

OCTOBER-DECEMBER 2019

# ARMY SUSTAINMENT

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# The Future: ARMY 2028

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As leaders in Army sustainment look to the future and modernization, a clearer picture of what Army sustainment looks like in 2028 emerges bit by bit. (Photo illustration/design by Sarah Lancia, Army Sustainment)

“We can have the best, most advanced equipment in the world, but without the infrastructure to train on it and project it forward, that advantage is lost. We must get this right—today—for the future.”

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# Modernize Today to Support Tomorrow's Equipment

■ By Gen. Gustave "Gus" Perna



As sustainers, we have a critical role in modernizing everything from our installations to our skillsets to keep pace with the developments of Army Futures Command's Cross Functional Teams.

For the past four years, modernization has been a priority for Army senior leaders. They codified it with the largest reorganization of the Army's structure in more than two decades, standing up Army Futures Command. But the responsibility to modernize does not lie with Army Futures Command alone. As sustainers, we have a critical role in modernizing everything from our installations to our skillsets to keep pace with the developments of AFC's Cross Functional Teams (CFTs). In fact, if we fail to modernize what is our responsibility, the best efforts of Army Futures Command will be for naught.

This starts by ensuring logisticians are fully embedded within every

modernization effort and initiative, advocating for innovative ideas that drive supply chain and sustainment efficiencies in next-generation weapon systems. We must be in lockstep with the CFTs on planned improvements and upgrades to equipment, and understanding the training, logistics, and sustainment requirements up front.

Once we understand the requirements, we must look forward and modernize the infrastructure on our installations. An improved, long-range automatic rifle is only as good as the Soldier firing it; the Next Generation Combat Vehicle is only as effective as the Soldiers who operate it. To be effective, Soldiers must train on the equipment, and that training is done on installations. Ranges must be prepared for weapon systems that shoot farther and drive faster. Likewise, motorpools and installation maintenance facilities must provide the right capability to enable Soldiers to maintain equipment. Our ranges, facilities and centers must be modernized to train and maintain as new platforms are developed and fielded.

Equally important as training is projecting our forces and equipment forward. We must be able to get our equipment to the fight—rapidly and efficiently. Our Strategic Power Projection capabilities—railheads, ports, airfields, shipping containers, and more—must also be modernized to support next-generation platforms. From weight to size, and from ease of mobility to cyber, we must consider the factors that impact our ability to move, and modernize accordingly, now.

Within the industrial base, modernization is key to sustaining our future systems. Most of the 26 maintenance depots, manufacturing arsenals, and ammunition plants within the Army's organic industrial base are WWII-era facilities. They were established to maintain the Army's equipment more than 75 years ago.

While many have gone through incremental upgrades, they must be modernized with the right machinery and tooling to manufacture, re-set and repair the weapon systems of the future. Our industrial base, particularly the munitions industrial base, must also have the modernized storage capacity to support future requirements.

Finally, we must modernize our logistics information—our data, processes, and systems that allow us to see ourselves. While we have made great strides, we are still operating in the industrial age, working in inefficient processes with duplicative systems. The amount and quality of data available to commanders is indescribable, but without the ability to harness and leverage that data, it lacks purpose. We also cannot underestimate the cyber abilities of our enemies. We must streamline and modernize our systems to safeguard and protect our data and to better understand the resident capabilities within them to make informed business decisions.

The bottom line is that our profession has a colossal and critical responsibility to modernize alongside our partners in Army Futures Command. We have long said that our strategic advantage is our projection and logistics capabilities. We can have the best, most advanced equipment in the world, but without the infrastructure to train on it and project it forward, that advantage is lost. We must get this right—today—for the future.

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Gen. Gustave "Gus" Perna is the commander of the Army Materiel Command at Redstone Arsenal, Alabama.



# Change of leadership at Army G-4



Lt. Gen. Duane A. Gamble assumed duties as the Deputy Chief of Staff, G-4 on 16 September 2019. He oversees policies and procedures used by all Army Logisticians throughout the world. He previously served as Commanding General of the U.S. Army Sustainment Command from July 2017 to August 2019.

A native of Arbutus, Maryland, Gamble attended Western Maryland College (since renamed McDaniel College), where he earned a Bach-

elor of Arts degree and was commissioned as an Ordnance officer in May, 1985. He has Masters of Science degrees from the Florida Institute of Technology and the Industrial College of the Armed Forces (since renamed the Dwight D. Eisenhower School for National Security and Resource Strategy).

Prior to assuming duties as the Deputy Chief of Staff, G-4, his most significant assignments include: Commanding General, U.S. Army Sustainment Command; Commanding General, 21st Theater Sustainment Command; Assistant Deputy Chief of Staff for Logistics (G-4), Headquarters, Department of the Army; and Deputy Commanding General of the 1st Theater Sustainment Command.

Gamble's other notable assignments include: Commander, 528th Sustainment Brigade (Airborne), supporting Army Special Operations Forces in Iraq, Afghanistan, and the Philippines; Commander, 426th Forward Support Battalion (Air Assault) supporting the Bastogne Bri-

gade (1st Brigade, 101st Airborne Division); Deputy Commanding Officer, 46th Corps Support Group (Airborne); and Commander, Company B, 782nd Maintenance Battalion (Airborne) supporting the Falcon Brigade (2nd Brigade, 82nd Airborne) during Operations Desert Storm and Desert Shield.

His other key staff assignments include: Director, Force Projection and Distribution (G-44D), Army G-4; Deputy J-4, United States Forces Iraq; J-4, Joint Task Force Haiti; G-4, XVIII Airborne Corps; G-4, NATO Rapid Deployable Corps -- Turkey; Executive Officer for the Army Materiel Command G3; G4, 101st Airborne Division (Air Assault) during Operation Iraqi Freedom; and Executive Officer, 307th Forward Support Battalion (Airborne), 82nd Airborne Division.

Gamble's awards and decorations include the Distinguished Service Medal, Bronze Star Medal (with Oak Leaf Cluster), Air Assault Badge, and Master Parachutist Badge.

## A Message from the Department of the Army G-4 Team

Thank you to Lt. Gen. Aundre F. Piggee, who for the past three years, has filled this recurring column with keen insight. He often viewed this column as a mentoring opportunity, sending messages on what sustainers had to do to build readiness and help the Army modernize. As his team created the policies that were used across the Army's formations, he often visited sustainers in the field and shared the lessons he learned with all of us—his recurring column on these pages was an extension of that same effort and served as his direct outlet for mentorship to the sustainment community.

Piggee was a mentor to us here on the DA G-4 staff as well, guiding us in preparing content for this publication,

selecting themes, and helping to secure interviews that have helped to make this publication the kind of professional bulletin the Army sustainment community needs. We wish him the best as he transitions to his next chapter.

We are excited to welcome Lt. Gen. Duane A. Gamble back to Washington, D.C. He has previously written articles for Army Sustainment Professional Bulletin, and beginning with the January edition, we are looking forward to sharing his unique perspectives on how logisticians can best help the Army win.

