment in the right amounts in the right places, at readiness levels that fully support the range of operations from homeland defense, to deploying from a contested homeland, to supporting defense support to civil authorities' operations, to disaster response.
- Increase U.S. Pacific Command (USPACOM) posture: The November 2025 *National Security Strategy (NSS)* assessment of USPACOM is that it is "already and will continue to be among the next century's key economic and geopolitical battlegrounds." However, legacy APS is more focused on the U.S. Central Command (USCENTCOM) and U.S. European Command (USEUCOM) areas of responsibility (AORs). To address this geographical imbalance, the Army is redistributing APS afloat equipment and assets to strategically located land-based locations, increasing the readiness, responsiveness, and resilience of the sets overall, and aligning the available force structures to theater requirements.
- Optimize USEUCOM posture: The *NSS* acknowledges that "Europe remains strategically and culturally vital to the United States." Working to maintain the security, stability, and prosperity of some of America's oldest allies and partners is and will remain a priority. All which must occur within a volatile and uncertain strategic environment.
- Reduce USCENTCOM posture: The USCENTCOM AOR has maintained a central focus of American geopolitics for more than three decades. Also, during that time, the Army's prepositioned equipment has become redundant and irrelevant, suffering from obsolescence and neglect. While the current posture may be adequate to support smaller-scale operations, it is inadequate to support large-scale combat operations. Additionally, maintaining APS at 100% full mission capable (FMC) comes at significant cost, leading Army senior leaders to make informed risk decisions on maintaining select equipment below 100% FMC when feasible. To remedy that, TAP2E is divesting current APS and aligning future sets using predictive logistics and super intelligence (SI) platforms for transparency, and to better support regional priorities and leverage burden sharing agreements.

Common to all four changes are better integration with joint and multinational partners and leveraging technology and data platforms that provide leaders with a single, near-real-time, common operating picture. The vocabulary of TAP2E includes SI and predictive data analytics to tear down legacy APS stovepipes and overcome systemic deficiencies.

The TAP2E strategy is transforming every aspect of how the Army pre-positions assets to be more responsive, increasingly lethal, and able to enter any fight, anywhere with overwhelming overmatch, no matter the environment.

Legacy Equipment Sets and Processes: Divesting and Transforming the Past

Under the current legacy system, APS equipment sets are broken down into three categories: unit sets, operational project (OPROJ) stocks, and war reserve stocks for allies per ATP 3-35.1.

- Unit sets consist of the "equipment, end items, and support materiel configured for combat (to include authorized stockage list, shop stock, and unit basic load) that are prepositioned ashore and afloat." In discussions and planning, these sets are generally what is being referenced. These are the go-to-war assets and are not used for other operations or to fill out other sets.
- OPROJ stocks are above and beyond what is needed to execute the Army's force projection strategy. These sets can be tailored to support multiple operations from a single set, and support other approved missions below the conflict threshold, such as supporting civil and disaster relief, humanitarian assistance, and civil defense.
- War-reserve stocks for allies are those sets designed to support key allies but are maintained and financed by the U.S. These sets can be transferred to supported allied forces "under the provisions of the Foreign Assistance Act and under existing country-to-country memorandum of agreement or acquisition and cross-servicing agreement."

Although the APS sets can be designed for multiple countries and operations, the footprint is largely fixed.

TAP2E Framework: Transforming the Present and Preparing for the Future

The new TAP2E framework demotes traditional APS to a sub-category and expands to five categories: APS, enduring equipment sets (E2Ss), U.S. Army Reserve forward-positioned equipment (FPE), Medical Materiel Readiness Program (MMRP), and combat training centers (CTC) sets.

- APS are being modernized and transformed around prepositioned unit sets and OPROJ stocks with the primary function as protected go-to-war assets.
- E2Ss are more versatile and preconfigured sets to support Army service component commands, allies and partners, and other operational demands as required.
- U.S. Army Reserve FPE is an ongoing pilot program that prepositions Reserve equipment in areas of potential crises to accelerate contingency response times and support Global Force Management Allocation Plan rotations.
- MMRP equipment consists of three 240-bed hospital centers and one 212-bed hospital center ready for rapid deployment globally.
- CTC equipment consists of smaller sets of forward-positioned equipment that can augment what units bring to a CTC rotation.

Critical Questions and Planning Factors: The So What

Leaders and planners who want to leverage TAP2E grapple with the same two questions that were critical to legacy APS operations:

- Question #1: *Is the current planning mindset laser focused on overcoming interoperability challenges and optimizing required draw procedures?*
  This question includes asking if organic materials handling equipment is compatible with TAP2E equipment, if the unit has linked up with the TAP2E managers forward to identify theater and TAP2E-specific requirements, and if the required TAP2E processes have been incorporated in operational plans, training calendars, and the internal unit lexicon.
- Question #2: *Are leaders and planners thinking through how to maximize throughput and capacity at forward TAP2E locations during equipment draw?*
  Rigorous and disciplined efforts to answer this question will determine success or failure for drawing units. For example, in USPACOM, with smaller, more dispersed locations, balancing throughput and capacity are vital to reception velocity. With land at a premium and contested conditions a likelihood, this should be the issue that keeps a commander up at night.

Likewise, leaders and planners at all levels must also grapple with three of the same critical planning factors as legacy APS:

- Critical Planning Factor #1: Reception, Staging, Onward Movement, and Integration (RSOI) velocity. Developing plans that get forces from arriving and drawing equipment to integrating combat-ready formations into the forward commander's operations will dictate how the opening round of combat operations happens. Also, accounting for environmental conditions will play a vital role in the success of RSOI, especially in the USPACOM theater.
- Critical Planning Factor #2: Maintenance and supply parity at the forward location(s). Arriving at a TAP2E site with mechanics and maintenance processes for different kinds or versions of equipment will impact critical velocity. Does the unit have trained mechanics in sufficient numbers to support the equipment draw? Are required tools and diagnostic equipment onsite for all types and versions of equipment to be drawn? Has the unit conducted an analysis across all classes of supply, and verified the analysis with personnel at the draw site for all classes and quantities of supply?
- Critical Planning Factor #3: Contested deployment and protection risks. The old adage, "The enemy gets a vote," is not less true because it is old. What is the plan for loss of a TAP2E storage area, key node, or equipment needed for the process? What other operations are ongoing that could compete for limited resources, and how will challenges be mitigated? What impact will weather (environmentally contested), civil unrest (politically contested), or enemy operations (militarily contested) have on the unit's ability to build combat power at a rapid pace?

Ultimately, the so what comes down to extreme rigor now, when time is available, equals velocity and success later, when time is at a premium. Time spent at all levels wrestling with the critical questions above and integrating the critical planning factors into staff processes are not luxuries; they are necessities. As GEN George S. Patton Jr. is attributed as saying, "He who sweats more in training bleeds less in battle."

Conclusion

To meet the challenge issued by the President and the Secretary of War, legacy thinking must be eliminated. Dynamic must replace static; integrated must replace stove piped; modern must replace moth balled. The TAP2E strategy is intended to do just that. No longer will the third leg of the strategic mobility triad be a back-end or low-priority logistics function; rather, it will exist in a strategic ecosystem that acknowledges its importance as a front-end warfighting requirement.

Mr. Stacey Lee serves as the chief of the newly formed Deployment, Human Resources & Finance Doctrine Branch within the CASCOM Doctrine Directorate at Fort Lee, Virginia. A retired U.S. Army lieutenant colonel, his military career encompasses assignments from company to four-star commands with multiple combat deployments, serving as an enlisted combat engineer and commissioned field artillery and transportation officer. He holds a Master of Military Art and Science degree from the School of Advanced Military Studies, and a Master of Divinity degree from Liberty University.

Featured Photo
A couple of host national Italian employees with Army Field Support Battalion-Africa's Directorate of Supply prepare some materiel for movement at the equipment configuration and hand-off area in Komotini, Greece, during DEFENDER 25, May 19, 2025. (Photo by Cameron Porter)

WHAT IS MDO-Maintenance?



Wrenching Army Sustainment Back to Reality

By Mrs. Brittany L.B. Truesdale

Multi-domain operations maintenance (MDO-M) is a framework to strategically restructure the Army's maintenance enterprise to survive and win on the modern contested battlefield. It replaces the counterinsurgency (COIN) focused, forward-heavy two-level maintenance (TLM) model with an echeloned, tech-enabled intermediate maintenance capability. By using a unified garrison-to-deployed structure enhanced with telematics and advanced manufacturing, MDO-M rebuilds organic tactical repair capacity to out-reconstitute our adversaries.

The Historical Failure: How TLM Broke the Force

To understand why the Army is pivoting to MDO-M, we must look at where the wheels fell off. In 2003, during active operations in Iraq and Afghanistan, the Department of War shifted to a TLM system, which recognized only field and sustainment echelons.

This was the bulldozer decision. The Army scraped off its intermediate levels of maintenance, eliminating all general support and a significant portion of direct support capabilities. This decision slashed thousands

of active-duty maintainer spaces and decimated organic infrastructure. For example, major heavy armor installations saw their organic support maintenance capacity reduced to a fraction of their original strength. The plan was contingent on a critical assumption: that national-level depots absorb the displaced intermediate workload and expand their structures. That never occurred. The depots were never funded to absorb the demand, and the Army deferred sustainment-level maintenance for major combat platforms. For over a decade, static, forward-operating COIN operations funded heavily by overseas contingency operations (OCO) dollars masked this gap. The Army grew dependent on civilian contractors to maintain readiness, causing organic Soldier maintenance skills to severely atrophy.

When OCO dollars vanished by the late 2010s, the structural deficit became clear:

- The Component Imbalance: The vast majority of SMCs were pushed into the National Guard and Reserve. The Regular Army component was left holding a disproportionate share of the equipment relative to its small fraction of maintainers, leaving many active units with little to no repair capacity to maintain equipment at home station.
- The Forward Bottleneck: With no intermediate units, all combat systems maintainers were pushed to the absolute forward edge of the battlefield. Units were forced to accumulate massive, high-signature maintenance collection points (MCPs), prime targets for modern adversarial unmanned aircraft systems (UASs) and precision guided munitions.
- A Readiness Crisis: Combat fleets degraded. The M88 recovery vehicle fleet currently sits at a dismal operational rate across the Army. Thousands of pieces of equipment were recently found in Condition Code F (non-mission-capable for at least 18 of the last 36 months) because they went too long without intermediate or depot-level resets.

MDO-M Structure

To resolve these vulnerabilities, the MDO-M framework restructures Army maintenance into a multi-leveled design that optimizes repair velocity and protects high-value heavy-recovery assets:

- Operator/Crew (First Response): Performs basic troubleshooting, preventive maintenance checks and services (PMCS), and battle damage assessment and repair (BDAR) to minimize equipment downtime. Use of tele-maintenance enhances effectiveness.
- Tactical (Rapid Repair/Return to User): Performs diagnostics, PMCS, and BDAR tasks requiring minimal special tools. This level is executed by brigade and division tactical maintenance companies and general maintenance company (GMC) tactical maintenance platoons. Agile tactical maintenance teams maneuver forward to operate unit maintenance collection nodes (UMCNs) for immediate BDAR under cover.
- Support (Repair and Return to Unit): Conducts component replacements, advanced manufacturing, and specialized low-density repairs. This level is executed by division SMCs and GMC support maintenance platoons. Division SMCs can push modular support maintenance teams (SMTs) forward to execute forward strategic-level tank engine repairs in the division area.
- Forward Strategic (Repair and Return to Supply System): Positioned in theater, using Operational Readiness Program teams, advanced manufacturing facilities, and localized retrograde sort yards for Classification and Inspection Companies (CICOs) to immediately reclaim and inject known good parts back into the supply chain.
- Depot Strategic (Repair and Return to Supply System): Continental U.S. (CONUS)-based depots performing comprehensive overhaul, modernization, and life extension of heavy combat systems.

MDO-M Concept

The primary purpose of the MDO-M concept is to repair equipment as far forward as possible while adapting to threat and operational tempo. Rather than relying on rigid rules, the design allows the organic logistics footprint to actively adapt to modern battlespace parameters through several highly detailed mechanisms:

- Echeloned Recovery and Evacuation: Forward recovery from the forward line of troops to the

battalion remains restricted to M88 recovery vehicles for tracked platforms and wreckers for wheeled vehicles. Ground equipment is not evacuated indiscriminately. Instead, Heavy Equipment Transporters (HETs) — organically integrated into the division sustainment brigade to coordinate intermediate recovery — transport heavy assets from the brigade support battalion to the division support area (DSA) and rearward. HETs are high-value, high-signature targets for adversary UAS and are strictly prohibited from operating forward of the brigade rear boundary.

- SMTs and Support+ Integration: The division SMC (DSMC) is responsible for highly complex, time-consuming tasks (e.g., full turret removals and limited component repairs). Rather than dragging deadlined combat vehicles to the rear, the new DSMC pushes modular SMTs forward into brigade nodes to conduct repairs. Crucially, co-located support+ maintenance teams, consisting of U.S. Army Materiel Command (AMC) government civilian technicians and senior NCO support mechanics, operate in the DSA of armored divisions. By executing depot-level engine component repairs and swaps locally, these teams prevent unnecessary engine evacuations to CONUS and significantly improve fleet availability.
- Maintenance Surge Teams (MSTs) and GMCs: The Army deploys highly mobile, platoon-sized MSTs consisting of a headquarters and sections specialized in platforms (Abrams 91A tanks, Bradley 91M fighting vehicles, or Stryker 91S systems). MSTs execute tactical and support maintenance globally, ordering parts exclusively through the supported unit's supply system so that parts flow directly to the vehicle owner. MSTs are deployed flexibly at theater ports (supporting reception, staging, onward movement, and integration), corps areas (partnering with GMCs and AMC depot flyaway teams), and division areas (attaching to SMCs). Concurrently, GMCs in the corps and theater areas provide robust support and tactical platoons to augment divisional sustainment.
- A Streamlined Parts Pipeline and Localized Salvage: Supply stockage is based on the demand generated by types of repairs done at authorized levels of maintenance. This removes excess stockage weight from forward tactical units, enhancing their mobility. Behind the divisions, CICOs in the corps rear area collect retrograded equipment and combat losses. They classify and disassemble deadlined systems to reclaim serviceable parts onsite. Reclaimed parts are immediately placed into the company's organic strategic support area, establishing a localized, self-sustaining parts supply chain with Army-wide visibility.

Why MDO-M Is the Future

MDO-M is not a simple return to the large footprints of the 1990s. It represents a highly agile, tech-enabled sustainment framework that uses cutting-edge capabilities as force multipliers to reduce the required manpower bill:

- Nodal Dispersion vs. Target Rich Environments: In contested, highly observed environments, amassing large MCPs is a liability. MDO-M shifts heavy repair capabilities further rearward, executing maintenance through small, dispersed UMCNs that limit the signature to a few vehicles per node, using natural cover and camouflage to evade precision fires and UAS.
- Unified Garrison and Deployed Structure: Unlike legacy designs that left units to independently adapt tactical models to home-station environments, MDO-M establishes a single, seamless architecture. The daily workflow in garrison motor pools remains identical to deployed operations, ensuring that garrison activities serve as the foundational training that builds the organic technical competency of Soldiers. Within this unified structure, *preventative maintenance is prioritized as a primary driver of combat power*. By dedicating personnel to preventative maintenance, units build a proactive maintenance culture that prevents catastrophic failures forward in the battlespace. Junior maintainers develop essential technical expertise during garrison PMCS, directly translating home-station readiness into immediate, sustainable combat power when deployed.
- Rigorous Quality Control (QC): Misdiagnosis and operator error historically drive a majority of maintenance delays, compared to just a small fraction for the actual wrench-turning repair time. MDO-M integrates dedicated QC NCOs (E-6 technical inspectors) into the maintenance control sections. Performing initial and final inspections ensures repairs are executed to standard, eliminating repeat failures and maximizing repair velocity. Quality assurance and QC are key elements of leadership redistribution, guaranteeing technical oversight forward and ensuring overall accountability at echelon.
- Condition-Based Maintenance Plus (CBM+) and Operations Jailbreak (Telematics): Legacy sustainment relied on rigid, calendar-based maintenance. MDO-M introduces predictive CBM+. On platforms like the M1A2 SEPv3 Abrams tank, which features a sensor suite capable of pulling hundreds of data points, data is harvested via tablet and transmitted into wireless networks to predict failures before they happen. For historically dumb platforms lacking sensor suites (like the M88), telematics tablets act as diagnostic bridges.
- Advanced Manufacturing: To defeat contested, long-range supply lines, MDO-M uses 3D printing at the forward edge. Deployable units can print high-demand, low-density parts onsite, converting a testing activity into an active repair-and-return function overnight, decreasing the forward shop stock footprint.

The Cost of Inaction: Operational Consequences of Maintaining the Legacy Model

Maintaining the status quo under the legacy sustainment architecture introduces severe, systemic operational points of failure that compromise mission success in any contested multi-domain conflict:

- Army National Guard/U.S. Army Reserve Dependency: Reconstitution and echelons-above-brigade support reside almost entirely in the Reserve component, posing severe mobilization-timeline risks during rapid Regular Army component deployments.
- SMC as a Single Point of Failure: Divisional installations currently rely on a single SMC. Deploying this single asset eliminates the entire maintenance support capability for that geographical area.
- Training Program of Instruction (POI) Effectiveness: Dwindling baseline automotive knowledge among incoming recruits, combined with a significant reduction in POI training time reduction for maintainers, has eroded primary technical skills.
- Grade Plate and Experience Reductions: Repeated personnel cuts have occurred alongside massive expansions in equipment saturation and digital technological expansion, leaving single military occupational specialties (like the 91B Wheeled Vehicle Mechanic) responsible for hundreds of complex systems.