*Editor's note: Department of the Army Deputy Chief of Staff, G-4 is a significant contributor, and key stakeholder of Army Sustainment, providing content, theme-based guidance and input, and resources to the editorial staff of Army Sustainment.*



Lt. Gen. Aundre F. Piggee, previous Army Deputy Chief of Staff, G-4

# From the Big Five to Cross Functional Teams: Integrating Sustainment into Modernization

■ By Maj. Gen. Rodney D. Fogg



To avoid the support problems encountered during the post-Vietnam modernization effort—development of “The Big Five”—the Army Sustainment community is working closely with Army Futures Command (AFC) to ensure that current modernization efforts include both the weapons of tomorrow and the support systems necessary to sustain them in combat.

## Big Five Modernization

Fifty years ago, the Army responded to an evolved threat and aging weapon systems with a new concept and new doctrine. In the early 1970s, as the United States reduced its military involvement in Southeast Asia, Army leaders shifted their focus from global deterrence toward defending Western Europe from an attack by Warsaw Pact forces. The 1976 version of Field Manual (FM) 3-0, Operations, introduced the Active Defense concept as the intellectual framework for how the Army would “fight outnumbered and win.” This concept attracted criticism on several points, including its exclusive focus on defense in Europe. Refinements

in concept and doctrine ultimately led to the 1982 version of FM 3-0 and the concept of AirLand Battle, a more comprehensive approach to defeating a numerically superior foe.

This doctrinal transformation influenced every aspect of the Army’s organization, training, materiel, leader development, personnel, and facilities. In the materiel domain, the new concept accelerated the Army’s efforts to upgrade key weapon systems. These efforts began years earlier as a disjointed series of initiatives to upgrade the M60 tank, the M113 armored personnel carrier, the AH-1 Cobra helicopter, the UH-1 Iroquois helicopter, and our anti-aircraft capability. In the early 1970s, senior leaders synchronized these efforts, coining the term “The Big Five” to identify the weapons systems needed to execute the new doctrine.

## The Problem

While Army leaders synchronized development of the five weapon systems, they did not prioritize development of supporting vehicles and equipment. The Army had not entirely ignored the need for better trucks, heavy transports, and bulk fuelers, but these programs were not integrated with development of the Big Five. Hence, it encountered capacity issues with such systems as the heavy expanded mobility tactical truck (HEMTT), the heavy equipment transporter (HET), and the M88 Hercules recovery vehicle.

Evolution of the Army’s M88 recovery vehicle illustrates the problem. The original M88 recovery vehicle was built on the chassis of the M60 Patton tank of the early 1960s. The Army designed the vehicle to enable battle damage assessment and repair or recovery of fighting vehicles while under fire. In 1977, the Army fielded an upgraded M88A1, several years

before fielding the M1 Abrams tank and M2/3 Bradley Fighting Vehicle. Unfortunately, like the original M88, the M88A1 was still a “medium recovery vehicle,” ill-suited to handle either the M1 or the M2/3 with their subsequent enhancements. As the Army began upgrading the M1 tank during the 1980s and 1990s, both the M1A1 and M1A2 tanks exceeded 70 tons, and two M88A1s were required to tow the new tanks. Development of a more powerful M88A2 heavy recovery vehicle helped, but that solution is temporary and already facing challenges. The M1A2 System Enhancement Package (SEP) continues to add more weight to the Army’s main battle tanks, forcing developers to consider further upgrades to its recovery vehicles and other support systems.

Development of the Big Five during the post-Vietnam era symbolizes the Army’s remarkable transformation into a lethal, rapidly deployable combat force. One of the hard lessons from that transformation, however, was the fact that development of sustainment capabilities needed to keep pace with the weapons systems that require their support. Acknowledging this lesson, Undersecretary of the Army (USA) Ryan McCarthy recently observed that “when you had these five weapons systems, you had to create HETs and HEMTTs and all the capability that enabled those weapons systems in combat. And so you learn along the way, if you will.”

## What Are We Doing Differently This Time?

The good news, as McCarthy pointed out, is that we have learned from our previous mistakes.

Today’s Army faces modernization challenges similar to those it confronted in the post-Vietnam era.



Once again, the Army must respond to evolving threats with new concepts, new doctrine, and new weapons systems. The Army must prepare for LSCO in highly contested, lethal environments where enemies employ powerful long-range fires and other weapons that match or exceed our own capabilities.

To meet this challenge, the Army published its new capstone doctrine in FM 3-0 in 2017, which nests with the Army's Operating Concept, "The U.S. Army in Multi-Domain Operations 2028" (MDO). FM 3-0 describes how the Army, as part of a joint team, conducts responsive and sustained LSCO. As in the past, the Army continues to pursue changes in doctrine, organization, training, materiel, leader development, personnel, and facilities (DOTMLPF) to execute our new capstone doctrine to defeat these new threats. As we do that, we are incorporating the sustainment integration lesson learned from the past through two basic approaches under the lead of the Combined Arms Support Command (CASCOM): comprehensive integration of sustainers within the materiel development of new systems led by the Army Futures Command's cross-functional teams and development of sustainment solutions fully integrated within Army-wide DOTMLPF solutions.

### Sustainment Within AFC Efforts

In regard to the first point, senior leaders have acknowledged the Army's need to change how it develops required capabilities and how it acquires weapon systems to succeed in future wars. Army Directive 2017-24, "Cross-Functional Team Pilot in Support of Materiel Development," and subsequent guidance set the direction for development. In October 2017, the Army established eight cross-functional teams (CFTs) focused on the following capabilities:

- Long-range precision fires (LRP)
- Next generation combat vehicle (NGCV)

- Future vertical lift (FVL)
- Network command, control, communication, and intelligence
- Assured positioning, navigation, and timing (A-PNT)
- Air and missile defense (AMD)
- Soldier lethality (SL)
- Synthetic training environment (STE)

The CFTs include expertise in acquisition, requirements determination, science and technology, test and evaluation, resourcing, contracting, cost analysis, military operations, and most germane to this discussion, sustainment. We have learned from our mistakes; capability developers from CASCOM are tightly integrated into the work of the CFTs. Team members share well-defined team goals with regular, open communication with each other, rather than individually providing input and reviewing products, as was frequently the case in past materiel efforts. Sustainment representatives influence sustainability throughout the process to ensure that all concepts, requirements determination, and materiel development efforts address critical sustainment considerations. The coordination and cross-talk within each CFT ensures that CASCOM developers are properly nesting their efforts with emerging modernization initiatives across all the DOTMLPF domains. In addition, CASCOM developers support modeling, experimentation, science and technology, demonstrations, and testing associated with AFC initiatives to ensure sustainability.

Sustainers have begun participating in all of the subsidiary lines of effort (LOEs) worked by the CFTs. In this context, its developers:

- Serve as members of integrated process teams working aspects of the overall CFT mission
- Participate in work groups developing the documents to identify requirements
- Identify cross-cutting sustainment complementary and enabling requirements
- Perform sustainment impact

Development of the Big Five during the post-Vietnam era symbolizes the Army's remarkable transformation into a lethal, rapidly deployable combat force. One of the hard lessons from that transformation, however, was the fact that development of sustainment capabilities needed to keep pace with the weapons systems that require their support.

analyses in such areas as maintenance, supply, transportation, and recovery

□ Participate in assessments to determine DOTMLPF solutions to mitigate sustainment gaps associated with CFT development efforts.

CASCOM is also working to expand direct engagements within the LOEs worked by the FVL, Network and A-PNT CFTs with their significant impacts on sustainment.

In addition to these efforts within CFTs, CASCOM personnel support another AFC initiative designed to avoid issues identified during the Big Five modernization effort. That initiative is designed to systematically achieve horizontal integration across CFT projects to fully enable an integrated approach to solutions designed for mission success in multi-domain operations in 2028. To achieve this integration, the AFC's Futures and Concepts Center (FCC) has established the Horizontal Integration Tiger Team (HITT) to identify and document CFT inter-dependencies, to frame challenges and opportunities to work across functions, and to provide sound analytics to inform senior leader decisions on modernization.

### **Sustainment Center of Excellence**

Facilitating the Army's ability to integrate its warfighting functions (WfFs) is the role of its centers of excellence (COEs). Under the leadership of the Training and Doctrine Command (TRADOC) and its Combined Arms Center (CAC), each COE serves as the force modernization proponent for its associated WfF. In that capacity, each is responsible for synchronizing all aspects of DOTMLPF. CASCOM serves as the COE for the sustainment WfF. As CASCOM operates under the leadership of TRADOC and CAC, it also receives guidance from the Army Materiel Command (AMC) and the Department of the Army G-4, as well as input from field units as it seeks to implement sustainment solutions within the

modernization strategy led by the AFC. Extensive coordination among all these stakeholders is vital as CASCOM works to prioritize and develop the most critical solutions among all the competing requirements. CASCOM does not have the resources to develop these solutions on its own; it must foster effective partnerships with all the stakeholders to achieve the modernization goals.

In fulfilling this role as the SCOE, besides integrating sustainers on the CFTs, CASCOM is working to develop the sustainment solutions required to fully support large scale combat operations during MDO. As an example, CASCOM has developed a trailer strategy that addresses existing capability gaps and consolidates requirements, while simultaneously meeting mobility requirements presented by the future force in MDO. Like the earlier M88 example, the Army's current fleet of trailers lacks the capacity to support critical systems such as the Paladin and field artillery ammunition support vehicle (FAASV) because the trailers do not meet height and weight restrictions for highway underpasses in Europe. This situation is exacerbated by new and heavier weapons systems currently under development.

CASCOM's strategy will consolidate trailer types by developing a more capable medium equipment transporter system (METS) and an enhanced heavy equipment transporter (EHET). The METS will be a lowbed trailer capable of transporting two thirds of the combat platforms in an armored brigade combat team. The EHET will transport an 85-ton payload, such as the M1A2 SEPv3 tank over road networks required for worldwide deployment. The strategy is an important example of a sustainment solution that resolves a current issue while also anticipating and supporting the capabilities necessary to fight and win the conflicts of tomorrow.

During the Army's modernization at the end of the 20th Century, sustainment capabilities failed to keep

pace with development of the big five weapon systems. The Army paid the price in terms of capability gaps, such as the inability to effectively recover its tanks. Fortunately, the Army has learned from those mistakes as it develops the next generation of combat systems. Today, CASCOM operates as the Sustainment COE to synchronize sustainment developments with the efforts of the AFC, its CFTs, and other sustainment partners. Fulfilling that crucial sustainment integration role ensures the Army will have the right sustainment capabilities to win the next war.

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Maj. Gen. Rodney D. Fogg is the commanding general of the Combined Arms Support Command. He is a graduate of the Quartermaster Officer Basic and Advanced Courses, Command and General Staff College and the Army War College. He has a master's degree in Logistics Management from Florida Institute of Technology and a master's in Strategic Studies from the U. S. Army War College.





# ARMY SUSTAINMENT

## Call for Submissions

***Army Sustainment is seeking articles on techniques, tactics and procedures; emerging trends; lessons learned; and other experiences***

**T**he editorial staff from *Army Sustainment* is seeking submissions from the community.

As with all content submitted to *Army Sustainment*, it should be sustainment focused, provide professional development information, and should not contain any classified or sensitive information.

Submissions should be well-developed narrative articles and can be opinions, techniques, tactics and procedures (TTPs), lessons learned, exploration of new technologies or emerging trends, or other similar content of a valuable nature to fellow sustainers.

General public affairs style coverage or content on units, exercises, initiatives and events that do not otherwise hold additional professional development value are typically not as strong as those submissions that offer real, actionable sustainment information.

The topic for the next issue of *Army Sustainment* is Allies and Partners, and articles on the subject should focus on the interaction between U.S. Army sustainment and partner nations and their militaries.

The deadline for complete submissions, including author bio forms and permission to publish forms, is no

later than Nov. 10, 2019.

Subjects could include TTPs for multinational sustainment operations, lessons learned from international exercises, or commentary or opinion on emerging trends in multinational and coalition sustainment communities.

All submissions should be reviewed for operational security, and should contain no classified information.

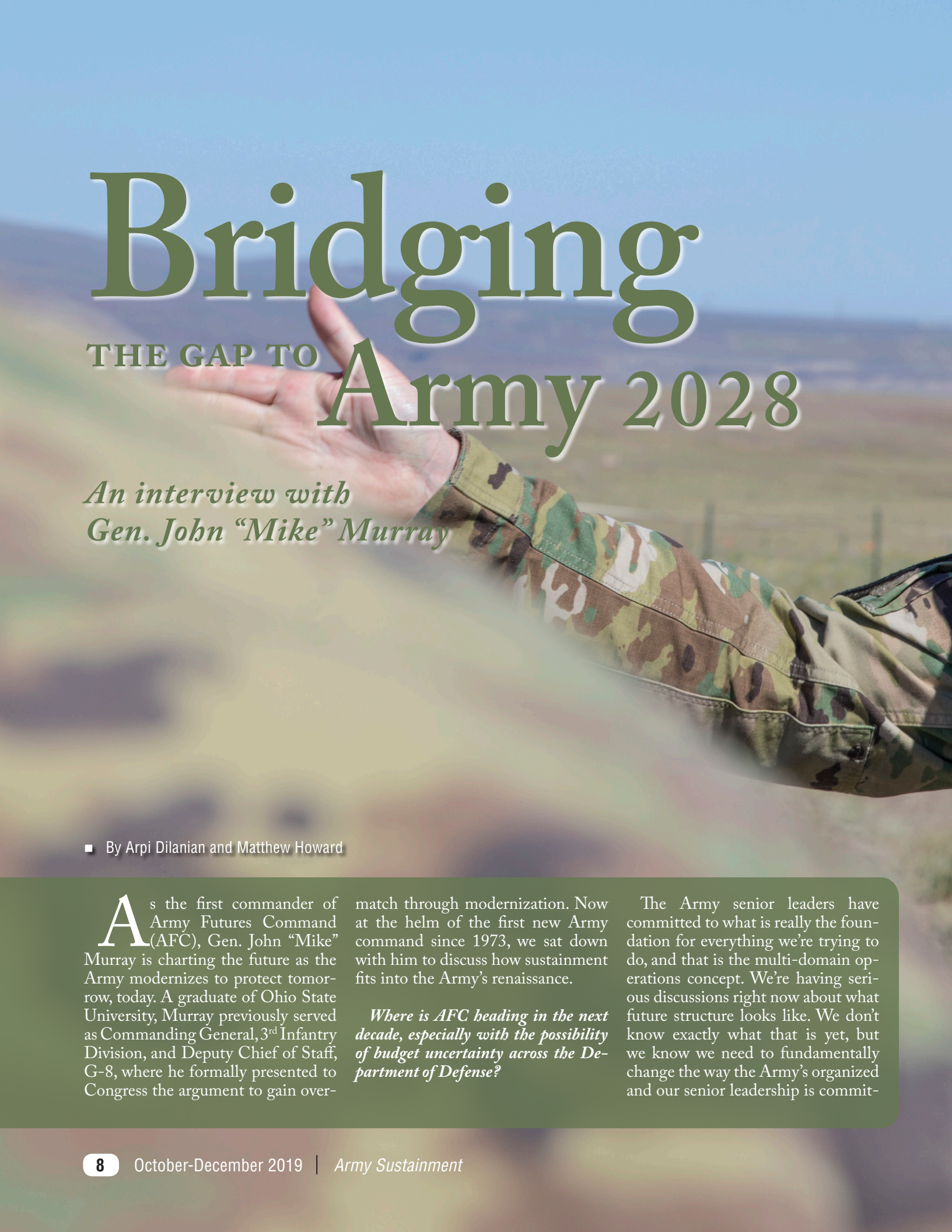
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# Bridging