Path Forward: Next Steps for the Force

To operationalize this critical transition and synchronize tactical capabilities, the Army must work with all relevant stakeholders, including AMC, Headquarters, Department of the Army G-4, the Ordnance School, the Army National Guard, and the Army Reserve, to implement a deliberate, multi-phased modernization campaign. This unified effort will ensure that every wrench turned in garrison builds the technical mastery, speed, and survivability needed to win in high-intensity, multi-domain conflict.

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Featured Photo
West Virginia National Guard SGT Bryce McClure and PFC Seth Pagano repair the front crankshaft seal and cooling fan on an M1152A1 High Mobility Multipurpose Wheeled Vehicle at Field Maintenance Support Shop 3, Glen Jean Armed Forces Reserve Center, near Glen Jean, West Virginia, July 27, 2026. (Photo by SPC Ayla Cameron)



ONE Section, Fight



Streamlining C2 for the Modern Battlefield

By MAJ Kyle A. Myers

"Counter-fire mission, counter-fire mission. Target number Delta Foxtrot Wun-Niner-Fower-Fife."

As enemy artillery threatened the brigade's flank, the field artillery (FA) battalion executed its core function flawlessly. The fire direction center (FDC) converted the radar acquisition into technical firing data, while the operations officer (S-3) confirmed the target geometry. The mission was processed, the rounds were fired, and the guns immediately displaced to survive. The FA battalion's operations staff managed technical execution and tactical survival simultaneously because they operated as one integrated section.

Across the battlefield, the support battalion received an emergency request for Class V (ammunition) from the same FA battalion. But as the support operations (SPO) section scrambled to assemble the logistics package, the S-3 section detected an enemy unmanned aerial system overhead and ordered an immediate displacement of the support area. Synchronization was shattered. The SPO was trying to execute the technical sustainment mission, while the S-3 was executing a tactical survivability move. With two distinct sections fighting for control of the same vehicles and personnel, the logistics package stalled. The

FA battalion survived by fighting as a single entity; the support battalion failed because it fought itself.

In the modern kill chain, the minutes lost to this internal organizational friction are paid for in blood. The complexity of the modern battlefield — characterized by faster decision cycles, dispersed nodes, and contested logistics — demands a streamlined command and control structure to maintain support to the maneuver force. Currently, the structure of support battalions divides operational planning and sustainment execution between two distinct entities: the S-3 and the SPO. This division creates unnecessary friction, as the S-3 focuses on internal tactical positioning and security of the battalion, while the SPO manages the external technical execution of sustainment to the force.

To achieve the unity of effort required to survive and sustain the force, support battalions must evolve by looking toward a combat arms counterpart. The FA battalion provides the perfect structural blueprint by integrating its S-3 and FDC into a single, cohesive operations section. Support battalions must follow suit. By consolidating the S-3 and SPO into a single operations section — underpinned by a distribution management center (DMC) consisting of materiel and transportation management cells — the support battalion can finally establish the S-3 as the distribution integrator at the tactical edge.

Materiel management is the continuous situational understanding, planning, and execution of supply and maintenance capabilities to anticipate, synchronize, and direct all classes of supply to maximize combat power.

The Field Artillery Blueprint: Integrating Tactical and Technical Execution

The FA battalion offers a proven organizational model for integrating tactical decisions and computing technical data. Within the artillery community, this integration is often described using a simple biological analogy: the forward observers are the eyes, the guns are the muscles, and the FDC acts as both the brains and the central nervous system. As a result, there is no artificial separation between the officers who plan the movement and positioning of units and the officers who calculate the firing data needed for the rapid determination of fire direction. The S-3 and FDC operate as a single, unified entity, preventing the disjointed communication that is known to plague support battalions.

Doctrinally, the FA battalion integrates its S-3 and FDC through overlapping roles and a unified command structure. In this construct, the S-3 focuses on tactical fire direction, determining which targets to engage, prioritizing fires, and establishing how artillery positions itself to support the commander's scheme of maneuver. Meanwhile, the FDC simultaneously handles the technical fire direction, executing the complex mathematics of converting calls for fire into precise firing data. To bridge these tactical and technical requirements seamlessly, the officer responsible for technical execution, the fire direction officer, concurrently serves as the assistant



SPC Landon Livermoore, a radiotelephone operator with Bravo Battery, 163rd Field Artillery Regiment, 76th Mobile Brigade Combat Team, 38th Infantry Division, receives and responds to commands during the Combat Readiness Exercise 26-02 at Camp Atterbury, Indiana, July 24, 2026. (Photo by SGT Johanna Pullum)

operations officer. This deliberate structural integration ensures that the officer responsible for the technical direction of fires is identical to the officer assisting the S-3 in general battalion operations.

By examining how the FA battalion merges the S-3 and FDC, it becomes clear how the support battalion can merge the S-3 and SPO. In the FA model, the S-3 handles the tactical geometry (where the guns go) while the FDC handles the technical math (how the rounds reach the target). In support battalions, sustainment operations require the exact same synthesis. Tactical sustainment involves the geometry of the battlefield: determining where to position the support area, executing route selection, establishing convoy security requirements, and coordinating survivability moves. Technical sustainment involves the mathematics of logistics: burn rates for equipment, consumption factors based on the environment, pallet position requirements to sustain the force, and carrying capacities to ensure everything gets where it needs to go. By merging the S-3 and SPO under a single operations officer, the SPO's technical planners in the new DMC become the direct equivalent of the FA battalion's FDC.

Building the Brain: Operationalizing the Tactical Distribution Management Center

To operationalize this FDC equivalent at the battalion level, the sustainment enterprise already possesses a doctrinal blueprint. The Army currently uses the DMC at echelons above division, specifically within the theater sustainment command, expeditionary sustainment command, and corps sustainment command. The DMC in these commands is the operational center responsible for managing distribution across its area of responsibility, synchronizing and integrating the

functions of distribution planning, transportation, and materiel management.

This unified approach to command and control is not unprecedented within tactical sustainment formations. The movement control battalion already operates under this model, with the S-2/S-3 section incorporating and providing oversight of the plans, programs, and operations and highway traffic sections. Furthermore, the Marine Corps has long centralized both tactical positioning and technical logistics under a single operations officer within their combat logistics battalions. To optimize the support battalion's merged operations section, battalions should adopt a scaled-down DMC model. This tactical DMC would serve as the FDC for the support battalion, using existing personnel to form two primary components: a materiel management cell (MMC) and a transportation management cell (TMC).

Materiel management is the continuous situational understanding, planning, and execution of supply and maintenance capabilities to anticipate, synchronize, and direct all classes of supply to maximize combat power. In the tactical DMC model, the MMC would serve as the analytical hub for all classes of supply, maintenance, and field services by absorbing the commodity managers previously housed in the SPO. This cell would track commodity levels, forecast future requirements, manage the capacities of various supply nodes across the battlefield, and maintain the logistics estimate for the support battalion's common operating picture (COP). Ultimately, this cell translates the operating force's composition and tactical mission into specific, quantifiable supply requirements.

While the MMC determines the requirement, the TMC is responsible for planning, prioritizing, and executing the physical movement of that materiel. Transportation management is the dual process of committing allocated transportation assets and regulating movements according to command priorities to synchronize distribution over lines of communication. In the tactical DMC model, the TMC would allocate the necessary distribution platforms, coordinate route clearances, and synchronize convoy movements. This cell dictates how the materiel moves, when it moves, and which specific platforms and routes will be used to ensure survivability and speed.

Eliminating Organizational Friction: Centralizing Distribution within the Operations Section

While the MMC and TMC handle the technical variables, their true value is unlocked when they are synchronized in the operations process. Distribution integration is the operational process of aligning personnel, equipment, and materiel requiring distribution with adequate transportation capabilities to synchronize distribution in support of the concept of operations. Consolidating the MMC and TMC under a DMC subordinate to the S-3 establishes the operations section as the primary distribution integrator at the tactical edge.

Under the current separated structure, the support battalion struggles to function as a cohesive distribution integrator. Army doctrine dictates that support battalions maintain distinct planning horizons for current operations, future operations, and plans, with the S-3 and SPO swapping leads from one planning horizon to the next. This artificial division of labor severely limits integration. When the SPO receives requirements from the force and attempts to push supplies forward, the distribution pipeline frequently stalls because the SPO lacks control over the battalion's internal tactical assets and movement plans. The SPO cannot guarantee the security of a supply route or the defensive posture of a logistics release point, as those functions belong to the S-3. Consequently, the integration breaks down at the point of execution because tasking authority is divided and the sections are forced to constantly trade ownership of the planning horizons.

A unified operations section resolves this friction by encompassing all variables of the distribution equation. When a maneuver element submits a critical requirement for Class V (ammunition) or Class III (fuel), the S-3 section processes the request holistically. The commodity managers within the MMC validate the requirement and source the supplies from subordinate supply elements. Simultaneously, the TMC assesses the threat template, designates a secure route, and allocates the required transportation assets. These forecasted materiel requirements and anticipated transportation assets are then integrated by the S-3 through a single, continuous process. The direct reporting structure enables cradle to grave distribution management.

Leveraging Professional Military Education: Aligning Execution with Education

The immediate counterargument to merging the S-3 and SPO is the risk of exceeding a single officer's span of control. Critics will argue that combining tactical operations and technical sustainment under one roof places an immense burden on the S-3. However, mitigating this span of control requires an honest assessment of our professional military education (PME) system and the structural imbalance of the current tables of organization and equipment.

The friction inside today's support battalion command post is largely exacerbated by rank disparity. In the 2013 fiscal year, the S-3 billet was downgraded from a major to a captain on the brigade support battalion's table of organization and equipment, while the SPO remained a major. Currently, the Army expects these captains and majors to operate within overlapping spaces during the operational planning process. In reality, a major who has completed the Command and General Staff Officer Course possesses vital repetitions in the military decision-making process (MDMP). Conversely, a captain typically has only a single, foundational rep of MDMP from the Logistics Captains Career Course, where education is heavily weighted toward the technical aspects of developing a concept of support.

A unified operations section capitalizes on this PME disparity rather than fighting it. As a field-grade officer, the S-3 possesses the necessary MDMP experience required to synchronize sustainment with the tactical force's scheme of maneuver, making them uniquely equipped to manage the expanded operational scope. To support this, the structure places more responsibility on the backs of captains and warrant officers of the tactical DMC's MMC and TMC. Reporting directly to the S-3, these captains are empowered to focus entirely on what their PME has trained them for: the technical, mathematical execution of sustainment.

One Section, One Fight: Optimizing the Commander's Decision Making

Ultimately, evolving the support battalion's C2 structure is about optimizing the commander's decision-making process within the complexity of the modern battlefield. In a rapid displacement, a support battalion commander does not have the time to synthesize conflicting COPs from the S-3 and SPO. The commander requires a single, unified sustainment and maneuver picture.

By adopting the FA battalion blueprint and merging the tactical geometry of the S-3 with the technical mathematics of the DMC, the support battalion would eliminate internal friction. This structural evolution would align perfectly with talent management, ensuring that field-grade officers would drive the operations process with holistic MDMP integration while company-grade officers drive technical execution. If these functions are fused, the commander would receive a synthesized logistics estimate tied directly to the tactical maneuver plan. One section, driving one fight, would ensure that the support battalion could operate at the speed of the modern battlefield, delivering uninterrupted sustainment support to the force when and where it is needed most.

MAJ Kyle A. Myers currently serves as the S-4/logistics staff officer of the 66th Military Intelligence Brigade at Wiesbaden, Germany. He previously served as the executive officer of the Regimental Support Squadron and as the regimental logistics officer of the 3rd Cavalry Regiment, and commander of the 526th Quartermaster Composite Supply Company. He was selected as part of Project Warrior, serving as an observer/controller at the National Training Center at Fort Irwin, California, and as an instructor/writer at the Army Sustainment University at Fort Lee, Virginia. He was one of the first two officers to attend the U.S. Marine Corps Advanced Expeditionary Logistics Operations Course at Twentynine Palms, California. He has a Master of Operational Studies degree from the Command and General Staff College.

Featured Photo
Left: SPC Jayvon Smith, a cannon crewmember assigned to Chaos Battery, 4th Battalion, 319th Airborne Field Artillery Regiment, 173rd Mobile Brigade Combat Team (Airborne), receives a call for fire during an African Lion 26 live-fire exercise at Cap Draa, Tan-Tan, Morocco, April 21, 2026. (Photo by SGT Christopher Sanchez)

Right: Polish K9PL Self-Propelled Howitzers simulate field artillery positioning during the Battle of Tanks reenactment event at Orzysz, Poland, July 25, 2026. (Photo by SGT Ronald D. Bell)

DATA IN THE DIRT

Connecting the Tactical Edge to Corps Command and Control

By MAJ Hansen Tan



In the modern battlespace, a commander's decisions are only as good as the data on which they are based. While Army sustainers have powerful systems of record like the Global Combat Support System–Army, their reach often does not extend to the tactical level, leaving a critical gap in understanding the immediate logistics landscape. To bridge this divide, the XVIII Airborne Corps assistant chief of staff, logistics (G-4) turned to logistics status (LOGSTAT) reports as a data source for experimentation for Scarlet Dragon 26-2. Scarlet Dragon is a recurring exercise founded by the XVIII Airborne Corps that focuses on data-centric warfare. As part of the exercise, corps staff are challenged to approach warfighting functions in new and innovative ways. During the planning process for Scarlet Dragon 26-2, it was quickly identified that the current workflow for collecting LOGSTATs is inaccurate, latent, and unresponsive. This flawed process results in a significant visibility gap for the commander, a challenge that the corps G-4 planners tackled as a primary technical innovation objective.

The concept of automating the LOGSTAT workflow is not new. The Army Software Factory (ASWF) began tackling this problem in the summer of 2025 with its LOGTAK+ team. Through months of observation and direct integration with company executive officers, brigade and battalion S-4s, and brigade support operations officers, the ASWF team engineered a solution to facilitate quality data collection at the tactical edge. This was pioneered through an Android Tactical Assault Kit (ATAK) plugin and a companion desktop web application, which simplified data entry and aggregated it into a clear visualization of LOGSTAT and combat slant status at echelon. Since its initial rollout in August 2025, the LOGTAK+ team has continuously tested, gathered critical feedback, and iterated on the software. Most notably, the team integrated their solution within two XVIII Airborne Corps units, the 82nd and 101st Airborne Divisions, during their Joint Readiness Training Center (JRTC) rotations in early 2026.

The XVIII Airborne Corps G-4 staff recognized the value of LOGTAK+ during the planning for the 82nd Airborne Division's JRTC rotation in March 2026. However, a significant challenge emerged. As a standard operating procedure, the corps headquarters operates on classified networks that host its primary mission command (MC) system. This created a disconnect because LOGTAK+ resides within a sensitive but unclassified (SBU) network, a lite network enclave that allows for secure encrypted communications through commercial internet transport. The critical question became, "How can the corps aggregate data from a SBU network and visualize it in a classified environment?" In the legacy process, the data was manually moved via human input, a swivel-chair approach, to a classified system. This added another step to an already cumbersome workflow, creating one more potential point of human error and further degrading data integrity.

The requirement to move data from unclassified to classified systems is not a new problem in the Army. Other warfighting functions commonly use cross-domain solutions (CDSs) to permit this data transfer within established technical and regulatory parameters. Corps G-4 planners realized they could leverage pre-existing and approved tools for this purpose. Building on previous efforts by the 82nd Airborne Division, Palantir engineers leveraged the

Vantage CDS, which is approved to move Army data between enclaves. The experimental workflow designed by the corps G-4 planners then aggregated LOGTAK+ inputs (from either the ATAK plugin or web application), visualized the data on the controlled unclassified information version of the LOGTAK+ dashboard, and then passed it through the CDS for visualization on the classified network.

The automated workflow was the centerpiece of the corps G-4's experimentation. After building the visualization tools within a low-to-no-code application builder within the corps's MC system, the team successfully passed LOGSTATs from a SBU network through the Vantage CDS to a classified network. The entire data flow, from unclassified entry to visualization on the classified network, took between minutes to an hour. On the classified network, the aggregated information populated two critical tools: a dynamic LOGSTAT dashboard for sustainment planners and a tailored visualization within the current operations integration cell (COIC) dashboard. Outside the sustainment warfighting function, this provided COIC staff with an up-to-date logistics picture, directly enhancing their ability to assess the correlation of forces and means and conduct effective battle tracking.

The automated workflow validated in Scarlet Dragon 26-2 is not the end goal, but a foundational beginning. By proving that this data pipeline is feasible, the corps is now creating the clean, reliable, and historical dataset needed to layer analytical tools that can generate forecasts and estimates, moving the enterprise closer to a predictive model. Furthermore, the availability of this live sustainment data opens the door for other warfighting functions to integrate it into their own combat power visualization tools, creating a more holistic common operational picture for the commander.

It is important to acknowledge the capability's limitations. The accuracy of the system still relies on human input at the tactical edge. However, by replacing cumbersome legacy methods with the intuitive LOGTAK+ interface on ATAK and on the companion desktop web application, we are promoting better data collection practices and lowering the barrier for Soldiers to provide timely and accurate reports. A further challenge lies ahead in fielding this capability more broadly. A transition plan, developed with key stakeholders like the ASWF and the XVIII Airborne Corps Joint Innovation Outpost, will be required to determine long-term ownership and backend support responsibilities.