THE GAP TO

# Army 2028

*An interview with  
Gen. John “Mike” Murray*

■ By Arpi Dilanian and Matthew Howard

As the first commander of Army Futures Command (AFC), Gen. John “Mike” Murray is charting the future as the Army modernizes to protect tomorrow, today. A graduate of Ohio State University, Murray previously served as Commanding General, 3<sup>rd</sup> Infantry Division, and Deputy Chief of Staff, G-8, where he formally presented to Congress the argument to gain over-

match through modernization. Now at the helm of the first new Army command since 1973, we sat down with him to discuss how sustainment fits into the Army’s renaissance.

*Where is AFC heading in the next decade, especially with the possibility of budget uncertainty across the Department of Defense?*

The Army senior leaders have committed to what is really the foundation for everything we’re trying to do, and that is the multi-domain operations concept. We’re having serious discussions right now about what future structure looks like. We don’t know exactly what that is yet, but we know we need to fundamentally change the way the Army’s organized and our senior leadership is commit-







ted to doing so.

Between now and 2028, I think budget uncertainty is almost certain. It really comes down to what you've seen from the secretary (of the Army) and chief (of staff of the Army)—and really all the Army senior leaders—to date: an unflinching focus on the modernization priorities.

Over the last couple years, we've gone through what are affectionately called "deep dives" to move resources around to fund those modernization priorities. Eventually, that will permeate across the doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) spectrum. As we implement that new equipment and structure, the new doctrine and leader development will follow and eventually the facilities and everything else.

***How are we changing culture when it comes to bureaucracy, requirements creep, and the stigma of failure?***

When I first took this job, I was told I needed to change the Army's culture. The more I thought about that, the more I disagreed; I think the Army has a very rich culture.

I see it more as the need to build bridges between cultures, rather than change them. Compare tech startups and innovation hubs to the Army: the cultures are two completely different things. So without me coming in as big Army trying to change their culture, and without them expecting me to change mine, how do we build bridges between the two so we can capitalize on what's best from each?

That being said, there is a piece of our culture I do think we need to change: the risk aversion with how we acquire materiel. There is a fear of failure. But out of everything we're working on, inevitably there will be something that won't go exactly right. I don't think it's going to manifest itself as a positive or negative until that point, so the institution's reaction to that "failure" will be key.

Failure is acceptable if we fail ear-

ly enough and cheaply enough. The problem with failures in the past is it took too long and we had way too much money invested before we decided we had failed.

When it comes to requirements creep, specifically for the 31 items the cross-functional teams (CFTs) have in their portfolios, I think a lot of senior leader involvement up front is critical.

We get into trying to build the perfect solution when often the 80 percent solution that we can iterate over time is probably good enough. It's this continued cycle of "make it better, make it better" and you never end up delivering.

The secretary and the chief have approved the overarching requirements for all 31 to ensure they're in line with the Army's priorities. A combination of the CFT directors and program managers then have weekly touch-points with the secretary and the chief, and every one of those discussions involves the requirements and where we are. So there's a good understanding that if we're going to have a requirements change, it has to come back to the Army senior leadership. I think this is a good model that doesn't happen in a lot of places.

In many cases, we're also very much focused on schedule first. The secretary has made very clear that the most important requirement is the ability to grow over time. When you look at our track record, yes, we have some miserable failures in new development. But we are actually pretty good in incrementally upgrading.

Take the Abrams, for example. We're developing its fourth system enhancement package which will allow it to remain the best tank in the world, just as it has been for the last 40 years.

The ability to incrementally upgrade can only go so far until you run out of physics, or as current Army Chief of Staff Gen. James C. McConville likes to say, "until you run out of letters in the alphabet," but that margin for growth in the future is key.

***What is being done to get the right technologies in the hands of our Soldiers at the right time?***

If you go back to the '50s and '60s, government investment in research and development, or more appropriately science and technology—outpaced commercial industry by about three-to-one. Today, most estimations say that ratio has reversed to about six-to-one in favor of commercial versus government investment. We have to tap into that commercial innovation as best as we possibly can, but that's not as easily done as said.

Universities across the country are also part of that picture. As I've gotten out to visit many of them, I've found that just about every university I've been to is standing up some sort of technology transfer tool to facilitate innovation movement out of universities and into industry and the military.

Interaction at every opportunity, and formalizing some of that interaction, is critical. But the one thing I don't want you to take away is that the interaction and interface with traditional defense suppliers is any less important than it's ever been. It's really a combination of maintaining that contact—that knowledge of what's going on in the industrial base—but also reaching out to some non-traditionals through organizations like the Army Applications Lab and the Army Reserve's 75th Innovation Command, both of which directly support AFC.

These types of organizations are really charged with finding non-traditional places for innovation and then figuring out how we get that into the hands of Soldiers. Particularly with the 75th, there is innovation going on all around the country and we also have Army Reserve Soldiers all around the country. So how can we combine those two and define the technologies that are going to be most relevant to us in the future?

The last piece is getting the technology into the hands of Soldiers earlier. Really when it's at the mint



value prototype stage, Soldiers need to be giving feedback on their needs and wants before we go into writing requirements and production.

***Does sustainment need to evolve to better enable maneuver commanders on the multi-domain battlefield?***

I have great respect for our logisticians. We often hamstring them and they always figure out a way to get the job done. That spirit—the can-do attitude, and really the ability to take a less-than-ideal situation and figure out how to make it work—has to remain no matter how the operating environment evolves.

We're going to be operating in smaller and smaller units, and more widely dispersed than we have in the past. How we sustain forward units is going to take a different thought process when we're operating like that.

3-D printing is going to play a role in some of these challenges, and I think we have to do some work to lessen our dependence on fossil fuels. Electrification can really reduce the burden we put on logisticians in terms of what we require.

There's also great opportunity for automation in logistics. Right now, we're working leader-follower concepts where you have a manned lead vehicle and up to seven follower vehicles. These systems may not be as useful on the frontlines, at least not in the near-term, but can be game-changing for line-haul from theater to forward. Small aerial resupply vehicles could potentially play a significant role as well.

***Is sustainment being addressed upfront in the Army's modernization, rather than as an afterthought?***

For all the new systems we're developing, sustainability and reliability are being looked at as part of the requirements process. While that was always the case to some degree, I think we're now putting increased emphasis on the sustainment piece.