This experimentation was not a theoretical exercise. The XVIII Airborne Corps is already fielding this capability, moving it from concept to practical application. During the recent Warfighter 26-4 command post exercise, the corps G-4 integrated the LOGTAK+ workflow with the 35th Infantry Division, marking the first time this application had been employed with an Army National Guard unit. The deliberate glide path for this initiative continues into the next Warfighter exercise, where the capability will be employed with three division headquarters simultaneously. This represents the first real-world application of this automated workflow at the corps level within a warfighter exercise, demonstrating the tangible value of exercises like Scarlet Dragon 26-2 in bringing critical, data-centric capabilities out of experimentation and into the hands of the warfighter.

MAJ Hansen Tan is a Canadian Army exchange officer currently serving with the XVIII Airborne Corps assistant chief of staff G-4 as the supply and services deputy and a G-4 planner. He has previously served as the 2nd Service Battalion transportation officer, the Canadian Forces Base Kingston rations and quarters support services officer, the Joint Task Force X adjutant, and within the Canadian Joint Operations Command as a J-4 Middle East and Africa planner. He has completed courses within the Royal Canadian Logistics Service, including Transport, Supply, Food Service, Contracting, and Quartermaster. He has also completed the Combat Service Support Convoy Commander Course and the Canadian Basic Parachutist Course. He holds a Bachelor of Arts degree in Military Psychology and Leadership from the Royal Military College of Canada.

Featured Photo
SPC German Gil Barios and PFC Rohan Forbes with 2nd Battalion, 37th Armor Regiment, 1st Armored Brigade Combat Team, 1st Armored Division, prepare the electrical system for a full engine replacement on a M1A2 tank during a live fire exercise, near Boleslawiec, Poland, July 24, 2026. (Photo by SSG Logan Ubaldo Lechuga)

LEAN, MOBILE, AND REDUNDANT

C2 for the Modern Battlefield

■ *By MAJ Kyle A. Myers*

"The support area was just hit."

Everyone in the command post (CP) stopped what they were doing and looked at the radio operator. Pressing the handset to her ear, she relayed the transmission with a deep sense of urgency, "Hit by loitering munitions."

A heavy silence fell as the grim reality sank in: a sister support battalion's CP had just been wiped out, instantly severing its centralized command and control (C2) capabilities. To an Army sustainer, this disastrous outcome should come as no surprise. The destroyed CP was a sprawling, highly targetable beacon. It relied on multiple tents, noisy towed generators, an array of computer-based systems to display the commonoperational picture (COP), and a perimeter secured by triple-strand concertina wire, all predictably situated near a major road crossing. It was the exact type of visual, thermal, and electromagnetic footprint that makes a CP stick out in a sea of noise to be targeted by enemy fires.

Massive, high-tech, do-it-all CPs are no longer assets; they are liabilities. To survive and sustain the fight on the modern battlefield, support battalion CPs must be lean, mobile, and redundant.

Lean by Design: Engineering Mobile and Redundant Command Nodes

The monolithic support battalion CP is a dated concept on the modern battlefield. To survive the modern kill chain, sustainers must favor a synchronized, multi-node bounding construct. By splitting the staff into two completely identical hubs of authority, the battalion ensures continuous C2. While the active node controls the fight under the primary call sign, the dormant node uses that window to jump to a new location and enforces mandatory crew rest. If one node is targeted and destroyed by enemy fires, the battalion does not suffer an instantly catastrophic decapitation of centralized C2 because the second node is already on standby to assume control.

However, this redundant architecture only works if each individual node is strictly lean by design. Support battalions must ruthlessly strip away the bloat of massive legacy tents, civilian-procured computer-based systems, and trailer-mounted generators. When viewed from the ground, the modern CP must project a radically low profile: no desks, no chairs, no tents, and no generators. This deliberate reduction in bloat is not about doing less with less; it is about minimizing visual, thermal, and electromagnetic signatures by forcing the staff to physically condense their operations.

The foundation of this austere node is adapted from the idea of a tactical CP, using a disciplined configuration of three tactical vehicles oriented in a tight U-shape. A utility vehicle anchors the front to house the battalion's COP with a single planning table established in the bed under cover. Two general purpose (GP) vehicles flank it perpendicularly, hosting the operations and intelligence (O&I) and administration and logistics (A&L) battle boards on their inward-facing sides. These three vehicles serve as the structural perimeter. The negative space in the center becomes the current operations (CUOPS) floor, immediately concealed from aerial observation by rapidly stretching camouflage netting over the entire node. To preserve this streamlined footprint, a separate logistics vehicle is staged nearby under its own netting to store food, water, and rucksacks.

This deliberate geometry is engineered for one purpose: speed. Optimizing the node for rapid transitions between at-the-halt (ATH) and on-the-move (OTM) C2 requires simple, leader-driven emplacement drills rather than complex site coordination. Upon arriving at a new location, an operations officer physically dismounts to establish the exact center of the COP. The utility vehicle establishes the baseline by parking directly in front of that position, serving as the guide for the two GP vehicles to close the U-shape. Staff members immediately dismount to hang analog battle boards.

To survive the modern kill chain, support battalions must execute this drill with ruthless efficiency. With a properly trained crew, initial operational capability must be achieved in under 10 minutes. Reaching full operational capability, which includes hanging the camouflage nets, must take under 10 additional minutes. Conversely, tearing everything down to displace must also be executed in under 10 minutes. These are not arbitrary training metrics; they represent the narrow window a staff has to mask their signature, execute their mission, and displace before enemy sensors align for a strike.

Despite this compressed timeline and austere footprint, the support battalion staff has everything they need to execute C2: communications, an updated COP, and the required information to make and execute decisions. Crucially, because the CP is lean and simple, it can move quickly if detected and adapt if compromised. On today's battlefield, true concealment is nearly impossible; survival relies on masking signatures and avoiding attention. And if the disguise fails, the CP is resilient through redundancy.

Surviving the Spectrum: Integrating Low-Signature Platforms for Sustained C2

The modern kill chain is not solely reliant on visual observation; it is intimately linked to the electromagnetic spectrum. The loitering munitions strike that decimates a support area is often guided by the massive electromagnetic beacon created by a dense array of unmanaged transmitters. To survive this threat, the C2 backbone must prioritize maintaining a streamlined, low electromagnetic signature. This means abandoning the massive antenna farms that traditionally telegraph a CP's location. Instead of radiating like a high-value target begging for a strike, the CP must effectively hide in plain sight by ensuring its electromagnetic and physical signatures mirror those of subordinate formations.

Achieving this disguised signature requires maximizing the integrated systems already present in standard tactical vehicles. The communication suite for most support battalions today is built around the AN/VRC-92F, a vehicle-mounted, dual Single Channel Ground and Airborne Radio System, alongside the Joint Battle Command–Platform using the Mounted Mission Command–Software for beyond line-of-sight (BLOS) satellite communications (SATCOM) chat. One of the GP vehicles also houses the AN/VRC-104 radio system, integrating a vehicle-mounted AN/PRC-150 radio for high frequency BLOS voice redundancy without relying on SATCOM. Ideally, the battalion would modernize the legacy AN/VRC-92F with the AN/VRC-125A radio set, leveraging the software communications architecture enabled by its radios to cover an expansive frequency range while running a vast array of waveforms to include the Mobile User Objective System to provide BLOS SATCOM voice and data both ATH and OTM.

While the baseline posture relies on organic vehicle whip antennas to mirror subordinate units, tactical positioning often dictates a compromise. When commanders leverage micro-terrain or deep defilade to physically conceal the CP, very high frequency line-of-sight communications naturally degrade. To bridge this gap without reverting to a sprawling antenna farm, staffs can employ a single quick erecting antenna mast (QEAM). By elevating an antenna just above the terrain, the QEAM restores connectivity while keeping the physical vehicle footprint hidden in the micro-terrain. Crucially, a proficient crew can deploy and retract a QEAM rapidly enough to preserve the strict, under-10-minute emplacement and displacement standards.

This vehicle-integrated setup, augmented only by a targeted QEAM when necessary, is purposefully streamlined to decentralize emissions. By distributing these platforms across the U-shaped configuration, the staff cleanly divides their communications efforts. One vehicle is dedicated to battalion and brigade command nets; the second monitors O&I nets and the third manages the A&L nets. Decentralizing these transmissions across the structural perimeter rather than clumping them into a single point of failure further degrades the enemy's ability to pinpoint the CP's exact location. While the lean and mobile physical aspects of the CP rely on analog tactical basics like map boards and markers, the digital nodes remain entirely dependent on this resilient architecture to stay connected to the fight.

Survival within this architecture demands a strictly enforced emission control (EMCON) posture, especially during displacement and recovery. After a battle handover, the dormant CP on its rest cycle must ruthlessly manage its output by transitioning to a highly restrictive EMCON state, shutting off all nets except two: the battalion and brigade command nets. A radio watch passively monitors these networks, initiating wake-up criteria for key leaders only as required. Even the active CP must adhere to disciplined EMCON measures by relying on burst data transmission over continuous voice traffic and minimizing unnecessary radio checks. It is an architecture built not for convenience, but to survive the spectrum through relentless discipline.

Shattering the Illusion of Comfort: Embracing the Austere CP

That same relentless discipline must be applied to the CP's internal operations, beginning with the most uncomfortable adjustment for a modern support battalion staff: breaking the tether to computer-based applications. Today's staffs are addicted to email and PowerPoint, often resulting in an overabundance of information that creates a self-imposed fog of war. A lean CP forces a necessary digital detox. By removing the sprawling networks and projector screens that make a traditional CP such a lucrative, power-hungry target, staff members are forcefully pulled out from their digital silos. They are required to communicate openly, collaborate face-to-face, and filter key information rapidly. By relying on analog map boards, markers, and person-to-person conversations, the staff drastically reduces its power requirements while simultaneously increasing its decision-making speed.

However, this physical austerity creates significant logistical and security friction. Keeping the footprint lean inherently limits organic sustainment capabilities. To prevent

footprint creep, the CP must strictly carry no more than three days of supply for food, water, and fuel. Consequently, resupply operations become a constant, critical concern on the modern battlefield, especially in environments lacking air parity. Furthermore, without a dedicated element to secure the CP, vulnerability must be mitigated through meticulous terrain selection. Traditional support battalions place their CPs in the middle of the sprawling support area, often predictably situated near major road crossings. Divorcing this lean, dual-node construct from the rest of the battalion frees the commander to exploit micro-terrain and elevation that standard sustainment formations typically ignore.

Operating this architecture under a relentless operational tempo also introduces severe human and procedural challenges. Executing a dual-node design creates persistent friction during battle handovers, and ensuring incoming data reports are received by the correct controlling element is a constant hurdle. This can be mitigated by enforcing strict communication protocols, such as sending reports via direct messages to role names located at each node instead of chats. Moreover, staff burnout is a critical threat. It is essential for leadership to strictly enforce rest cycles. Whichever CP is dormant and not in control must drop down to a passive radio watch and mandate adequate sleep.

This exhaustion is often compounded by the constant tension of deciding when to bound. While the CP is explicitly designed for rapid mobility, displacement is not advantageous in every situation. Moving in an air-contested environment presents a massive risk, since displacing vehicles generate a sustained heat signature and an obvious visual target. Leaders must constantly weigh the costs and benefits of movement. If compromised, the CP must jump immediately. However, if the node remains undetected, disciplined staffs must deliberately time their displacement to coincide with thermal crossovers around dusk and dawn when thermal imagery is least effective. A proficient staff would plan their battle handover before thermal crossover, using the remaining window to tear down and prepare to displace.

Occupying a site in this austere environment requires constant adaptation to manage both signatures and weather. To eliminate the acoustic and thermal signature bloat of legacy CPs, this design shuns noisy towed generator trailers. However, it forces the staff to weigh the signature trade-offs between idling their tactical vehicles for 15 minutes every hour to power the communications architecture versus using a single, man-portable 3 kW generator or portable power station. To mask residual engine heat, staffs can adopt the simple technique of placing covers spaced over the vehicle hoods to marginally reduce their thermal signature. Furthermore, operating without tents exposes the staff to the elements. Stringing a tarp beneath the camouflage net serves as a vital mitigation procedure, blocking ambient light at night while keeping the CUOPS floor functional during rain.

In the end, the goal is not to hide completely from advanced sensors, which is nearly impossible, but to disguise the node. By structuring the visual and thermal signatures to replicate those of a subordinate element, the CP operates below the targeting threshold. In the new age of warfare, survival and lethality are not enabled by the massive, high-tech, do-it-all CPs that doom today's support battalions. By embracing austerity and returning to analog fundamentals, sustainers will prove far more adaptable and resilient on the modern battlefield.

MAJ Kyle A. Myers currently serves as the S-4/logistics staff officer of the 66th Military Intelligence Brigade at Wiesbaden, Germany. He previously served as the executive officer of the Regimental Support Squadron and as the regimental logistics officer of the 3rd Cavalry Regiment and commander of the 526th Quartermaster Composite Supply Company. He was selected as part of Project Warrior, serving as an observer/controller at the National Training Center at Fort Irwin, California, and as an instructor/writer at the Army Sustainment University at Fort Lee, Virginia. He was one of the first two officers to attend the U.S. Marine Corps Advanced Expeditionary Logistics Operations Course at Twentynine Palms, California. He has a Master of Operational Studies degree from the Command and General Staff College.

Featured Photo
SGT Edwin Gutierrez, a network communication systems specialist, assigned to 261st Signal Company, Headquarters and Headquarters Company, Special Troops Battalion, runs a diagnostic test on a server at the 1st Armored Division's Headquarters main post during one of its command post exercise iterations held at Fort Bliss, Texas, Aug. 6, 2024. (Photo by PVT Dominic Atlas)



Shattering the Silos

Restructuring Support for the Modern Battlefield

■ *By MAJ Kyle A. Myers*

The enemy rocket barrage lasts less than 60 seconds, but the operational impact is catastrophic. When the smoke clears over the brigade support area (BSA), the brigade support battalion (BSB) commander realizes that the brigade has not just lost a few trucks, but also its second sustainment load of Class III (fuel). Because the battalion is structured around functionally stove piped base companies, the brigade's bulk fuel and distribution platforms are consolidated under the distribution company in a single location. One localized strike instantly severs the maneuver force's logistical lifeline.

This scenario highlights a grim reality: to prevent a catastrophic single point of failure on the modern battlefield, support battalions often attempt to disperse

their assets into smaller, intermixed base clusters tucked deep into the vegetation or terrain. But breaking the legacy BSB apart to create these survivable nodes reveals its fatal structural flaw. Because the table of organization and equipment (TOE) isolates capabilities by company lines, ensuring each new cluster has holistic capabilities requires building ad hoc task organizations on the fly.

The BSB commander must rip distribution platforms from the distribution company, recovery assets from the maintenance company, and medical evacuation platforms from the medical company just to create a single self-sustaining node. Suddenly, platoon leaders who have never trained together at home station are thrown under an unfamiliar company commander. The maintenance section does not know the distribution company's standard operating procedures (SOPs), and the medical element operates on a different radio net. By the time these fragmented elements untangle their own command and control (C2), they are identified by an enemy unmanned aircraft system (UAS), and the kill chain does the rest.

The tactical survival of any support battalion on the modern battlefield relies on unified operations and highly survivable, low-signature command posts. However, those operational optimizations will ultimately fail if the underlying force structure executing the mission is too bloated and rigid to maneuver. The current BSB is anchored to the past. Built on a foundation of massive, functionally isolated base companies, the legacy BSB lacks the agility required to survive in modern combat. To sustain a highly dispersed and mobile maneuver force, the force supporting it must fundamentally restructure away from functional stovepipes in favor of multifunctional support companies.

The Base Cluster Dilemma: A Lose-Lose Scenario

Currently, when a BSB attempts to survive on the modern battlefield, it is forced to choose between two heavily flawed base cluster models: the organic company cluster or the intermixed asset cluster.

Today's FSC is misnamed. It is not a forward support element of the brigade; it functions purely as a direct-support logistics element hardwired to a maneuver battalion.

The organic company cluster represents the most traditional, and arguably the most administrative, adaptation of the dispersed model. In this configuration, each functional organic company in the BSB establishes its own distinct, geographically separated base cluster. The primary operational advantage of this model is clear: it uses established, organic chains of command. Because the companies remain internally cohesive, the leadership dynamics, SOPs, and interpersonal trust forged during garrison operations and home-station training are preserved. This facilitates relatively frictionless internal C2.

However, despite this administrative ease of control, the organic company cluster carries severe and potentially catastrophic operational risks. While the brigade disperses its overall footprint, it inadvertently creates isolated single points of failure. If an adversary identifies and destroys the medical company's cluster, the brigade instantly loses a massive percentage of its Role 2 medical treatment facility (MTF) and casualty evacuation capacity. Therefore, while this model is structurally comfortable for inexperienced organizations, it allows the enemy to achieve disproportionate operational effects through the selective targeting of isolated vulnerabilities.

To counter the vulnerabilities inherent in the organic model, highly proficient and aggressively trained units employ an intermixed asset cluster design. This sophisticated configuration disaggregates the traditional company structures, cross attaching a proportional mix of distribution, maintenance, and medical capabilities into every single cluster across the rear area. This model provides superior deception and signature management; from an adversarial intelligence perspective, an intermixed cluster closely mimics the electromagnetic and physical signature of a standard maneuver battalion forward support company (FSC), effectively masking the BSA's true location.