On each of the CFTs, there is

a logistician from Army Materiel Command who is part of the process. Those individuals are not only making sure sustainment is addressed, but more importantly, that we're honest in our assessments of how reliable and how sustainable an individual piece of equipment will be.

From a systems standpoint, we have recently started an effort to look at things from a system of systems perspective—so a mission threat, if you will, or mission engineering. Take the next generation combat vehicle: the logistics tail and how we would actually sustain that system is being looked at not just from the vehicle standpoint, but from more of a holistic mission threat perspective.

***How do our allies and partners fit into AFC's operations, and how are we balancing modernization with interoperability?***

You're not going to be interoperable every place, but there are certain areas, such as digital fires, where you want to remain absolutely interoperable. So there's a fair amount of concern from our key allies and partners now that AFC has come to fruition.

I was recently in Australia for conversations with their army. Their fear stems from being much smaller in terms of structure and operating with much smaller budgets. While this actually gives them an advantage of agility in making changes, it's hard for them to keep up when we keep changing our mind. So constant dialogue and being as transparent as we possibly can on where we're taking our investments is the first critical step. We've created recurring meetings throughout the year to talk through interoperability. The ability to have liaison officers will also help; we'll soon have the first two at AFC from the British and Australian armies with full transparency to where we're going. And as the focus with interoperability is often placed on materiel, joint exercises play a large role to strengthen our ability to work with each other.

***Change seems to be the only constant as we head into the future of Army sustainment. What advice do you have for our young Soldiers as we transform to Army 2028?***

My focus is even further out. AFC was stood up to make sure future Soldiers—some of whom are toddlers right now, others are not even born yet—have the organizational structure, doctrine, and tools they need to fight and win on the battlefield. Better yet, we want to have done our job so well that our future Soldiers never have to use these tools because nobody will ever consider taking on the United States in ground combat. That deterrence piece is really what we're focused on.

I recently enlisted a group of young Soldiers, and I wish they had asked me that. I would've told them not to get comfortable with the Army they're enlisting into today because we're going to be in a constant state of change for the next 10 to 15 years.

We have a general idea of where we're heading in terms of organizational structure and multi-domain operations. But we need the room to learn, grow, and experiment because the world is constantly going to change. It's all about the ability to be agile within that process so we can adapt to the world we're in, not the world we'd like it to be.

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# Logistics Important to Shaping the European Theater

■ By Lt. Gen. Stephen M. Twitty

The most challenging day of my 34-year Army career was on April 7, 2003, during the Battle of Baghdad as a part of Operation Iraqi Freedom. In what has come to be known as the "Thunder Run," I served as the Battalion Commander of the 3rd Battalion, 15th Infantry Regiment. As a part of 2nd Brigade of the 3rd Infantry Division, our mission was to seize three key intersections along Highway 8 in order to secure the primary line of communication into the city. Through the course of the day, we pushed forward and secured our three objectives (Larry, Moe, and Curley) but found ourselves black

on almost every class of supply and still in a 360 degree fight. Towards the later part of the afternoon, our need to resupply, particularly ammunition, had become singularly critical.

While that particular fight had significant challenges, logistics allowed those challenges to become opportunities. The capability to deliver the ammunition and classes of supply at the right place at the right time was the result of ruthless training and an aggressive attitude. Fomenting this, the actions of our flexible, adaptable, and courageous Soldiers allowed the team to plan quickly and move to execution on

very short notice. While a tactical fight, Thunder Run underscores an important premise of theater-level logistics strategy planning: we can never lose sight of the vital importance of logistics preparation. Our ability to prepare in such areas as pre-positioning equipment, stockpiling theater supplies, and having a resilient and capable infrastructure are the strategic and operational level tasks that enable tactical success.

Within U.S. European Command (USEUCOM), logistical readiness is a key element of achieving our command priorities: fielding a combat-credible force that constantly improves the warfighting readiness



*An M1 Abrams Tank belonging to the 3rd Battalion, 66th Armored Regiment maneuvers across an 85-Class bridge deployed by Combat Engineers from the 1st Engineer Battalion, 1st Armored Brigade Combat Team, 1st Infantry Division as part of a day of breach training conducted at a range near Camp Trzebień, Poland, May 22, 2019. Training to deploy and cross the bridge is an essential part of the combat readiness mission of the 1st Eng. Bn. during Atlantic Resolve and future operations. (U.S. Army Photo by Sgt. Jeremiah Woods)*





Army Prepositioned Stocks, which consist of equipment for an Armored Brigade Combat Team as well as enablers, are vital to expanding USEUCOM's ability to rapidly move forces and enable a credible deterrent posture.

of our Joint Force, strengthening the solidarity and unity with our Allies and Partners, and fostering a highly-motivated team of patriots. Shaping the European theater extends well beyond USEUCOM and our components. Our efforts, alongside our NATO allies and partners, are central to developing a logistics architecture that enables execution of a full range of military options in order to deter and, if necessary, defeat any potential adversaries. Flexible, agile, and resilient logistics serve as the cornerstone for generating and sustaining readiness and lethality in a dynamic environment. To do this, USEUCOM, in conjunction with our allies and partners, is focused on three key logistics areas: setting the theater, improving rapid movement across Europe to sustain operations and increasing interoperability across U.S. joint forces, allies and partner militaries.

### Setting the Theater

Our preeminence in building combat power for use in military operations is unmatched throughout the world. This advantage and our nation's ability to project combat power depend on several factors including our ability to maintain assured, secure access to the theater, host nation logistical capacity, the movement and stockpiling of supply, and a robust, reliable distribution network. All of these factors are paramount to success. This success demands that we continue to be able to quickly receive, stage, and project multiple combat brigades and enabler units through multiple ports and forward to point of need.

To posture for this potential scenario and to deter further aggression in Europe, USEUCOM is executing a logistics strategy that assures access and freedom of movement, improves logistics infrastructure posture, leverages commercial capacity in Europe and most importantly, improves vertical and horizontal synchronization with the Joint Logistics Enterprise. In line with the National Defense

Strategy and critical to this effort, we continue to work with NATO, Supreme Headquarters Allied Powers Europe, partner and host nations, and the European Union (EU) to maximize the entire Theater Distribution Network.

As an example of our collective efforts, in October 2018, USEUCOM and French military forces successfully conducted a proof of principle, demonstrating a large-scale strategic deployment in the port of Radcatel, France, marking the end of a 50-year gap in exercising bilateral military port operations in France. The exercise demonstrated the capability to conduct large scale joint reception, staging, onward movement, and integration (JRSOI) of equipment and cargo into the theater, thereby expanding the range of options for U.S. forces. In addition to identifying several opportunities for future improvements, the exercise strengthened our relationship with a critical ally.

Another critical aspect of setting the theater is to decrease our response times by leveraging unit equipment sets that provide surge forces the ability to rapidly respond in the event of a crisis. Army Prepositioned Stocks (APS), which consist of equipment for an Armored Brigade Combat Team (ABCT) as well as enablers, are vital to expanding USEUCOM's ability to rapidly move forces and enable a credible deterrent posture. Primarily resourced through the European Deterrence Initiative (EDI), the capability of our APS provides the very definition of scalability in terms of having a force posture that meets the challenges of a dynamic security environment. APS significantly reduces requirements for strategic lift assets when responding to a European crisis. Augmenting U.S. efforts, NATO recently announced \$260 million dollars in funding to build a storage site in Podwicz, Poland for U.S. pre-positioned military equipment.

Rotational ABCTs are a significant portion of our rotational force and are



comprised of approximately 3,500 troops and 3,000 pieces of equipment, projected from the continental U.S. in support of their nine-month mission to conduct bilateral, joint, and multi-national training events across Europe. An ABCT deployment equates to approximately four cargo vessels of equipment arriving through multiple European ports with subsequent onward movement by military convoy, commercial rail, line haul, and barges to different countries across Europe. To deploy and place one ABCT in Europe, it takes roughly seven different organizations from U.S. Transportation Command (USTRANSCOM) and U.S. Army Europe partnering with host-nation military and local governments to plan, prepare, and execute movement of equipment and personnel into final tactical assembly areas. We have made significant progress with maturing our APS and improving force-flow timelines, which reduces the possibility of adversary miscalculation and further strengthens our NATO Alliance.

### Importance of Rapid Movement to Sustain Forces

The ability to rapidly move and sustain forces where they can be most effective is another key component of deterrence. Within Europe, virtually any movement of U.S. or allied forces requires crossing multiple borders of sovereign nations. Border crossings require customs processes, diplomatic clearances, route approvals, timing, and escorts, which vary widely amongst European nations. Detailed planning mitigates the potential for delays, disruption, higher costs, or increased vulnerability for fighting forces. To further mitigate risk, USEUCOM is working with NATO and the EU to standardize and simplify administrative procedures to reduce lead times and if needed, expedite movement of military assets across Europe.

Mutually beneficial solutions to these issues are essential to improving the speed of assembly and reducing

the military resources needed to maneuver through complex administrative and customs requirements. The ability to move and sustain substantial surge forces rapidly to the point of need greatly enhances USEUCOM and NATO's deterrence posture and our defense against multi-domain threats. When a potential adversary realizes they cannot achieve objectives before U.S. and NATO surge forces are mobilized and postured, it is probable to alter their decision, change their calculus, and limit the potential for miscalculation.

### Increasing Interoperability

Interoperability is the bedrock for effective allied operations in the European theater. Allies and partners that can quickly mass into an effective combat force, enhances our deterrence and, if necessary, the ability to quickly defeat an adversary. USEUCOM, NATO, and EU organizations work together to integrate logistics command and control and align infrastructure improvements to provide multi-national solutions for logistics support to steady-state and potential crisis operations.

Alignment of infrastructure improvements across USEUCOM and NATO simplifies troop and equipment mobility across European borders. During recent exercises, transnational support were validated using methods such as acquisition and cross-servicing agreements and host-nation support agreements. While these agreements will provide increased agility and redundancy, the requirements must be planned in advance, synchronized across NATO, and integrated with movement and maneuver requirements. EDI investments in resilient JR-SOI have yielded infrastructure improvements as well as the APS and European Contingency Air Operation Sets. USEUCOM coordinates with USTRANSCOM in the Joint Deployment and Distribution Enterprise to find integrated solutions and facilitate strategic movement and maneuver through our military

and commercial partners. The EU is also addressing logistics through its Permanent Structured Cooperation project focused on military mobility and partnering with NATO to better facilitate the movement of troops and equipment across European borders.

### Way Forward

The threats facing U.S. interests in the USEUCOM area of responsibility are real and growing. They are complex, trans-regional, multi-domain, and multi-functional. They require the United States, together with our European allies and partners, to constantly adapt with forces and concepts that are able to outpace the evolution of these threats. To meet these threats and deter further aggression, we must collectively remain committed to the critical path of improving our readiness and force posture in Europe. Most importantly, the peace and stability in Europe is fundamentally based on our strong relationships with our indispensable European allies and partners. With continued focus on setting the theater, increasing mobility and improving interoperability with our Allies and Partners, I am confident the U.S. logistic posture in Europe will remain resilient and possess the agility to support full spectrum military operations.

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Lt. Gen. Stephen M. Twitty is Deputy Commander, United States European Command, Stuttgart, Germany. U.S. European Command prepares ready forces, ensures strategic access, deters conflict, enables the NATO Alliance, strengthens partnerships, and counters transnational threats in order to protect and defend the U.S.

# TOTAL ARMY

A portrait of Lt. Gen. Daniel Hokanson, a middle-aged man with short, graying hair and blue eyes. He is wearing a camouflage military uniform with a tactical vest. On his left chest, there is a patch with three stars, indicating his rank as Lieutenant General. The background is slightly blurred, showing other people in military uniforms and a structure with vertical slats.

AN INTERVIEW WITH  
LT. GEN. DANIEL HOKANSON



# EFFORT

■ By Arpi Dilanian and Matthew Howard

Throughout his 33-year career, Director of the Army National Guard Lt. Gen. Daniel Hokanson has been making a difference across the Total Army. A graduate of the United States Military Academy at West Point, Hokanson served as an Army aviator on active duty for nearly a decade before joining the Oregon National Guard. Most recently, he served as the 11th Vice Chief of the National Guard Bureau; Deputy Commander, U.S. Northern Com-

mand; and the Adjutant General of Oregon. Here, he discusses the Guard's support to mission success.

*What role does the National Guard play in sustaining readiness for the future fight?*

Our total force structure in the Army National Guard is 335,500 Soldiers, and we have a good balance between our combat, combat support, and combat service support capabilities. When we look specifi-

cally at sustainment, three-quarters of the Total Army's capabilities are in the reserve component. In terms of sustainment formations within the National Guard, we have a theater sustainment command, two expeditionary sustainment commands, 10 sustainment brigades, and more than 100 supporting battalions. That equates to about 40,000 Soldiers who conduct sustainment operations during drill, at annual training (AT), or while deployed.

As leaders decide on modernization and fielding schedules, our involvement makes the process transparent and gives us a chance to advocate where we should be in the process to ensure we remain relevant.

Readiness is the No. 1 priority. When I look at our sustainers, I'm focused on making sure they're a relevant part of the Total Army. To be relevant, there are three principles we talk about.

First: deployability. Our Soldiers and their equipment need to be ready and capable to deploy whenever the Army needs us.

Second: sustainability. We know the Army is going to modernize, but as it does, we have to make sure we can still maintain and get repair parts for our equipment so it is operational and can perform its assigned missions.

Both of those go into the third principle: interoperability. In modernizing, we can't buy everything we need at one time; it will be fielded over time. As new equipment is fielded, we need to keep everything interoperable so we can communicate and work together to accomplish the mission. Not only is this important between our three components, it's also critical for our allies and partners.

An amazing thing about the National Guard is the civilian experience our Soldiers bring with them. In 2009, when I was an infantry brigade combat team commander, our mission set was to escort convoys across two-thirds of Iraq. When we arrived in theater, we looked closely at the convoy routes as we used them. One of our operations sergeants major at the time was Ed Carlson, who worked for Federal Express. One day I asked Ed how would FedEx do it and he responded, "We wouldn't do it like this."