The secondary and tertiary effects of this model, however, present formidable leadership challenges. The C2 requirements for an intermixed cluster are highly complex. Company commanders are forced to exercise administrative and tactical control over disparate assets spread across multiple geographic locations while simultaneously commanding personnel from other functional companies temporarily attached to their node. This requires a flawless tracking system to manage commodities, maintenance backlogs, and personnel across a highly fragmented landscape. Ultimately, the BSB is trapped: the organic model risks total capability annihilation, while the intermixed model risks total C2 failure.

Modular Sustainment: Forging the Multifunctional FSC

The solution is not a compromise, but a complete structural overhaul: redesigning the TOE to fuse the survivability of the intermixed model with the seamless C2 of an organic unit.

Achieving this requires a fundamental shift in tactical terminology and alignment. Today's FSC is misnamed. It is not a forward support element of the brigade; it functions purely as a direct-support logistics element hardwired to a maneuver battalion. Legacy FSCs must be redesignated as combat logistics companies (CLCs) to accurately reflect their direct-support role. This critical redesignation frees up the FSC nomenclature to be repurposed for new, highly mobile BSB formations designed for true dispersed sustainment.

Built from the ashes of dissolved functional base companies, these newly minted FSCs are constructed by reallocating their assets into two highly mobile, multifunctional nodes. Designed to operate on their own tactical islands forward of the BSA, they are engineered for total self-sufficiency. Commanded by a single company headquarters, each FSC packs a punch: they inherently contain a field feeding team using an Assault Kitchen (AK), an ammunition team operating an ammunition transfer point (ATP) with a light capability rough terrain forklift, and a maintenance section providing tactical maintenance for the company and recovery capability from battalion maintenance collection points (MCPs) to the brigade MCP.

Crucially, these new FSCs integrate distribution and medical evacuation natively. Their distribution platoon carries half of the brigade's secondary sustainment loads for Class I (subsistence and bulk water), Class III, and Class V (ammunition), while an organic evacuation platoon controls half of the brigade's Role 2 evacuation platforms prepositioned forward on the battlefield.

Because these assets are permanently assigned under a single TOE, the FSCs solve the fatal flaws of both the organic and intermixed cluster models. When an enemy UAS enters the airspace, the FSC commander does not waste critical minutes cross-talking on different radio nets to untangle attached platoons. The company simply packs up and moves out, breaking the enemy kill chain before artillery can fire. Furthermore, this design mathematically eliminates the single point of failure that can doom the legacy BSB. By splitting the brigade's secondary sustainment loads between the A and B FSCs, the support battalion ensures that a single localized rocket strike can no longer wipe out 100% of the brigade's bulk fuel or medical evacuation capacity.

Generating Combat Power: Establishing the Brigade GSC

While the new multifunctional A and B FSCs push forward to support the brigade at the tactical edge, the remaining heavy assets from the legacy BSB must be consolidated into a new general support company (GSC).

Operating as the anchor of the BSB, the GSC serves as the centralized hub for the brigade's heaviest, least mobile, and most specialized sustainment capabilities. Under a single company headquarters, the GSC controls its own field feeding team using an AK and a heavy lift team operating the main ATP with the All-Terrain Lifter Army System. Its supply platoon manages only Class IX (repair parts) for the brigade, while the maintenance platoon provides tactical maintenance to the GSC and the BSB and brigade headquarters, simultaneously managing the low-density, specialized tactical maintenance for the entire brigade. By stripping away the lighter, forward-focused elements, the GSC becomes a hyper-focused logistical nerve center.

Most importantly, the GSC centralizes the brigade's definitive medical care by housing the treatment platoon, which operates the Role 2 MTF. By consolidating these specialized assets into a single company, the BSB commander drastically reduces the brigade's traditional logistical footprint in the rear area.

Under the legacy BSB, the BSA became a massive target because it forces all distribution, maintenance, and medical vehicles to consolidate into a single, sprawling footprint. With bulk commodities and evacuation platforms pushed aggressively forward into the new FSCs, the GSC sheds the physical bloat that invites artillery fire. The result? The BSB no longer offers the enemy a sprawling, single-strike jackpot. Instead, it operates a hardened, low-signature hub that quietly and seamlessly generates combat power from the shadows.

Surviving the Kill Chain: Aligning Structure with Strategy

The complexity of the modern battlefield demands a sustainment force that is as agile and survivable as the maneuver elements it supports. The 60 seconds it takes for an enemy rocket barrage to impact leaves no time for administrative hiccups. The legacy BSB, tethered to the static, functional stovepipes of the past, is structurally incapable of meeting this demand without assuming catastrophic risk. Forcing a support battalion commander to fracture organic companies to create ad hoc, survivable base clusters introduces unacceptable friction at the exact moment when rapid execution and clear C2 are required.

By redesignating legacy direct-support elements as CLCs, the sustainment enterprise can repurpose the FSC nomenclature for its true tactical calling. Restructuring the BSB's functional base companies into multi-functional A and B FSCs and a centralized C GSC will provide commanders with a pre-packaged force capable of rapid displacement. This modernized structure will ensure that the distribution, maintenance, and medical elements share a unified chain of command, eliminating the internal friction of temporary task organizations and allowing the support battalion to move faster than the enemy's targeting cycle.

Ultimately, operational agility cannot be achieved through sheer force of will or staff workarounds; it must be built directly into the TOE. When the BSB no longer has to fight its own internal structure just to survive, it can focus entirely on its core objective: generating uninterrupted combat power and delivering lethal sustainment to the maneuver force.

MAJ Kyle A. Myers currently serves as the S-4/logistics staff officer of the 66th Military Intelligence Brigade at Wiesbaden, Germany. He previously served as the executive officer of the Regimental Support Squadron and as the regimental logistics officer of the 3rd Cavalry Regiment and commander of the 526th Quartermaster Composite Supply Company. He was selected as part of Project Warrior, serving as an observer/controller at the National Training Center at Fort Irwin, California, and as an instructor/writer at the Army Sustainment University at Fort Lee, Virginia. He was one of the first two officers to attend the U.S. Marine Corps Advanced Expeditionary Logistics Operations Course at Twentynine Palms, California. He has a Master of Operational Studies degree from the Command and General Staff College.

Featured Photo
Soldiers assigned to the Division Sustainment Brigade, 1st Armored Division, set up camouflage netting over the ammunition control point during preparations for a convoy protection platform gunnery range at Karliki, Poland, July 28, 2025. (Photo by SGT James Lefty Larimer)

Fundamentals of the Operations Process

By CPT Joseph A. Carroll, Captains Career Training Department

Situation

During reception, staging, and onward movement at the National Training Center, Task Force (TF) GAMBLERS (15th Brigade Support Battalion [BSB], 2/1 Cavalry Division) initiated their military decision-making process (MDMP) in support of TF BLACK JACK. As part of the operation, the 15th BSB S-3 is responsible for executing BSB operations in a manner that supports the ability to provide logistics and health service support to TF BLACK JACK.

TF BLACK JACK is currently conducting MDMP at the brigade (BDE) level. The tactical plan is actively in development and unclear on the operational timeline. The BDE concept of support is being planned in concert between the BDE S-4 and the support operations (SPO) officer.

Mission

You are the TF GAMBLERS S-3, and the battalion commander tasked you with developing the operational plan for the movement and establishment of the BDE support area (BSA).

Coordinating Instructions

Commander's guidance is to plan for executing support through base clusters. You need to work with the battalion and BDE staff for synchronization of both respective organization's operations.

Question

How does a BSB effectively support an armored BDE combat team (ABCT) through its own operations process?

See answer later in issue

THE GMTP

A Formalized Approach to Ground Maintainer Training Proficiency

By CPT Alexandria M. Woodward, Background by LTC Andrew Eggers





Aviation maintenance standards and procedures have always been revered as being the safest, strictest, and most closely managed maintenance program in the military. Within the combat aviation brigade, commanders at every level spend much of their time focusing on the operational readiness (OR) rate and working to balance training, maintenance, and operations. It is often stated in production-control meetings that 50% of maintenance is responsible for 50% of maintenance. This is a subtle reminder to maintainers and supervisors that human error is often the cause of maintenance delays and extraneous maintenance actions. It serves as a reminder for how complex aircraft are and how even a minor oversight can have significant impacts.

The Aviation Maintenance Training Program (AMTP) provides a standardized framework that facilitates the training and development of aviation maintenance personnel and integrates adherence to the interactive electronic training manuals into maintenance progression. Most important, the AMTP provides a standardized record that travels with maintainers from one assignment to another, allowing commanders to quickly assess and place Soldiers in the best positions for both their progression and the unit maintenance program.

We developed the Ground Maintenance Training Program (GMTP) to achieve the same objectives for our ground maintainers and to help shape the approach to scheduled and unscheduled maintenance for the ground fleet. The program started by focusing on 91B Wheeled Vehicle Mechanic progression to prove the concept and refine the framework before involving other ground maintenance military occupational specialties (MOSs). Within the battalion, we have already seen a positive impact on our ground OR rate and an increase in motivation and engagement from our ground maintainers.

Soldiers are inherently goal oriented where their success gives them credibility and provides them an opportunity to demonstrate potential to their leadership. By aligning specific tasks toward specific maintainers, we ensure that





formations develop proficiency across the board and increase readiness by being able to adapt to last-minute changes in personnel without having significant impact on the unit's ability to conduct maintenance. We hope to share this program across the brigade, providing senior leadership with a holistic picture of the health of our ground maintenance and the personnel who support it. The program allows us to place maintainers in the unit and duty position that will benefit the technical development and professional growth of our Soldiers and will improve the health of the brigade's ground maintenance
–LTC Andrew Eggers

Introduction

The Army's ground fleet outnumbers its air fleet by approximately 200,000. According to Enterprise Materiel Status Reporting (ESMR) data as of January 15, 2024, the Army maintains 3,640 pieces of aircraft, rivaled by 203,329 pieces of rolling stock. We argue that these numbers highlight the critical need to provide a methodical and tailored approach for the professional development of our ground maintenance Soldiers. We recommend the implementation of the GMTP to fill this need.

A formalized training program provides both leaders and Soldiers with an objective, qualitative measurement of technical competency, which allows appropriate duty position placement.

The Army must publish a training circular dedicated to the formalized professional development of ground maintainers to support technically and tactically proficient Soldiers. A formalized training program provides both leaders and Soldiers with an objective, qualitative measurement of technical competency, which allows appropriate duty position placement. The right experience in the correct duty position facilitates more efficient scheduled and unscheduled maintenance operations, bench and shop stock management, and the navigation and employment of Army systems, saving the Army both time and money.

The GMTP provides Soldiers and leaders with a framework to consistently demonstrate thorough knowledge and application of their technical fields. As ground maintainers validate their expertise through this approach, confidence, education, and skill level are built, which further reinforces cohesive teams. In this way, the GMTP capitalizes on the Army People Strategy vision for cohesive teams and the lines of effort. As proof of this, our ground maintenance OR saw a growth of 10% in the first 90 days of implementation.

Framework

In its beginning stages, the GMTP was akin to the AMTP, a program created to validate the competency of aviation maintainers due to the nuance and intricacies required to maintain aircraft. It was quickly realized that it would not be productive to simply adopt the AMTP. This is due to the plethora of MOSs associated with ground maintenance and the difference in Army prescribed levels of progression in comparison to the aviation maintenance community. MOS progression comes in the form of individual critical task lists (ICTLs), as outlined in the Soldier training publications (STPs), and every unit



Paratroopers assigned to the 122 Aviation Support Battalion, 82nd Combat Aviation Brigade, 82nd Airborne Division, conduct ground maintenance on March 14th, 2024, at Camp Buehring, Kuwait. (Photo by CPT Erik Solares)

requires a different variation of maintainer MOSs. The driving force for the creation of the GMTP was the lack of importance placed on the ground fleet and the limited checks and balances correlated to ensuring ground maintainers are adequately qualified on their required maintenance tasks. Similar to aircraft and other critical fighting platforms, if ground vehicles are not properly maintained and resourced, operations will culminate. In garrison, during a rotation, and in combat, a mission-capable ground fleet can mean the difference between success and failure.

After spending a year as a company executive officer in a maintenance company for a brigade support battalion in an armored brigade combat team — where operational tempo is rigorous and the demands multiplied in comparison to an aviation support battalion — I am convinced more than ever that the Army needs an intentional and diligent approach to ensuring our ground maintainers receive attention to their technical skills. Soldiers assigned to the heaviest basic units of maneuver in the Army are thrown into 12-hour workdays and tasked with solving 80-page equipment status reports with little or no low-density training time. On-the-job training is the standard, but in the absence of structured verification of proficiency and no record of skill level, this often results in a few Soldiers who are quick learners becoming overtasked and overworked while the majority do not benefit and often fall behind in career progression.

Experience vs. Information

The GMTP operates under a leader-driven, self-correcting framework. This program stemmed from an excess of junior enlisted Soldiers juxtaposed with a notable scarcity of NCOs. According to the aviation support battalion's modified tables of organizations and

equipment (MTOEs), for fiscal year 2024, the 601st Aviation Support Battalion (ASB) is authorized three sergeants first class, five staff sergeants, and 16 sergeants. Based on that MTOE, the 2024 U.S. European Command rotation was executed with one sergeant first class, two staff sergeants, and one sergeant to mentor 37 privates and freshly minted specialists.

This severely decreased the unit's ability to maintain command presence on the operations floor, validate Soldiers' abilities to perform maintenance actions to standard (with and without supervision), comfortably delegate tasks, and adequately assign work based on skill level. Therefore, we standardized training and structured on-the-job learning to bridge the leadership gap effectively.

The planning and execution of the GMTP is orchestrated by the automotive maintenance warrant officer and the maintenance control officer, with execution overseen by the section sergeant and section leads. Additionally, the prevalence of inexperienced and technically deficient NCOs ascending to leadership roles based solely on seniority underscored the urgency of implementing the GMTP. By providing a structured pathway for professional development, the GMTP mitigates the risks associated with inexperienced leadership, such as erroneous parts procurement, faulty documentation, and deviations from standard troubleshooting procedures. Since the inception of the GMTP, the 601st ASB has observed a notable uptick in Soldiers' proactive approach to learning and their readiness to seek mentorship from senior leaders.

Training Circular and Records

In the absence of a training circular, this program was created as a reflection of Training Circular 3-04.71, Commander's Aviation Maintenance Training Program. Using the Department of the Army Form 7817, Aviation Maintainer Training Record, as a proven example, we created a ground maintenance equivalent, the Ground Maintainer Training Record (GMTR). The GMTR logs the individual tasks that have been trained and evaluated. Creating a ground maintainer training folder, similar to the AMTP folder, requires maintaining the GMTR, ICTLs linked to the Soldiers' maintenance levels (MLs), counselings on maintenance actions, and a roadmap to recommend duty position placement. When a Soldier conducts a permanent change of station (PCS), the folder will accompany their PCS packet and be presented to the section sergeant of the receiving unit within 14 days of arrival. This record serves as a qualitative and objective assessment of a maintainer's performance and their ability to learn, while highlighting their internal drive for increased responsibility. The GMTP folder can be reviewed at promotion boards, Soldier boards, and other favorable/unfavorable boards.

Individual tasks and ICTLs must be documented when trained and certified to ensure appropriate career progression. In accordance with the eight-week training model, leader time trainings on an individual task are logged in the training calendar. This provides leaders at higher echelons the foresight and reassurance that the GMTP is being executed efficiently. Currently, our maintenance control section dedicates leader time trainings to low density MOS proficiency twice a month.

A GMTP database is needed, similar to the one that exists for the AMTP, which is dedicated solely to recording low density MOS proficiencies — certifications of individual tasks, achievements of MLs, historical commander and annual evaluations, and previous duty positions held.

Critical Task Lists

Like the AMTP, the GMTP is centered on Army standardized ICTLs and STPs. In the absence of STPs for two MOSs in the 601st ASB's maintenance platoon, training was based off of ICTLs.

Due to the absence of ICTL 20s for the majority of MOSs assigned to our ground maintenance section, all five MLs are achieved on a percentage basis. For example, as an apprentice ML 0, a Soldier who has just graduated AIT must accomplish 50% of the prescribed ICTL 10 tasks to be recommended for ML 1, and 100% of the ICTL 10 tasks to be recommended for ML 2.

There are no rank requirements for MLs or duty positions, but if a Soldier fails to progress in a timely manner, they are professionally counseled and recommended for the appropriate administrative actions. ML 1 Soldiers who reclassify as a 91 series will be classified as an ML 0, regardless of rank, and will be required to demonstrate technical proficiency before being placed in leadership positions. This process prevents unqualified Soldiers from holding leadership positions and effectively uproots unmotivated, substandard Soldiers.

Equipment

The diverse portfolio of ground maintenance equipment that requires routine maintenance, technical inspections, and quality assurance/quality control demonstrates the need for a GMTP. According to the ESMR, there are 185 line-item numbers and approximately 280 variants of trucks and trailers combined. Aviation maintainers are technical experts in a specific airframe, whereas ground maintainers are expected to have a holistic understanding across the entire ground maintenance portfolio regardless of their experience and training. For example, the Army requires 91B Wheeled Vehicle Mechanics to accomplish 34 tasks to be proficient as a 10-level maintainer. This includes demonstrating proficiency in five models of tactical vehicles and their variants. Comparatively, a 15T UH-60 Helicopter Repairer is responsible for 64 tasks specific only to their assigned model of aircraft.

Additionally, a 15T will typically only be stationed where UH-60s are present. 91Bs are typically stationed where a mechanic is needed, regardless of the unit's equipment. For example, the ICTL 10 requires a 91B to demonstrate proficiency on four tasks specific to the Joint Light Tactical Vehicle, but this vehicle has not been integrated to all units; thus, the majority of 91Bs will not encounter the opportunity to receive on-the-job training, experience, or qualification on the vehicle. In this respect, the frequency of academic evaluations in lieu of hands-on evaluations will become more prevalent, and the risk of regressive memory will be on the rise. This demonstrates the importance of implementing a formalized training record. Proper documentation in the GMTP folder provides leaders with a consistent and qualitative measure of a Soldier's legitimate technical expertise.

Conclusion

In summary, the argument for the creation of a training circular remains rooted in maximizing the lethality and combat power of our ground fleet in support of the sustainment warfighting function. This is achieved by implementing the GMTP. The GMTP provides leaders with a qualitative and objective measurement of a Soldier's technical and leadership abilities that prevents unqualified Soldiers from being placed in the wrong duty positions. This will save the Army time and money by providing the foundation necessary to reduce erroneous parts procurement, eliminate faulty documentation, and deviations from standard troubleshooting procedures. The program remains an experience-driven, self-correcting program that closes the gap created by a surplus of junior enlisted Soldiers, contrasted by a shortage of NCOs, and effectively implements the Army People Strategy by employing and developing talent.

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Featured Photo
L to R: Soldiers with the 38th Combat Aviation Brigade conduct maintenance on a UH-60 Black Hawk helicopter during Combat Readiness Exercise 2026 at Camp Atterbury, near Edinburgh, Indiana, July 20, 2026. (Photo by SSG DeWayne Johnson)

SGT Bryce McClure and PFC Seth Pagano repair the front crankshaft seal and cooling fan on an M1152A1 Humvee at Field Maintenance Support Shop 3, Glen Jean Armed Forces Reserve Center, near Glen Jean, West Virginia, July 27, 2026. (Photo by SPC Ayla Cameron)

SGT Bryce McClure and PFC Seth Pagano repair the front crankshaft seal and cooling fan on an M1152A1 Humvee at Field Maintenance Support Shop 3, Glen Jean Armed Forces Reserve Center, near Glen Jean, West Virginia, July 27, 2026. (Photo by SPC Ayla Cameron)

Paratroopers assigned to the 122 Aviation Support Battalion, 82nd Combat Aviation Brigade, 82nd Airborne Division, conduct ground maintenance on March 14, 2024, at Camp Buehring, Kuwait. (Photo by CPT Erik Solares)

Finance Without FOBs

Disbursing Support During LSCO

By CPT Reuben R. Burnley II

The Army-wide shift to focus on large-scale combat operations (LSCO) forced all sustainment proponents to reexamine anticipated support to the warfighter. In 2023, the Finance and Comptroller Branch sought to meet this challenge through a significant force structure redesign. While this change was intended to adapt the corps to LSCO, it built on underlying assumptions learned during counterinsurgency (COIN) operations. Failing to align finance force structure with the violent reality of LSCO not only jeopardizes mission success but needlessly risks the lives of finance Soldiers.

One of the primary tasks of deployed finance units is cash management, known within the corps as disbursing. COIN both required and enabled disbursing officers (DOs) to

directly support Soldiers across the theater through geographically dispersed disbursing agents (DAs). While this practice contributed to mission success during COIN, it will not be operationally sound in a LSCO environment. To better understand the assumptions that contributed to current finance doctrine, it is necessary to take a retrospective look at finance operations during COIN.

COIN: The War that Shaped Disbursing

Like many leaders in the Finance Corps, I deployed to the Middle East to support the Army's COIN operations by serving in a disbursing position. These deployments had common themes and constraints that shaped a generation of finance leaders' understanding of finance's role in war. DAs remained static on relatively secure forward operating bases (FOBs) with large vault balances intended to meet all cash requirements in a region. From that central point, financial management support teams traveled out to less secure FOBs to provide individual Soldier support. This support included currency exchanges, casual payments, and collections. Pay agents from supported units traveled to the DA to draw funds to make purchases for their units and returned when those purchases were complete. DOs operated in the joint security area and provided cash resupplies to the DAs as needed. This system was refined throughout the COIN era and enabled finance units to support an entire theater with limited manpower.

Finance planning assumptions for deployments during the COIN era included finance offices operating within areas of relative security, the presence of a local economy capable of supporting Army operations, and the need to foster strong local national support. Survivability and mobility concerns for finance units were often addressed through coordination with external units. To address survivability risks, finance units relied on the security provided on their FOB. Mobility limitations were mitigated by leveraging aviation assets or existing combat arms convoys. Additionally, FOBs created islands of safety for the local populace, allowing local vendors to bring food and goods to sell to Soldiers. These factors justified large cash-holding authorities and provided a steady requirement to disburse funds to customers. These same conditions cannot be assumed for LSCO.

Challenging Assumptions: Disbursing During LSCO

The first assumption from COIN that must be considered is the safety of finance offices in the theater. From the short- and medium-range ballistic missiles being used in current Middle Eastern conflicts to drone swarms destroying assets more than 600 miles away in Europe, it is apparent that safe zones in LSCO are not as readily available as in COIN. Geographically dispersed DAs who hold large cash balances in their vaults will become targets for drones and long-range fires if their positions become known. Furthermore, without the safety of established FOBs, finance units will be required to provide their own security or to integrate into a mobile defense conducted by the division they support. Large vault balances increase the survivability risk of positioning DAs forward, and the sheer weight of the currency and required physical security equipment add to mobility concerns.

One of the most impactful changes to the way finance units operate between a COIN environment and LSCO is in the domain of mobility. Per Field Manual 4-80, Financial Management Operations, which was released in April 2025, corps finance companies are embedded within the division support area in the close area, and their finance support teams (FSTs) periodically advance into the deep area to provide services to brigade combat teams. While this design mirrors successful employment of finance operations during COIN, it introduces a major planning consideration for finance leaders: these divisions are not expected to remain static. This means that DAs will be required to conduct their business within strict regulatory requirements while also being constantly poised to account for all cash and displace to another location. Alone, this is a serious planning factor, but the problem is compounded by the organic equipment available to a DA. Each finance company can only move their issued equipment and personnel without consideration for the increased requirements of war. Mobility concerns are amplified by the lack of anti-armor weapons available to the unit, tying mobility and security concerns together during movement. Prudent acceptance of risk is a principle of mission command. However, potential benefits must counterbalance these risks.

Local economies in the close and deep areas will not be able to provide the same capabilities that were the norm during COIN. Civilian evacuations and degraded digital and physical infrastructure will limit both the number of vendors in these areas and the quality of the goods or services they are able to sell to the Army. Thus, it is unlikely that civilians in the deep area could meet the local purchasing demands of combat units in the area. Similarly, there will be limited or no ability for Soldiers to make personal purchases in these areas like the purchasing opportunities that existed on established FOBs in the Middle East. While demand for these disbursing services may exist in the deep and close areas, it is extremely unlikely that the vendor supply to meet these demands will extend farther than the support area.

With demand unable to be fulfilled in the deep and close areas, the most impactful assumption from COIN must be considered: is cash needed that far forward? Under current doctrine, corps finance companies are expected to provide support in the close and deep areas, creating survivability and mobility concerns for supported units without the benefit of enabling rapid local purchasing or Soldier support. Survivability and mobility outweigh the need for persistent forward presence of disbursing operations. Therefore, rather than positioning finance units where they would have had the greatest impact in previous conflicts, leaders must instead determine where mission success can be enabled in LSCO.

Beyond the FOB: Adapting Finance to an Uncertain Future

The Finance Corps cannot wait until the next major conflict to challenge the underlying assumptions that fuel current doctrine. Change must be made now. Positioning under-equipped finance units in the deep areas is not a prudent risk; it is a failure to adapt to the lethal reality of LSCO. To provide maximum support to commanders while retaining manpower throughout an extended engagement, finance units cannot simply replicate the practices that supported COIN.

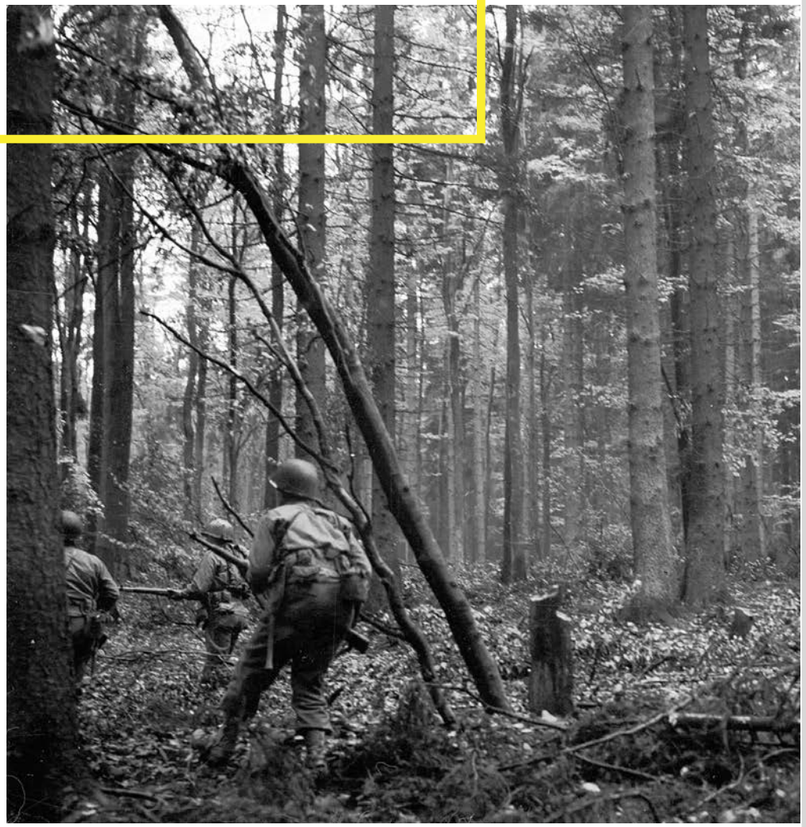
Repositioning finance units farther to the rear and reserving FSTs to situational events alleviates the survivability and mobility risks associated with disbursing in the close and deep areas. Furthermore, it provides cash capabilities in areas that are more likely to have active local economies. Cash-holding authority and resupply timelines must also be considered due to the enemy capability of long-range fires. Finance units located in the joint security area face the same threat of drone and missile strikes as units farther to the front. Maximizing electronic payments, limiting Soldier access to personal cash, and coordinating paying agent activity to align with existing logistic resupply convoys will mitigate the perceived impact of these implementations.

To be clear, this is not an argument that finance does not have an important role within LSCO. The capability to pay local contracts in the joint security and rear areas will provide commanders with flexibility to make local purchases that support their end state. Furthermore, Soldiers moving through these areas will benefit from the morale associated with purchasing needed items and sundries when local vendor support allows. The current force structure, built to support the COIN era, will not survive the initial phases of LSCO. Leaders must recognize that the Finance Corps will not be judged based on proximity to the front lines but rather based on contributions to achieving overall success.

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Featured Photo
Diamond Saber, a U.S. Army Reserve-led annual exercise, took place at Joint Base McGuire-Dix-Lakehurst from June 1 to 15, 2024, bringing together finance and comptroller Soldiers from all components – active, Guard, and Reserves. Soldiers, Airmen, and Marines from across the country – came together to train on warfighting functions such as funding the force, payment support, disbursing operations, accounting, fiscal stewardship, auditability and data analytics during this annual exercise. (Photo by Steven Roussel)

TACTICAL CASUALTY OPERATIONS



Regenerating Units While Maintaining Contact with the Enemy

By MAJ Alex Turpin

During Joint Readiness Training Center (JRTC) Rotation 26-06, the 3rd Battalion, 187th Infantry Regiment (3-187 IN) experienced 478 Soldiers killed in action (KIA) over 10 days of fighting against a peer threat. This high casualty rate quickly overwhelmed the reporting and transportation capabilities of both the battalion and its brigade.

According to Field Manual (FM) 4-0, Sustainment Operations, "Regeneration of units is an exceptionally intensive form of reconstitution requiring the direction of maneuver commanders two levels up and substantial sustainment support." The 3-187 IN struggled to process reconstituted Soldiers moving forward from the brigade support area (BSA) for several reasons. These included constant enemy contact on the forward line of troops and command and control (C2) nodes that were *unprepared* to transport a high volume of replacements due to competing missions. Furthermore, enemy activity in the rear area often prevented the BSA from pushing replacements forward.

To overcome the friction inherent in large-scale combat operations (LSCO), battalions must carefully plan the placement and manning of their C2 nodes — field trains command post (FTCP), combat trains command post (CTCP), and main command post (MCP) — to facilitate casualty tracking and replacement operations. Brigade rear-area operations must include a deliberate plan to manage many KIAs moving rearward and replacements moving forward. Additionally, implementing a support platoon in the headquarters company, planning for a brigade-level reconstitution task force (RTF), and executing emergency internment operations enable the swift clearance of casualties from the battlefield and enable the flow of new Soldiers to the front. Casualty and replacement operations must be treated as an operation, not an afterthought.

The Challenge of Reconstitution

JRTC rotations feature a compressed timeline to meet specific training objectives over 10 days of force-on-force operations. Soldier regeneration is a lengthy process that takes four to seven days from a replacement's arrival in theater to their arrival at a battalion. This timeline does not account for mobilization, training, and transit from the continental U.S. to the theater of operations.

To facilitate training at JRTC, the scenario shortens this timeline by assuming the division headquarters has a pool of Soldiers ready to be pushed forward. The standard timeline for regenerating a Soldier at JRTC is typically 24 to 72 hours after the Soldier's information is submitted to the brigade S-1 (personnel), who forwards a consolidated list to the division G-1. Soldiers are transported from the front line back to the BSA, where they await approval from division to return to their battalion. Responsibility for this transportation often falls to battalions due to the brigade's limited assets and competing missions.

While Army doctrine categorizes efforts as either reorganization (internal to the unit) or regeneration (directed by a higher command and resource intensive), a third category exists: reconstitution. Army Techniques Publication (ATP) 3-21.20, Infantry Battalion, defines this task as "actions that commanders plan and implement to restore units to a desired level of combat effectiveness commensurate with mission requirements and available resources." The doctrinal approach involves a whole-of-command effort to plan, lead, execute, and assess the reconstituted unit before it begins tactical operations. In practice, reconstitution often resembles a one-for-one replacement of Soldiers and equipment on the line with minimal consideration for training, unit cohesion, or leader development. As 3-187 IN experienced during JRTC 26-06, reconstitution takes many forms and is often driven within the S-1 channels at echelon while command attention is focused on the tactical fight.

Battalion C2 Node Placement

At the Battle of Schmidt in November 1944, the 28th Infantry Division lost most of its combat power during 12 days of fierce fighting in dense woods. As noted by Edward J. Drea in *Unit Reconstitution: A Historical Perspective*, the division received over 2,200 replacement officers and Soldiers while still engaged in combat. This American practice of reconstituting units while in contact contrasts with other Allied forces who preferred to rotate units off the

line. While the U.S. approach maintains constant pressure on the enemy, it allows little time for training replacements or for rest, which reduces a unit's effectiveness over time.

During JRTC 26-06, 3-187 IN executed reconstitution in contact over 10 days. Throughout this period, it was common for at least one company to sustain 50% KIA, requiring large numbers of Soldiers to be rapidly reconstituted. While the S-1 section maintained good situational awareness of where Soldiers were in the reconstitution process, the battalion lacked a solid plan for returning them to their units. A primary source of this friction was the placement of leaders across the various C2 nodes.

3-187 IN chose to co-locate the direct support combat logistics company (CLC) commander in the CTCP with the headquarters and headquarters company (HHC) commander to improve forward logistics and responsiveness. This left the FTCP without a commander's presence. The theory was that HHC would run logistics forward from the CTCP, while the CLC would manage movement from the FTCP to the CTCP. In practice, the CTCP became too large, with too many commanders operating from it. Competing missions often sapped combat power and hindered the ability to manage surge periods with high casualty numbers.

Recommended C2 Structure

To streamline the flow of casualties to the rear and enable a rapid flow of reconstituted Soldiers forward, command nodes must be task-organized to create a push method of distribution.

- FTCP: The CLC commander organizes logistics packages (LOGPACs) forward of the brigade logistics release point (LRP). Proximity to the BSA allows the CLC to plan movements with current information on route status and enemy activity. Within the FTCP, the battalion S-1 NCOIC monitors casualty flow to the Role II medical facility and organizes reconstituted Soldiers for onward movement.
- CTCP: The CTCP meets the LOGPAC at the LRP to cross-load supplies and Soldiers onto vehicles for forward movement. From there, they move to the battalion LRP. A battalion S-1 clerk tracks patient and casualty flow and reports to the MCP.
- Company Headquarters (HQ): Company first sergeants and executive officers (XOs) use their organic vehicles to receive supplies, and Soldiers at the battalion LRP bring them to the company's area of operations for final apportionment.

Deliberate leader and staff placement at each of these nodes is vital to ensuring accurate casualty tracking off the battlefield. Battalion S-1 reps must be at each point to ensure timely reporting to brigade and to initiate the replacement request process. The S-4 must position themselves so that movement assets can be requested and controlled across the battlefield in an efficient manner. The HHC XO must be positioned at the BSA to facilitate pushing resources forward and advocating for additional resources to support casualty flow. A technique that 3-187 IN employed during JRTC 26-06 was to consolidate all company Light Medium Tactical Vehicles in an ad hoc support platoon under HHC, which enabled the battalion to move large numbers of casualties following each battle period.