Ed knew other Soldiers across the brigade who worked for other delivery or trucking companies, so we put a team together. They took six MRAPS and drove the numerous convoy routes around Iraq for three weeks. When they came back, Ed and his team had a plan. Sure, there were some things FedEx did that could never happen in Iraq; but because he was in the Guard and worked for FedEx, he was able to see a lot of areas where their practices

could be applied.

We had the opportunity to brief the plan to Gen. Raymond Odierno, commander of forces in Iraq at the time. After, listening to the entire proposal, he said, "make it happen."

With a series of relatively minor changes, Ed streamlined routes and optimized how often we did convoys. The end result was reduced time on the road, which ultimately saved lives and property. He was able to leverage his civilian experience, and his plan made a difference.

***Can you expand on modernization, and how the Guard ties into Army Futures Command (AFC)?***

As we look to 2028 and beyond, we realize the Army can't afford to modernize everybody at the same time, nor can industry produce it fast enough. Our senior leaders have said we're going to modernize the units most likely to be in contact first, and I am in full agreement. Unfortunately, we can't always pick who is going to be in contact first.

As Army Chief of Staff Gen. James McConville has said, it's critical we modernize the total Army, not exclusively the active component before the reserve component. Especially with our role in sustainment, we must be relevant—and again, that means our units need to remain deployable, sustainable, and interoperable throughout the modernization process.

We also have several ARNG Soldiers at AFC, and that number may grow over time because we see such value there. As leaders decide on modernization and fielding schedules, our involvement makes the process transparent and gives us a chance to advocate where we should be in the process to ensure we remain relevant. They are great conversations and we're doing everything we can to leverage our resources to modernize as part of the Total Army.

***How is training evolving to ensure the Total Army is integrated to***



***meet short-notice or unpredictable requirements?***

The National Guard now has four combat training center (CTC) rotations every year. Throughout those four weeks, our Soldiers are conducting sustainment operations every day under combat conditions. For our battalions and below, this is the best training experience they can get.

For us to be successful at the National Training Center (NTC) or Joint Readiness Training Center, we need to leverage our drill periods and annual training. The learning curve is incredibly steep at the CTCs, so we need to work with our leaders to give our Soldiers every opportunity to get those repetitions, do those sets, and practice. Anything and everything we can do on a regular drill weekend to give them a running start makes a huge difference.

At the tactical level, the 30th Armored Brigade Combat Team out of North Carolina finished an NTC rotation in mid-July. From the time they came out, they had 35 days to get their equipment fully mission capable so it could go to port for deployment, which was almost unprecedented. Our folks rolled off NTC's battlefield and utilized the California National Guard's Maneuver Area Training Equipment Site to make repairs as quickly and efficiently as possible to meet that timeline.

It was a huge effort when you look at the number of vehicles, but what an experience! Our Soldiers trained and conducted a successful CTC rotation, repaired their equipment in a very short time, and then deployed—truly incredible work between the North Carolina National Guard, the many states that supported them, Forces Command, First Army, Army Materiel Command, and the Army G-4.

At the strategic level—the echelons above brigade—the focus is on the National Defense Strategy, great power competition, and large-scale combat operations. Through exercises like Army Materiel Command's Pa-

triot Press, we're helping redistribute ammunition throughout the United States. Exercises like this provide our Soldiers and their units a chance to do the things they'll be asked to do in a future conflict.

***Can you discuss the State Partnership Program (SPP)?***

This is an incredible program that links a state's National Guard with the armed forces of another country to support defense security goals, to leverage relationships, and to facilitate broader cooperation. The program has been building readiness for 25 years, and we now have more than 75 of these partnerships across the globe.

An example of a recent SPP event is Operation Hydrocarbon that took place in Niger. The Indiana National Guard trained with Nigerien forces and shared best practices in fuel distribution, maintenance, management, and safety. Not only did it give our Soldiers a chance to share their knowledge and experience, they also learned from their partners as we operated in their unique environment. In the end, we learn from each other, and we both become better as we build enduring partnerships.

***What are you doing to help the Guard's citizen-warriors balance civilian employment with their service?***

Without our people, we couldn't do anything. Recruiting new Soldiers to be part of our formations is fundamental to our success, but retaining those already serving is also critical. In the reserve component—and this is both the National Guard and the Army Reserve—we face a triad: helping our Soldiers balance their civilian career, military career, and family. We never want them to have to choose between them.

We work very closely with our leaders at all levels on this. Whether it's a change in family situation, employment, or a CTC rotation plan, we try to be cognizant and help our Soldiers

through those times so we can retain their experience and capabilities.

A lot of our Soldiers came into the Army National Guard to serve their country and they want to deploy. One of the most important things we can do is give them predictability, so they can prepare their families and work with their employers so everyone knows when they will be away from home and when they will return.

***What is the most important thing you tell Soldiers today?***

Every Soldier is important to the Army! Whether Active, Guard, or Reserve, our Army is the force it is because of you. We need you to stay on the Army team and to help us recruit the next generation of Army leaders. If you decide to leave the active component, please contact an Army National Guard unit wherever you end up. We'd love to give you the opportunity to stay on the Total Army team and to continue to serve our great nation!





*Command Sgt. Maj. Timothy Guden, U.S. Army Training and Doctrine Command, addresses Soldiers after an early morning command run at TRADOC headquarters, Fort Eustis, Va., on April 17, 2016. The quarterly run develops esprit de corps and provides the opportunity for command leadership to provide updates on command-wide issues. (Photo by TRADOC Public Affairs)*





# KEEP IT SIMPLE:

## An Interview with Command Sgt. Maj. Timothy Guden

■ By Arpi Dilanian and Matthew Howard

As the senior enlisted leader of Training and Doctrine Command (TRADOC), Command Sgt. Maj. Timothy Guden is at the forefront of preparing our future force. In between six combat tours, Guden previously served as command sergeant major of the United States Military Academy at West Point, the Maneuver Center

of Excellence, and the United States Army Infantry School. Here are his thoughts on the Army of 2028, and the role sustainers will play.

*How do our non-commissioned officers—the backbone of the Army—stay relevant as the Army modernizes?*

As someone who's been in the Army for a while, it can be difficult to imagine. But if I put myself in the shoes of a new Soldier who is immersed in this modernization and technology all the time, I don't think it's that hard.

Words matter; we need to stay away from the mentality of "back in the day when I grew up, it was like



Things are changing, but it's important to make sure you don't lose focus on the fundamentals. To a cadet or new lieutenant, that may not sink in initially. But right away—and we say this all the time—talk to your NCOs and trust them. Most of the time, they're going to be the ones who help you set priorities and keep you grounded in those fundamentals.

this.” That may have a small impact or bearing on modernizing, but it’s not going to be exactly the same. A lot of things are going to be different.

Our new Soldiers must understand the importance of their positions and their roles as enlisted leaders. Regardless of all the technology or the pace at which it comes along, when they become an NCO, they must take ownership and accountability of it. If it’s the bread and butter of their career management field (CMF) or military occupational specialty, they are the subject matter experts, and it’s incumbent upon them to share that knowledge with their Soldiers as primary trainers.

With modernization, it can be easy to separate yourself from that line of thinking. Whether that bread and butter has changed radically after 10 years or is still the current model that’s there today, it’s absolutely critical to keep our NCOs focused on their primary roles as a trainers of modernization.