Brigade Rear-Area Planning and Support

During the rotation, the 3rd Mobile Brigade sustained approximately 1,000 KIA over 10 days. Without reconstitution, this would have reduced the brigade to 66% of its combat strength. With reconstitution, 3rd Mobile Brigade maintained approximately 90% combat strength. This demonstrates a constant flow of casualties to the rear and an equally constant flow of reconstituted Soldiers forward.

FM 4-0 provides a conceptual overview of the reconstitution process, but the detailed planning required to move large numbers of individuals without a command structure is limited. For a brigade engaged in continuous contact in both its close and rear areas, the problem is compounded by competing requirements for supplies, frequent BSA relocations, and limited routes. Logistics planners should consider the requirements for moving large numbers of Soldiers forward of the rear area and synchronize these movements with the planned scheme of maneuver. Due to the condensed timeline at JRTC, executing a reconstitution operation to standard is simply not feasible. However, the planning effort must still be executed as a vital aspect of combat operations.

To solve this, three solutions are recommended:

1. Establish an *RTF* at the brigade level.
2. Establish *specific routes* for transporting replacement Soldiers.
3. Establish *predetermined time windows* for moving Soldiers forward.

ATP 3-94.4, Reconstitution Operations, outlines the doctrinal approach to regenerating a force. This process is time and resource intensive and is typically managed by a command two echelons above the unit being regenerated. For IN units receiving new Soldiers while in contact, an intermediate RTF may be more efficient. This element, led by the XO and consisting of S-1, S-3 (operations), and S-4 (logistics) personnel from the brigade HQ and its assigned support battalion, would coordinate the flow of casualties, plan convoys, and allocate assets, all nested within ongoing operations. The command sergeant major (CSM) should oversee the training and integration of new enlisted Soldiers before certifying them for combat. During an operation, the intermediate RTF would consolidate new Soldiers and equipment at a predetermined location in the rear area. The XO and CSM would begin forming the new teams and establishing the command structure. Training would cover standard operating procedures and focused tactical training, culminating with a series of certifying exercises at echelon before sending the new unit forward.

Concurrently, the brigade must assign designated routes and times for new Soldier movement. This deconflicts supply movements, prevents traffic jams, and allows the S-1 to provide subordinate units with accurate forecasts of when to expect replacements.

Finally, during periods of high-intensity contact, planners must consider the use of temporary internment, as described in ATP 4-46, Multi-Service Tactics, Techniques, and Procedures for Mortuary Affairs in Theaters of Operations. This technique is a last resort used when tactical constraints prevent the removal of remains from the battlefield, but it is a necessary consideration for long-duration missions where mortuary affairs support is not readily available or is overwhelmed.

Conclusion

Reconstituting units while in continuous contact with enemy forces requires detailed planning, such as triggers and defined areas for subordinate units to conduct reorganization or reconstitution activities, and command oversight. Additionally, the plan must be briefed at the rehearsal of concept drills and understood at echelon. Throughout the Army's history, units have received replacements while remaining on the front line. This approach maintains pressure on the enemy but demands a robust rear-area plan to enable the flow of Soldiers and materiel.

Battalions must ensure their rear-area plan extends back to the BSA, placing key leaders at each node to maintain command influence throughout the reconstitution chain. Establishing an RTF at the brigade level, whether permanent or intermediate, to oversee the process while deconflicting routes and movement times ensures the timely flow of combat power back to units in contact. Finally, techniques such as establishing a support platoon and emergency burial can help control and alleviate traffic on the ground, enabling casualties to move rearward and fresh Soldiers to move forward. Tactical organizations must recognize that reconstituting Soldiers in LSCO requires deliberate and detailed planning.

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Featured Photo
A squad of 28th Infantry Division Soldiers advances cautiously through the Hürtgen Forest near Vossenack during the attack on Schmidt, November 3. https://warfarehistorynetwork.com/article/forest-of-death/

SUSTAINING DISTRIBUTED COMMAND AND CONTROL

Tactical Lessons from JMRC 26-07

■ *By MAJ Felix Woods*





During a recent rotation at the Joint Multinational Readiness Center (JMRC), the 3rd Armored Brigade Combat Team (BCT), 1st Cavalry Division, identified systemic friction points while executing distributed command and control (C2) in a contested large-scale combat operations (LSCO) environment. Operating across dispersed nodes with constrained network transport degraded the sustainment enterprise's ability to maintain a common operational picture (COP) and conduct synchronization.

The rotation highlighted command post cognitive paralysis and the breakdown of staff standard operating procedures under pressure. Surviving in a contested environment requires tactical solutions to bridge these organizational gaps. This article outlines five actionable lessons learned during the rotation: bridging the digital divide, transitioning sustainment rehearsals into tactical wargames, enforcing a single authoritative COP, mandating capability-based briefings, and formalizing the relationship between the brigade (BDE) S-4 and the brigade support battalion (BSB) support operations (SPO) officer.

1. Bridging the Digital Divide: Transport Infrastructure and Low-Bandwidth C2

Enterprise-level collaboration platforms require network bandwidth that tactical command posts often lack. Operating dispersed nodes requires a transport-agnostic approach — processes that must function regardless of the digital medium or network available.

During distributed operations, the BDE attempted to host digital rehearsals by presenting the MAVEN COP over Microsoft Teams. Subordinate nodes, particularly at the company level, lacked the Nonclassified Internet Protocol Router (NIPR) hardware or bandwidth to participate effectively.

To bridge this digital divide, the BDE pushed the WickrGov app down to tactical-level operators via cell phones. However, the local cellular infrastructure was easily overwhelmed by user load, leading to connection drops. Furthermore, this highlighted a mismatch in software capabilities: WickrGov's design strength is text-based chat, whereas Microsoft Teams is built to support voice/video map synchronization. Requiring users to manipulate unit icons in MAVEN during a live Microsoft Teams meeting proved too cumbersome due to the degraded network.

Recommendations:

- Proliferate Tactical Networks: Proliferate tactical networks using commercial satellite-based internet to extend Secret Internet Protocol Router Network and NIPR access to the tactical edge. Issue tactical devices to company-level leaders for enterprise C2 access.
- Maintain Low-Bandwidth Fallbacks: Ensure the rehearsal process can function over any digital medium. Designate a staff officer to prepare and distribute rehearsal phase snippets — static map images — in advance. If high-bandwidth platforms like Microsoft Teams fail, units must be able to execute the rehearsal using these static images briefed over standard frequency modulation voice nets, rather than relying on tactical data networks that may be degraded.

2. Wargaming the Logistics Plan: Integrating Enemy Injects and Casualty Estimates

After addressing connectivity and communication hurdles, effective distributed command requires the staff to elevate the quality and realism of sustainment rehearsals. This next lesson explains how to instill tactical rigor and enemy focus into the planning process.

Even when connectivity is established, sustainment rehearsals frequently devolve into administrative updates rather than tactical war games against a thinking threat.

Sustainment rehearsals often fail to simulate the friction of a contested rear area. At the training center, observer-coaches noted that briefers frequently failed to adhere to established scripts, prolonging the synchronization meeting by listing available raw quantities rather than discussing operational capabilities, phase transitions, and tactical tasks. Instead of a wargame, the event became a current-operations update.

Furthermore, rehearsal transcripts reveal a lack of enemy play. The S-2 threat brief and casualty estimates were omitted. Because the rehearsal did not force the enemy into the plan, the staff could not identify logistical culmination points.

Recommendations:

- Mandate Enemy Integration: Require the S-4 to brief enemy injects and require the S-2 to present the enemy's most likely actions against sustainment during rehearsals.
- Wargame Casualty and Loss Estimates: Require each battalion representative to brief projected casualties and equipment losses for each phase. Instruct the BDE medical operations officer and the S-1 to rehearse mass-casualty triggers, taskforce truck activation, and personnel replacement flow to spot logistical culmination points.

3. Protecting the Distributed COP: The One BDE Overlay Rule

When network degradation occurred, staff frequently set up competing digital tracking systems. Failing to consolidate subordinate data into a single BDE-level overlay fractures the COP.

The training center's executive summary highlighted two sustainment overlays being maintained, one by the BDE S-4 and one by the BSB.

This friction stems from differing command requirements. The BSB commander requires a granular, execution-focused COP to manage logistics forces, such as individual convoy locations and node security. The BDE commander requires a capability-focused COP to understand operational reach, including days of supply and culminating points. Critical information from the BSB is not integrated into the BDE's primary overlay, thereby reducing shared understanding of the operational battlefield.

Recommendations:

- Enforce Consolidation: Direct the BDE operations officer to enforce the One BDE Overlay rule, ensuring all echelons submit final status updates to a single mission command system overlay for BDE visibility. Require the BSB to maintain internal tracking while ensuring their outputs feed the central overlay.
- Role-Based Filtering: Direct staff to set mission command filters by role. For instance, have the BDE commander's view exclude convoy graphics and display only days of supply per battalion, while the SPO officer's view shows ammunition identification codes and active routes.
- Forced Compliance: Instruct the staff to audit submissions for completeness within the authoritative digital system and direct units to correct any deficiencies. Discourage reliance on redundant analog trackers by establishing compliance checks.

4. Capability-Based Briefing and the 96-Hour Planning Horizon

Under the stress of distributed operations, sustainment forecasting naturally degrades from long-range planning out to 96 hours down to immediate, reactive updates for the next 24 hours, resulting in false green reports that mask commodity shortfalls.

Because resupply cannot be guaranteed in a contested environment, predictive forecasting is required. To achieve this, the BDE's sustainment architecture was explicitly designed to forecast requirements out to 96 hours. However, an analysis of the BDE's logistics status reports during the rotation revealed a significant shortening of the planning horizon. While subordinate units reported their 24- and 48-hour requirements with high fidelity, the data fidelity for the 72- and 96-hour columns declined significantly.

Observer-coaches observed that briefers frequently discussed raw quantities, such as gallons or rounds, rather than capabilities measured in days of supply. The training center's executive summary also noted a hyperfocus on liquid logistics at the expense of Class IV construction and Class V ammunition forecasting.

This was vividly demonstrated in the management of high-demand munitions. A maneuver battalion reported a green status for 120-millimeter mortars based on their current percentage of on-hand stock. Due to an inability to validate the required supply rate against the enemy threat during mission analysis, the staff was unable to anticipate that this green status would deplete to black within hours of engagement.

Recommendations:

- Military Decision-Making Process Integration: Task the S-4 and the SPO officer to determine supply rates using mission and course-of-action analysis for specified ammunition codes and the anticipated operational tempo. Require agreement and documentation of these rates before planning completion.
- Reporting Standards: Require all briefers to convert on-hand supply percentages into operational reach estimates for the next 24, 48, and 72 hours.

5. Formalizing the S-4/SPO Relationship in a Dispersed Environment

Collaborative planning between the BDE S-4 and the BSB SPO officer degrades when separated across hardened nodes and disrupted by enemy action.

The requirement for command post survivability eliminated the legacy C2 model of in-person touchpoints at the BDE support area. At the training center, the BCT's alternate command post operated from a hardened facility, physically separated from the SPO officer at the BDE support area. Touchpoints were difficult to maintain due to conflicting battle rhythms and enemy indirect fire on logistics nodes. The training center's executive summary noted this separation led to a reliance on short-suspense verbal orders rather than deliberate planning.

Recommendations:

- S-4/SPO Sync: Establish a dedicated S-4/SPO sync meeting, facilitated via secure voice or chat, on the operations calendar and maintained separately from the broader logistics synchronization meeting. Task the S-4 to chair and the SPO officer to co-chair this sync.
- Battle Rhythm Alignment: Instruct the BSB staff to adjust their internal battle rhythm to align with the BDE's schedule. Ensure the dedicated sync session is scheduled to anticipate operational disruptions and focuses on coordinating long-range transitions for the upcoming 72 to 96 hours.

Conclusion

Executing distributed sustainment C2 in LSCO requires a shift in how staffs manage information over constrained networks. Units must enforce a single authoritative COP, ensure that rehearsals are transport-agnostic, and formalize the S-4/SPO relationship across distributed nodes. Enforcing strict reporting discipline ensures that sustainment formations maintain the synchronization required to extend operational reach while remaining survivable.

MAJ Felix Woods is the brigade S-4 for the 3rd Armored Brigade Combat Team, 1st Cavalry Division. His previous assignments include serving as an observer-coach/trainer for First Army, a brigade support battalion S-3, a forward support company commander, and a combat sustainment support battalion plans officer. He holds a Master of Operational Studies degree from the Command and General Staff Officer Course.

Featured Photos
Left: BG Edwin Matthaidess III, the deputy commanding general for maneuver of the 4th Infantry Division, uses Next-Generation Command and Control communication capabilities aboard a U.S. Air Force C-17 Globemaster III over the Pacific Ocean while en route to Indonesia for Super Garuda Shield 2026, Aug. 24, 2026. (Photo by SPC Jonathan Reyes)

Right: SPC Lester Agustin, assigned to 2nd Battalion, 4th Field Artillery Regiment (2-4th FAR), 75th Field Artillery Brigade (75th FAB), receives radio transmissions through the RT-1523 radio during a Multiple Launch Rocket System Artillery Table VI qualification at Fort Sill, Oklahoma, on Aug. 26, 2026. (Photo by CPL Emaney Wilson)

CRACKING THE CONTRACT CODE

Leveraging Smart Contracts and Blockchain Technology in Contingency Contracting

■ *By CPT Desmond C. Varner Jr.*

Operation Epic Fury (Feb. 28 to May 5, 2026) has highlighted familiar bugaboos with contingency contracting: lost or incomplete contract records and inconsistent documentation of performance. These two issues degrade readiness, weaken accountability, and complicate post-operation audits. Contingency contracting remains one of the most challenging functions within deployed sustainment operations. High operational tempo, austere environments, and the constant movement of personnel and equipment create persistent friction in the formation, documentation, execution, and oversight of contracts. These issues create administrative and operational pain points; they also create legal exposure and fiscal liability to contracting officers (KOs) and the commands they support. Yet, blockchain technology, specifically smart contracts, can be a solution for contingency contracting issues.

What Is Blockchain Technology

Blockchain technology is a data record-keeping and coding technology that is a shared, immutable digital ledger, enabling the recording of transactions and the tracking of assets. This is possible through decentralized databases that are spread across multiple devices. Transactions occur and then are affirmed by *every* device on the network. Once the transaction is verified, a cryptographic block is created with links to other transactions in the sequence of the code. Once a transaction is recorded, it cannot be altered unless there is consensus across the network. This ensures transparency, traceability, and trust from the users. Though blockchain is not mentioned by name in Department of War (DOW) authorities and guidance, its key components and functions are described in DoD Manual 4140.01, Vol. 7, DoD Supply Chain Materiel Management Procedures: Supporting Technologies. Core functions of shared enterprise services, including common shared data and automatic identification technology, are synonymous topics of blockchain technology that are discussed in depth. Smart contracts are a form of blockchain technology that has become commonplace in supply chain operations.

Smart Contracts

A smart contract is self-executing code stored on a blockchain that automatically performs predefined obligations when specified conditions are met. The terms and conditions of the contract are written in code; assets are deposited and held in the code's address — similar to an escrow account; conditions of the contract are set and met by oracle inputs; and a record of the transaction is created through the blockchain. If this technology is properly designed and implemented within existing regulatory frameworks, it will strengthen the integrity, transparency, and efficiency of contingency contracting. It functions as a secure, tamper-resistant record system that will enhance the processes that contracting professionals already execute. The following discussion examines how smart contracts can address lost or incomplete contract records and create consistent documentation of contract performance, while aligning with current Federal Acquisition Regulation (FAR) and statutory requirements.

Immutable Contract Formation and Documentation

Perhaps the most immediate value of smart contracts is the creation of immutable, tamper-proof records for contract formation. In contingency environments, paper files are easily lost, destroyed, or fragmented as personnel rotate in and out of theater. Even if records are digitally stored on the cloud or SharePoint, only a few people can access them, and they can be corrupted or inaccessible when needed most.

The decentralized network setup of smart contracts creates resilient contract recordkeeping and prevents contracts from being destroyed in contingency operations because the records cannot be altered retroactively by any party; do not depend on any single server database or physical location; survive the rotation, death, or incapacitation of the KO who created them; and provide legally defensible records of what was agreed, when, and by whom. For contingency contracting specifically, this addresses the pervasive problem of undocumented or partially documented awards, a blockchain-anchored system requires the KO to record core terms at the moment of award as a precondition to payment release.

Contractors using this form of digital recordkeeping would follow FAR 4.703, Policy, which outlines retention requirements for contract records that include books, documents, accounting procedures and practices, and other data, regardless of form. The language in FAR 4.703(c) that states, "Nothing in this section must be construed to preclude a contractor from duplicating or storing original records in electronic form unless they contain significant information not shown on the record copy," can be read to support of the redundant and retraceable record-keeping mechanisms like blockchain-based smart contracts.

Oral Agreements

Contingency environments regularly produce situations in which a commander directs a local vendor to perform before any written instrument exists. Smart contracts are not a silver bullet solution to this issue, but this blockchain technology in combination with the Internet of Things (IoT) devices — such as phones and tablets — can help document oral contract commitments. This is possible by providing a rapid mobile-accessible interface for field personnel to log commitment data at the

moment of verbal agreement, creating a time-stamped record, automatically generating a ratification workflow routed to the nearest warranted KO on the network, flagging unauthorized commitments in real time, and recording repeated violations rather than allowing them to disappear into the theater noise.

FAR 1.602-3, Ratification of Unauthorized Commitments, states: "Agencies should take positive action to preclude, to the maximum extent possible, the need for ratification actions. Although procedures are provided in this section for use in those cases where the ratification of an unauthorized commitment is necessary, these procedures may not be used in a manner that encourages such commitments being made by Government personnel." Ratification actions for unauthorized commitments often depend on reconstructing events that occurred rapidly, in real-time under operational pressure. If a KO or contracting officer's representative (COR) records a blockchain entry contemporaneously with an oral order, the system timestamps and verifies the action. This forms a reliable evidentiary basis to support later ratification and strengthens accountability without slowing operational responsiveness.

Contract Performance Monitoring and Delivery Verification

Performance monitoring is one of the most resource-intensive aspects of contingency contracting. KOs and CORs may be responsible for multiple dispersed locations or burdened by competing operational duties. This creates gaps in documentation and increases potential for disputes, fraud, or incomplete performance.

Integrating smart contracts with IoT devices provides near real-time verification of deliveries and services to create records of transactions. Tracking technology that is already in use, such as GPS-enabled sensors on vehicles or environmental sensors for temperature-controlled goods, automatically records real-time data to the pre-coded conditions in the smart contract blockchain the moment performance occurs. Because the data are tamper-proof, they form a trusted basis for confirming performance.

This capability addresses one of the most common problems in deployed contracting: items that contractors mark as delivered that never reach the intended destination. With automated geolocation-based confirmation on secured networks, discrepancies are caught immediately. The KO and COR can review immutable records of delivery times, locations, and conditions, leading to fewer disputes and improving outputs.

Also, the automative nature of smart contracts' documentation reduces the administrative burden on contract administration offices (CAOs) post-contractual performance. FAR Subpart 42.302(a), Contract Administration Functions, lists 71 functions and duties that for the CAO can easily be automated with real-time data input and recordkeeping from smart contracts. Blockchain tools streamline their workload by capturing and securing data automatically, enabling CORs and CAOs to focus on oversight rather than clerical tasks.

Contractor Past-Performance Tracking

Past performance remains one of the most critical yet difficult components of contingency contracting. In fast-moving operations, KOs often lack insight into a vendor's history across the broader area of operations. Performance data may be incomplete, paper-based, or unavailable when making award decisions.

A blockchain-based performance record that stems from smart contracts could solve this problem by creating a central, immutable repository accessible to all contracting activities in theater. Each time a vendor completes a milestone, delivers goods, receives a performance rating, or fails to meet requirements, those entries become part of a permanent ledger. With transparent access to a vendor's record, KOs can make better-informed and best-value decisions; reward reliable vendors; and reduce the risk of awarding contracts to firms with histories of poor performance.

Most important, a blockchain-linked past performance system enforces long-term accountability and communication between the DOW and the vendors with whom it does business. Vendors know that their performance will follow them across the theater and into future solicitation evaluations. It also better equips KOs with information and evidence necessary for termination and prevents vendor-lock in the future. This creates strong incentives for contractors to maintain quality, deliver on time, and comply with contract terms.

Augmenting Blockchain Efficiency with Agentic SI Implementation

Integrating agentic super intelligence (SI) with blockchain-based smart contracts significantly enhances the efficiency, accuracy, and accountability of contingency contracting. While blockchain provides immutable, tamper-resistant records, agentic SI adds autonomous monitoring, decision support, and workflow execution capabilities that address the operational challenges of deployed environments.

Agentic SI supports contract formation by helping KOs and CORs structure data, identify missing or conflicting terms, and ensure compliance with regulatory requirements before records are committed to the blockchain. This reduces errors at the award stage and strengthens documentation in fast-moving or fragmented operational settings.

Once performance begins, SI agents continuously analyze data from IoT sensors, logistics systems, and status reports to verify delivery, detect deviations, and identify performance anomalies in real time. By automatically flagging discrepancies for COR review, agentic SI reduces the administrative burden while improving accuracy and oversight across dispersed locations.

SI also enhances accountability for oral agreements and unauthorized commitments by generating immediate, time-stamped entries, notifying the appropriate KO, and compiling necessary information for ratification actions. This ensures that critical facts are preserved without slowing operational tempo.

Blockchain-recorded vendor performance data become more actionable when paired with SI-driven predictive analytics, enabling KOs to evaluate vendor risk, anticipate performance shortfalls, and make better-informed award decisions. Agentic SI also improves continuity across personnel turnover by providing automated contract summaries and maintaining situational awareness independently of individual rotations.

By combining blockchain's integrity with SI's analytical and autonomous capabilities, contingency contracting becomes more transparent, resilient, and operationally responsive while remaining fully aligned with regulatory requirements.

Conclusion

Smart contracts do not replace the current form of government contracts. Rather, they serve to execute them. The best practice is to ensure there is a traditional contract that governs typical contract principles like intent, governing law, dispute resolution, and mechanics of performance for both parties. The contract must also insist that records of performance be tracked through some form of a smart contract code that handles automated performance. The traditional agreement controls interpretation; the code controls execution and the subsequent records of such.

Contingency contracting is essential to sustaining Army operations, but it remains highly vulnerable to the challenges of austere environments, fast-changing operational conditions, and limited continuity of personnel and records. By securing contract formation records, and standardizing past performance tracking, smart contracts align directly with existing statutory and FAR requirements while offering capabilities uniquely suited to deployed environments.

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Answer

A BSB S-3 must leverage all the key players within the brigade (BDE) in order to effectively plan their own organization's operations.

The S-3 must work closely with the BDE's S-4 and SPO officer, so that all parties have a fundamental understanding of the concept of support. BSA displacement timing and capabilities by base cluster rely on the concept of support, otherwise the risk of desynchronization becomes a reality.

It is equally crucial that the S-3 conducts parallel planning with the BDE. The BSB does not have the luxury of waiting until the BDE publishes a complete operations order before they can begin conducting MDMP. Ensuring the BDE synchronization matrix supports movement, maneuver, and sustainment is paramount to executing BSB internal operations in support of the BDE.

The BSB's internal and support operations require development alongside the BDE's operations. The outcome is twofold when conducted effectively. First, the BSB nests its movements and protection within the structure of the BDE's operational tempo and does not desync operations by conducting ill-timed movements, communication failures, or overextended support lines. Secondly, it assists in the development of the BDE's operations and ensures it is planned with sustainment warfighting function in mind and not as a separate operation.

Ultimately, the BSB S-3 is not a direct planner for the concept of support, but they are vitally important in providing the operational link between the BSB, BDE S-3, S-4, and SPO officer throughout the BSB's operations process.

Analysis

Logisticians who understand and can apply the concepts within Field Manual (FM) 5-0, Planning and Orders Production, gain the ability to plan operations that effectively support maneuver. Army Doctrine Publication 4-0, Sustainment; FM 4-0, Sustainment Operations and Army Techniques Publication 4-90, Brigade Support Battalion, are critical for logisticians' development within their warfighting function, but logisticians cannot exist only within their own silo of excellence. Operating in a tactical environment requires understanding how the remaining warfighting functions conduct operations.

Additionally, incorporating the other warfighting functions into internal BSB planning provides a greater degree of survivability, longevity, and options to the commander. Doctrine is the foundation on which we rely. The expectation is that logisticians are the subject matter experts on all matters of sustainment. However, the effectiveness of only focusing on sustainment creates a critical deficiency.

Understanding tactical aims within movement and maneuver will aid the development of a plan to directly support the maneuver forces. Incorporation of intelligence allows for increased survivability of convoys and reporting of battlefield conditions. Protection allows the establishment of BSAs, logistics release points, caches, and various other locations in a manner that minimizes risk by understanding capabilities, effects, and mitigation techniques.

Sustainment is the heartbeat of an ABCT, so when threatened, fires can provide final protective measures, but only if it's trained and planned against as a contingency. Lastly, command and control links all the warfighting functions together and bolsters the employment of sustainment assets to the greatest degree possible.

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Logistician Takeaways

- Understand and incorporate all warfighting functions in BSB planning.
- Parallel planning is critical for nesting BDE and BSB operations.
- Concept of support requires concurrent development alongside the tactical plan.
- BSB S-3 links key individuals and understands all in order to effectively support the BDE through the BSB's internal operations.

Improvisation Beyond Doctrine

Redefining Sustainment Flexibility for Large-Scale Combat Operations

■ *By LTC Carl S. Miller and CPT Zachary P. Rardon*

Field Manual (FM) 4-0, Sustainment Operations, emphasizes the importance of improvisation: "Sustainment leaders must be able to improvise operational and tactical actions to meet a changing operational environment (OE)." When logisticians read this definition of improvisation, they understand it to mean minor tactical adjustments like shifting the location of a logistics release point or establishing base clusters at a brigade support area rather than the sweeping organizational adaptation sometimes demanded of sustainment units. Logistics commanders must ask: Can our sustainment formations improvise beyond basic operational and tactical actions? Can they overhaul their mission-essential task lists and overcome deep structural shortfalls when the mission demands it in large-scale combat operations, when the Army insists that a logistics battalion headquarters is just that and must be able to conduct any logistics mission? The 49th Movement Control Battalion (MCB) proved that the answer is a resounding yes. The MCB can shift focus and function as a division sustainment support battalion (DSSB) when duty calls.

From Doctrinal Misalignment to Operational Necessity

In April 2025, III Armored Corps (IIIAC) faced a dilemma. No DSSB was available to support the 1st Brigade Combat Team, 1st Armored Division (1/1 AD), during National Training Center (NTC) Rotation 26-01. The four DSSBs across IIIAC were already overtasked. One was supporting an overseas rotation, one was supporting border operations, one was in training for a warfighter exercise, and one was recovering because IIIAC had supported five other NTC rotations in the last 12 months. With no DSSB available, IIIAC turned to 13th Armored Corps Sustainment Command (ACSC), which in turn tasked the 49th MCB. The 13th ACSC is the pass-back support for IIIAC's divisions and brigade combat teams (BCTs).

This decision presented immediate challenges. The 49th MCB was neither structured nor manned for a DSSB mission. Its modified table of organization and equipment (MTOE) authorized only 51 personnel, primarily 88N Transportation Management Coordinators. The doctrinal purpose of an MCB is to provide in-transit visibility, coordinate the use of common-user land transportation (CULT) assets, and synchronize use of routes. A DSSB, by contrast, includes hundreds of Soldiers across multiple specialties — fuelers, mechanics, ammunition handlers, and logisticians. To further complicate matters before this mission, the MCB would command and control the three companies in its operational control (the composite supply company, the support maintenance company, and the composite truck company) but not organically assigned to it.

Companies are usually the beneficiaries (or victims) of the output of MDMP rather than a part of the process. Bringing the companies in (a necessity for the shortened planning timeline) ensured shared understanding of staff functions, timelines, and intent.

The battalion faced two operational questions:

- How to fill critical specialty manning gaps, or substitute the skills required using an MCB MTOE, in a mission designed for a DSSB?
- How to rapidly form a cohesive team with newly attached companies during reception, staging, onward movement, and integration (RSOI) before going into The Box at NTC?

Improvising Structure: Learning the DSSB Mission

Before deploying to Fort Irwin, the battalion began by focusing on adapting the structure of the MCB headquarters staff at home station. A structural focus enabled the battalion staff to understand what gaps it had compared to a DSSB. To bridge identified structural and doctrinal gaps, the MCB conducted leader professional development (LPD) sessions on DSSB organization and support operations (SPO) processes. Internal leaders with DSSB and SPO experience took the lead on training the staff. While these LPD sessions were instructor led, they were also discussion heavy to gain comprehensive understanding of how a DSSB staff functioned. A major insight gained during the discussions was that the MCB must consider the role that a DSSB plays at NTC. The question was: What would the 49th MCB be required to do at NTC as the division echelon of support? The question was not: How can the 49th MCB recreate the entirety of a DSSB staff structure

without operational context? This reframing allowed for optimization and efficiency in manning. While specific manning and expertise gaps would need to be addressed, many would not.

The LPDs were followed by a three-week command post exercise (CPX) at Fort Hood that used real garrison sustainment tasks as a simulation within the exercise. The command added injects that demanded the command post jump several times, react to enemy drones, and receive reports from convoys on distribution missions. In this CPX, the MCB bifurcated its S-3 and dedicated half the manning to SPO. The benefit was that SPO delved into planning for fuel, maintenance, and Class IX parts deliveries. In the end, the CPX trained the staff on critical sustainment planning skills necessary to establish the muscle memory needed for NTC and further solidified contentions from the LPDs that manning from outside of the organization must be sourced.

When the MCB arrived at NTC, it applied the operations process (plan, prepare, execute, and assess) just as it would for movement control operations. The staff adapted the same thought process to a sustainment battalion framework to enable the tracking of commodities for the supported battalions in BCT, which would not be normally tracked by the MCB. During RSOI, requirements arrived quickly and simultaneously: tracking incoming personnel, managing rail and line-haul operations, overseeing equipment draw and issue, and running a new untested battle rhythm. To synchronize efforts, the MCB integrated the newly received company command teams into the military decision-making process (MDMP). Companies are usually the beneficiaries (or victims) of the output of MDMP rather than a part of the process. Bringing the companies in (a necessity for the shortened planning timeline) ensured shared understanding of staff functions, timelines, and intent. Later in operations, this enabled mission command, where companies could make tactical decisions with a complete understanding of the commander's intent. The newly received companies also brought expertise to the MCB that it needed to function as a DSSB. Once in The Box, the borrowed manning and expertise (fuel, ammunition, maintenance, etc.), was returned to the staff.

Improvising Teamwork: Building a DSSB on the Fly

RSOI planning quickly evolved into full sustainment operations with an emphasis on planning and preparation. The MCB deeply integrated the company command teams with the newly altered staff, and forced shared experiences through MDMP, rehearsals, and the battle rhythm to establish a unity of effort. The following eight products developed in the RSOI phase proved to be key throughout the operation, especially during the MDMP:

- Base order.
- Logistics synchronization matrix.
- Execution checklist to measure convoy timeliness.
- Convoy tracker.
- Decision support/authority matrix.
- Digital and analogue operations graphics.
- CULT report.
- Running estimates of consumption and capacity.

Once in The Box, the battalion adjusted its battle rhythm events to better align with the immediate needs of executing and assessing real operations — moving the battle update assessment (BUA) to later in the evening. Since this was the first time the battalion functioned together in the field, the command emphasized frequent communication and adaptable processes.

The battle was in constant evolution, and frequent updates mitigated the risk of decision-space being squandered. The commander's update assessments, BUAs, operations synchronizations, and command team huddles were tailored in flight to prioritize real-time adjustments, creating a fluid exchange of information and fostering faster decision making that drove execution and assessment. This battle rhythm kept priorities aligned, even with an undersized staff. The battalion commander used each forum to restate intent (purpose, key tasks, and end state), ensuring clarity and creating disciplined initiative across the formation. During events, the battalion staff refined each forum and altered how information flowed to ensure company actions aligned with evolving requirements.

Improvising Expertise: Filling Gaps with Ingenuity

During the rotation, the MCB reorganized the staff to form an ad-hoc sustainment operations section. The S-3, entirely manned by 31A Military Police, 88N Transportation Management Coordinators, and 90A Logistics Specialists, provided the bulk of the personnel. The S-4 provided visibility of internal and external capacity by developing an external logistics status and CULT report. The battalion also leveraged expertise from attached units:

- 664th Ordnance Platoon (Fort Bliss) for ammunition operations.
- 142nd DSSB (Fort Bliss) for fuel management.
- 96th Heavy Equipment Transporter Company (Fort Hood) for materiel management proficiency.
- 86th Expeditionary Signal Battalion (Fort Bliss) for connectivity.
- 153rd Field Feeding Company (Fort Bliss) for field feeding expertise.

This mosaic of skills exemplified true improvisation. Soldiers and leaders stepped outside their normal roles to meet the mission guided by the philosophy often attributed to Steve Harvey: "Be comfortable being uncomfortable."

Improvisation Redefined

The 1/1 AD had a very successful NTC rotation in its victory over Black Horse. Logistics and sustainment were considered big wins, and the lines of communication extended further into the east-west rotation than one would normally see. Not a single battalion ran out of fuel, went hungry for a meal, or went without water. The 49th MCB played a large role in the brigade's success. The ad-hoc DSSB kept the supply trains running on time, and the headquarters displaced multiple times with no interruptions in support by staggering jumps over two days. In addition, the battalion was able to protect itself from drone attacks using counter-reconnaissance and a quick reaction force. The observer controllers noted that they had not seen a DSSB protect itself so well in years.

The bottom line is that the logistics community's interpretation of FM 4-0's definition of improvisation, acting at the tactical level to meet a changing OE, is too small and does not fully capture what modern sustainment units must do. We would be better off looking to other doctrine. Army Doctrine Publication (ADP) 6-0, Command and Control, offers a broader lens: "Army forces continue to make decisions and act in the absence of orders, when existing orders no longer fit the situation, or when unforeseen opportunities arise." By this measure, the 49th MCB's experience at NTC 26-01 was improvisation at its finest. The battalion transformed itself from a movement control headquarters into a functioning, and expeditionary, DSSB. It built new processes, trained beyond its military occupational specialty expertise, and successfully led unfamiliar units through a complex sustainment mission. The MCB not only adapted but reinvented itself in real time.

As the Army faces increasingly dynamic OEs, this kind of improvisation will be essential. The 49th MCB's success must challenge the sustainment community to expand its own definition of improvisation, not as a tactical reflex, but as an organizational art form that keeps the Army moving, supplied, and ready for the next fight. The Army must adopt the art of improvisation as a core competency, and units must stop training for the perfect and start training for functional fluidity.

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A MAGIC BULLET STILL NEEDS ZEROING

Avoiding Pitfalls in 3D Printing for Army Maintenance

■ *By 1LT Ya Xing He*

As the Army continues its transformation amid the paradigm shift to large-scale combat operations, 3D printing, technically known as additive manufacturing, has become a ubiquitous solution chosen by leaders to address the difficulties of regenerating combat power under a contested operating environment and with a disrupted industrial base. Instead of ordering an entire enhanced combat helmet assembly for $2,100 and waiting for weeks, a battery bracket was 3D-printed in under an hour for a mere 10 cents by the allied trade Soldiers at 3rd Mobile Brigade Combat Team (MBCT), 25th Infantry Division (ID). Nevertheless, despite its numerous advantages, 3D printing still has inherent shortfalls, and failure to address such issues can result in disastrous outcomes. Therefore, it is imperative for Army leaders — especially those spearheading field-level maintenance — to holistically approach 3D printing by recognizing its limitations, deliberating its implementation, and leveraging cross-organizational expertise.

3D Printing: Continuously Transforming Manufacturing Since the 1980s

3D printing adds base material — photopolymer resin, thermoplastic filament, titanium powder, etc. — together, one layer at a time, into the final product. A digital model of the final product is first created via design software and converted into a geometry mesh file in the format of either standard tessellation language (STL) or 3D manufacturing format (3MF). A slicer software then converts the mesh file into layers of XYZ coordinates and an associated tooling pathway to actuate the machine. For each layer — which can be as thin as 0.08 mm, thinner than a dollar bill — the machine's toolhead arranges base material to specified X and Y coordinates, similar to an inkjet printer spraying ink droplets onto paper. Upon completion, the machine adds a new layer on top of the previous one. New material is added layer by layer according to three-dimensional XYZ coordinates, for which the vernacular name 3D printing is derived.

FDM and SLA: The Backbone of Field-Level 3D Printing

The two common 3D printing technologies for the Army's field-level maintenance are fused deposition

modeling (FDM) and stereolithography (SLA). Other technologies, such as selective laser sintering, direct metal laser sintering, and electron beam melting, are currently suitable for sustainment-level maintenance at or above corps support area due to their cost, footprint, power consumption, and operator expertise. For instance, a typical SLA or FDM 3D printer costs a couple hundred dollars, operates on a 120V residential outlet, and only needs a 15-minute video tutorial to start, whereas a metal laser sintering machine costs millions of dollars, occupies an area the size of a pickleball court, demands a dedicated power supply, and takes days just for initial setup.

An FDM printer extrudes spooled polymer filament through a heated nozzle and deposits a layer of melted polymer onto a platform, like how a craft glue gun consumes glue sticks. New layers of polymer are then subsequently deposited on top of the previous layer, which solidifies as it cools. Due to FDM's simplicity, versatility, and minimal footprint, it is well tailored for maintenance nodes close to the forward line of own troops (FLOT) that necessitate frequent jumps, such as in the back of an M1079 or M1087 van parked near the field trains command post (FTCP).

The SLA printer — the original 3D printing technology since 1984 — uses an ultraviolet (UV) laser to selectively solidify spots of photopolymer in a pool of liquid resin. In addition to the difficulty in transporting liquid resin, SLA printers require a level, stable platform throughout printing for dimensional accuracy. Therefore, SLA is suitable for maintenance nodes that are relatively static and with moderate infrastructure, such as at a division support area (DSA) or higher echelons.

3D Printing's Masked Achilles' Heel(s)

Despite their profound transformation to Army maintenance, both FDM and SLA technologies have shortcomings that can jeopardize mission: material compatibility, strength anisotropy, dimensional tolerance, acquisition hurdles, and information security.

Material Compatibility

Both SLA and FDM use polymers (plastics), which vary drastically in their performance. Their chemical composition, microscopic structure, printing techniques, and curing environment all affect the final product's properties. Therefore, deliberate selection plus continuous improvement via trial and error are necessary to ensure selected materials' compatibility with the final product's intended use.

A terminal cover that was FDM printed with polylactic acid (PLA) initially fit perfectly, but it shattered after a slight bump, because PLA lacks toughness and impact resistance, despite its excellent stiffness. Its replacement was made of polyamide nylon for its superior toughness, but the new cover gradually warped and eventually deformed during rotation at the Joint Readiness Training Center, since nylon is extremely hygroscopic and softened by moisture. In the meantime, the allied trade shop at the FTCP was unable to print new covers, because their stock of nylon filament had also absorbed excessive moisture that evaporated during extrusion through a heated nozzle, leaving the finished product full of air bubbles. Acrylonitrile butadiene styrene (ABS) filament was then used, after maintainers spent countless hours tuning their printer for ABS, which demands high temperature and emits pungent, carcinogenic fumes when melted.

The new ABS covers worked fine until rotation to the U.S. Central Command, where blistering sunshine accelerated the covers' degradation due to ABS's susceptibility to UV embrittlement. Fortunately, a support maintenance company (SMC) attached to the theater sustainment command had SLA printers. The SMC's 91E Allied Trade Specialists fabricated covers with an acrylic-based resin that finally met requirements, although several batches were defective due to insufficient post-processing curing.

Strength Anisotropy

Even with the perfect material, the part's orientation during printing also impacts its performance. Traditional polymer manufacturing processes, such as injection molding or vacuum forming, create products with properties that are uniform in all directions. 3D printing, in contrast, creates products whose properties change depending on the direction in which they are measured.



The establishment of this new makerspace reflects a broader trend within the U.S. military to leverage the power of additive manufacturing. Similar innovation labs have been opened at other U.S. Army and Department of War locations, including the Maneuver Innovation Lab at Fort Benning, Georgia, and the Airborne Innovation Lab at Fort Bragg, North Carolina. (Photo by Eric Kowal)

A side-release, snap-fit buckle offers a vivid example of anisotropy. Two male buckles, made with the same filament on the same FDM printer, can differ in their prongs' bending toughness by almost 40%, simply due to how the buckles are oriented.

Dimensional Tolerance

The right material and correct orientation alone still are insufficient to guarantee a functional product. All manufacturing processes involve dimensional tolerance, which is the permissible deviation from the ideal physical dimension. While 3D printing typically has tight tolerance, such accuracy demands profound expertise, proper equipment, and ideal environment, all of which are in scarcity near FLOT. The lack of geometric dimensioning and tolerance specification from the original engineering drawings exacerbates the issue.

Due to the layer-by-layer nature of 3D printing, warping occurs when older, colder layers shrink, creating thermal strain against the freshly extruded, hotter layers. Warping is further exacerbated during prolonged, frequent pause of printing amid hasty displacement near FLOT. Excessive overhang across vertical planes induces sagging, especially for SLA printing, because the wet part has yet to achieve its post-cure strength. A printer that is overdue for maintenance might not actuate as precisely due to fouling on power screws that drive the nozzle or laser.

Acquisition Hurdles

After countless hours of trial and error perfecting the combination of material, part orientation, and printer parameters, it is time to scale up production. Unfortunately, the current acquisition policy, such as those governing the Government Purchase Card (GPC), is not optimized for

units at tactical echelon to execute agile adaptation of the latest additive manufacturing technologies.

A wave of democratization of 3D printing has fundamentally changed its market landscape after the original patent's expiration. Entrepreneurs have seized the opportunity to bring affordable 3D printers to garage-based hobbyists. Increased adoption further inspires rapid innovation. The majority of SLA and FDM printers available today are commercial off-the-shelf (COTS) items. Although the Federal Acquisition Regulation (FAR) has exemptions, the overall process on using GPC to micro-purchase is still burdensome for line units. A proprietary resin is supplied by a single vendor, making it impossible to compare three quotes per the FAR mandate. Commercial vendors occasionally refuse to ship to Army post office (APO) addresses for overseas units.

During the 758th SMC's mobilization to U.S. European Command, their allied trade Soldiers discovered a thermoplastic polyurethane filament ideal for alignment aids. The unique filament was readily available on the host nation's local platform operated by a U.S.-based, multinational e-commerce giant, with free shipping to local addresses. However, after spending weeks communicating with the vendor, the vendor decided to pass due to their perceived burden on compliance. Eventually, a stateside vendor that specialized in government sales added the filament to their catalog, effectively using the filament's original equipment maker (OEM) as their subcontractor. By the time the filament was finally delivered to the APO address, the total cost charged to the GPC was $99 per spool plus freight, which was approximately 300% higher than the local price of 31 Euros.

Information Security

Finally, the prevalence of COTS printers endangers the Army's information security. As COTS printers prioritize ease of use and seamless integration for consumers, they predominately use Wi-Fi, Bluetooth, cloud-based remote control, and over-the-air firmware update. Such network protocols, while efficient and convenient, also pose perilous concern for information security, both in garrison and during deployment. The mere presence of cyber electromagnetic activities associated with COTS printers still jeopardizes missions due to their emission, signature, or spillage. Furthermore, the convoluted global supply chain for consumer and industrial-grade electronics is still fraught with potential backdoor malwares.

Practical Principles for Minimizing 3D Printing's Risks

Risk acceptance, a key principle of mission command, is embedded in Army culture. Integrating 3D printing into field-tier maintenance is no exception. Maintainers must deliberately mitigate technologies' shortfalls to maximize their potential. While the Army's strategic-level echelons are diligently incorporating 3D printing amid the Transformation in Contact initiative, leaders at operational and tactical echelons can leverage simple principles tailored for 3D printing.

Enhancement, Not Replacement

3D printing enhances, not replaces, the regular process of obtaining Class IX parts. Numerous doctrines and policies provide guidance on incorporating 3D printing into the sustainment warfighting function. Leaders must distinguish limited-use versus final-use parts when it comes to 3D printing:

- Final Use: Parts that have been cleared as direct, OEM replacement after rigorous testing. Such parts are usually manufactured at sustainment-tier activities and can bring equipment back to full mission-capable status.
- Limited Use: Parts used during battle damage repairs or expedient repairs that are temporary, improvised in nature, and aim to restore equipment to a partially functional condition.

For equipment that has been repaired with limited-use, battle damage repair fabrication (BDRF) parts to continue their mission, the correct Class IX parts must still be ordered while the equipment's technical status is properly updated in accordance with the Global Combat Support System–Army job aid for advanced manufacturing, however long the lead time might be, to generate demand signal for supply chain and to enable national-level supply activities to justify their pursuit in certifying alternatively sourced, final-use parts.

Adaptation, Not Imitation

3D printing multiplies its effectiveness when adapted for its unique versatility, rather than simply making imitated, mirror copies of OEM parts. Engineering principles, such as design for manufacturing and failure-modes effects analysis, must be used.

For instance, rather than simply imitating the snap-fit clips on an injection-molded part, adapting the clips into housings for clevis pins preserves the ease of access, while mitigating the risk of shearing off the clips due to anisotropic strength inherent to 3D printing.

Collaboration Over Compartmentation

The Army fights as a team, and maintenance is no exception. In addition to the 914A and 91E allied trade Soldiers, who are the Army's experts on fabrication, talents can also be discovered in many other places: experts at the Rock Island Arsenal–Joint Manufacturing and Technology Center, Reserve Soldiers, dental officers, and armor officers. Collaboration across the Army's sustainment enterprise avoids reinventing the wheel for 3D printing. Leaders must discover the vast expertise among their ranks and files.

People Over Machine

GEN George S. Patton once said, "Wars may be fought with weapons, but they are won by men." Similarly, 3D printers do not magically revolutionize manufacturing. It is transformed by the people who diligently pursue manufacturing excellence. Army leaders ought to recognize the importance of human capital and then facilitate Soldiers' development, instead of adhering to an expectation of simply pressing a button and getting a part. From prioritizing training on technical proficiency, facilitating Soldiers' continuous education at community colleges with centrally funded tuition assistance/credential assistance, and leveraging the industry base by Training with Industry, leaders can build the Army's in-house expertise on 3D printing for maximum effectiveness.

Not a Panacea, But an Omnipotent Tool in the Right Hands

3D printing has been continuously transforming maintenance for the Army, but it is no panacea. Just like its many preceding disruptors, such as robotics and microelectronics, 3D printing has its shortfalls. Hence, leaders in the Army must recognize its pitfalls, act deliberately in its adoption, and finally, fully use its potential amid the Army's continuing transformation.

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Featured Photos
SSG Adrian Herrera assembles the cap portion of a 3D-printed grenade deployment device at Norio Training Area, Georgia, Aug. 2, 2025, during Exercise Agile Spirit 25. (Photo by SFC Brittany Conley)

BRAINSTORMING

an overlooked management tool

by Captain W. John Stoddart



[Editor's Note: This Blast from the Past article was initially published in Army Logistician (the former title of Army Sustainment) in the January–February 1976 issue, volume 8, number 1.]

Have you ever called a staff meeting and after it was over kept a few members of your staff to mull over a problem and then had someone throw out the answer after just a few seconds? And was the answer so patently obvious that everyone felt foolish for not having thought of it before? Almost everyone is familiar with the often-overlooked word "brainstorming," but how many military managers are familiar with the procedures and applications of brainstorming?

Brainstorming can actually be considered as nothing more than a verbal staff study. Everyone connected with the military has at least some familiarity with the written staff study format — statement of the problem, assumptions, facts bearing on the problem, courses of action, conclusions, and recommendations. Innovate and think of brainstorming as an oral staff study. This technique can be used in day-to-day workings of middle managers and top executives in any kind of organization. The brainstorming concept can be used to augment aggressive, dynamic leadership. These simple techniques provide the steps that can help to solve the most complex and highly sophisticated technical problem or a relatively sensitive personnel problem. The middle manager in many organizations is fortunate because usually his work force is small enough for him to include every member in a meeting and gain their individual participation. Many divergent ideas can often be generated this way.

Whether the manager is at the middle level or at the highest level, brainstorming procedures remain virtually the same with only minor exceptions. The high-level manager, obviously, cannot call together his entire work force, but he can select a cross-sectional group to wrestle with the problem at hand. In many military organizations, selection is delineated through a grade structure that leaves the commander only one course of action — that is to exploit the synergistic capability of his command group or staff. Take care not to exclude nontechnical people from the brainstorming group even though the problem is highly technical. Quite the opposite approach should be taken, for nontechnical members often provide the divergent ideas that lead to innovative solutions. This is where the total assets of a command can be used by the commander to gain a wealth of ideas and knowledge.

Once the group is selected and the objective is defined, the manager must instruct the group to present only positive statements, but make clear that any idea, regardless of how outlandish it may sound, should be presented. Any idea that stimulates other ideas should be introduced immediately into the discussion. Quantity of ideas should be stressed to the group. The manager should designate someone in group to record the ideas brought out in the session or make notes of them himself. This may be done informally on butcher paper or a plain note pad, but the ideas must be preserved for future analysis.

After the manager has elicited ideas from the staff, the real work begins. There are many different methods of analyzing the ideas, and this becomes the "pick and shovel" part of the operation. If the manager wants to continue with the group to further avail himself of the existing synergy, he can use what is commonly known as the Osborne technique. The group's role in this technique is nothing more than providing data for the commander or manager to use in making a decision. The Osborne technique is a definite, viable management tool, closely paralleling the staff study. However, when comparing it to a staff study, the commander or manager must make his own innovations, which will not follow exactly the rigid staff study format.

The manager or commander can use the Osborne technique or modify it to suit himself. There are five major areas in which trade-offs between the formal staff study and the Osborne technique can be made. Each of the five major areas is discussed in separate sessions. They are not autonomous or unrelated and each session should be considered as an integral part of the process to achieve a viable solution. The sessions are supported primarily by the inherent synergy of the group.

The first area is *fact finding*. This is where it is decided just what facts are wanted for the study. The second area is *problem definition*, identifying and specifying the problem. *Idea finding* is the third area, and it brings out from the group the many

The brainstorming concept can be used to augment aggressive, dynamic leadership.

diverse actions related to solving the problems. *Solution finding* is the fourth area, and its function is to identify the alternatives bearing on the problems. This area also helps determine the feasibility of courses of action that have been proposed. The decisions on what to do with the data that have been developed are carefully weighed. Finally, the fifth area covers the *acceptance finding*. The questions of who, what, when, where, and how are dealt with in this area. Alternatives are weighed and culled, and methods of implementing them are examined. Here, the proof of whether the work was worthwhile manifests itself.

After the group, through its interactions, has exploited the process and provided many ideas, the commander or manager must then earn his money. He must decide which ideas are beneficial and which ones are infeasible. He must decide which ones to act upon, to hold in abeyance, and to disregard. Brainstorming is nothing more than a tool for the manager or commander to use in obtaining more information on which to base decisions.

Private industry profitably uses this technique or a similar method of their own with minor variations. The technique takes advantage of time, eliminates individual bias, and provides a broader perspective of an objective. The major advantage of brainstorming is that the manager can institute the procedure immediately because he has ready access to people, the only resource the technique requires. By channeling everyday discussions along the lines indicated, even an informal coffee break can be turned into an extremely beneficial idea-producing session.

Remember that creative problem-solving techniques are augmentation to management principles and not the panacea. This is just one more method to obtain vital information to assist in making accurate timely decisions.

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