***How is TRADOC staying nested with Army Futures Command (AFC)?***

To not be nested would be a disservice to our Army and every intent of AFC. As they look out to the Army of 2028 and 2035, they’re coming up with what our future formations should look like: how our squads are structured, what equipment our Soldiers and formations will be outfitted with, and the like. At a certain point in that cycle, TRADOC has to develop the doctrine and programs of instruction, and ultimately introduce it into our training courses. So it’s extremely important that TRADOC and AFC stay nested.

As it is, some TRADOC entities slid over and became part of AFC, such as the capability development integration directorates (CDIDs) at the centers of excellence (COE) level. The CDIDs work on capabilities and requirements and integrate directly with the TRADOC capability managers (TCMs). They are

both tied in with the cross-functional teams that are associated with the Army’s six modernization priorities, such as Soldier lethality. By having that connection, we’re able to start introducing and familiarizing Soldiers with those future developments earlier in training.

***Can you discuss progress on the synthetic training environment, and how it will enable our Soldiers in the future?***

You could argue we’ve been dabbling in the synthetic training environment for a long time. Going way back, we had the old weaponeer for marksmanship training. They would bring it to your location and give you on-the-spot practice for your four fundamentals without shooting real bullets. Even five to 10 years ago, we had the stationary disks for the dismounted Soldier training system that connected Soldiers for a situational training exercise where they’d essentially march in place in their full kits and visualize squad movement virtually. Now, we’re at the point where you sit in a chair, you’ve got a screen in front of you, and you go through all of that training either individually or with a squad.

We’ve come a long way. Whether it’s leader or individual Soldier decision making, or it’s actual tactical action like pulling a trigger or acquiring a target, it’s all about being able to get as many repetitions as you can. The synthetic training environment affords the ability to constantly change scenarios; nothing is ever the same. Each action or decision takes you down a different trail. Historically, you only had that opportunity when you took all your equipment and went to a combat training center.

Some tasks we just haven’t been able to do over the past 15 years because of throughput and operational tempo. I remember getting a bandolier of ammo strapped to me, marching out to a firing position, sitting there with my NCO, and plugging away at 200 meter targets at the



range. While that can still happen, you can now do the same thing without going to the range and shooting the bullets and still get to the same level of proficiency.

That being said, it's important to note that even though synthetic training is the future, it should never be mistaken as a complete replacement for getting out on the ground. To say that an infantry squad doesn't actually have to get out and perform the actions required in the last 100 yards is not the right mindset. They still have to get out and do those things. But the more reps they can do to supplement those limited opportunities in live training, the better off they're going to be.

### ***How has sustainment evolved throughout your career?***

Early on, I really didn't have any idea about the way the sustainment system worked. The supply room was largely the basis for my interpretation of logistics working well. Our NCOs and S4s at the battalion and brigade level were always on top of things when it came to supporting the warfighter.

But over the last 10 or 15 years of counterinsurgency (COIN) operations, I think we got away from that reliability on a good logistics system. Whether it was a big forward operating base or a small joint security station, the mentality was if you could get your hands on it, you took as much as you could: I need as many tires as I can get because I don't want to run out. It was easy to stockpile.

Very routinely, I'd go into those places and see supplies that were probably accumulated three or four rotations prior. Why were we continuing to stockpile them? Obviously the need wasn't critical because they were still there collecting dust.

As we shift to multi-domain, large-scale combat operations, we're really putting the proper focus back on what it means to be logistically supplied, correctly. Especially with advanced individual training and all

the instruction we do within the Sustainment COE and Combined Arms Support Command at Fort Lee, we're moving in the right direction.

### ***What's on Soldiers' minds in terms of future sustainment needs?***

Soldier lethality. How can we maximize Soldier, team, and squad lethality for their warfighting mission while staying supplied properly? A lot of that has to do with the way we are modernizing and designing our future force, and I think it's important to keep it as simple as possible.

You can't just take a whole bunch of stuff with you, whether you may need it or not. Soldiers can't become the holiday tree where we continue to strap things on them—pretty soon they feel like pack mules. On the frontline, that's not necessarily the right idea for those last 100 yards when we're trying to close with and destroy the enemy.

We also can't talk out of both sides of our mouths. If we say we're going to lighten the load and make them more lethal, flexible, and energetic, then at the same time we have to be able to give them confidence in what we supply them. If it goes bad or runs out—whatever the case is—they can turn around to exchange or resupply. It's right there so there's no gap or stoppage in moving on with the mission.

Again, that was a little hard to actually experience during COIN operations because of the availability of supplies. But with the uncertain character of any future conflict, establishing that faith and trust in the sustainment system early in training is a necessity. We have to get in the reps of working through those resupply actions so it becomes second nature.

It's all about ensuring the ability to maintain a steady, on-time logistics program that builds confidence in the supported Soldier.

### ***What is the most important thing young Soldiers should know as they***

### ***enter a dynamic, evolving Army?***

Things are changing, but it's important to make sure you don't lose focus on the fundamentals. To a cadet or new lieutenant, that may not sink in initially. But right away—and we say this all the time—talk to your NCOs and trust them. Most of the time, they're going to be the ones who help you set priorities and keep you grounded in those fundamentals.

With the speed at which we're modernizing, it's hard to keep up. Just take the cell phone: it seems like every few months a new iPhone model is released, and each one is significantly different from the last. You're just not going to be able to stay up front with every bit of modernization and new technology.

You have to be a little cautious in not consuming too much at once; how much are you actually going to be able to do effectively? You can't touch everything. You can't do everything.

Doctrinally speaking in terms of numbers, you can really only effectively control three to five things. That's why we set our organizations up that way: there's four squads in a platoon, three to four platoons in a company, and so on. As a leader, it comes down to priorities.

Figure out the things you can actually control, and focus on getting those right. Don't try to become a steward of strategic things; be a steward of the things you can effectively execute and do those fundamentals well.



*25th Combat Aviation Brigade Soldiers prepare to push out the aerial delivery using the free drop technique in support of four companies of the 2nd Battalion, 27th Infantry Regiment, 3rd Brigade Combat Team during Operation Lightning Strike field exercise. Each free drop supplied 2-27INF, 3IBCT Soldiers with 390lbs of meals and ammunition; approximately one day worth from four UH-60 Black Hawk helicopters to two locations simultaneously.*





# The Road to Predictive Logistics: Perspectives from the 8th Theater Sustainment Command

*Achieving predictive logistics requires five tenets to posture the U.S. for success: access, pre-set agreements, dynamic forward posturing, agile sustainment, leveraging technology.*

■ By Maj. Gen. Charles R. Hamilton and Lt. Col. Edward K. Woo

Former President and Army Gen. Dwight D. Eisenhower once observed, "You will not find it difficult to prove that battles, campaigns, and even wars have been won or lost primarily because of logistics." Stated during World

War II, Eisenhower's message is archaically imperative for the battlefield of tomorrow, with evolving logistic designs to sustain drones, vertical lift, robotics, and virtual reality. This is principally true in the Indo-Pacific area of responsibility

consisting of half the globe. Under a future complex battlefield in a Large-Scale Combat Operation (LSCO), questions arise to optimize readiness. What can we do now to prepare the LSCO battlefield for tomorrow? How do we accomplish

this with the strategic support area on the other side of the world in the Indo-Pacific (INDOPACOM) Area of Responsibility (AOR)? The 8th Theater Sustainment Command (TSC) engaged in deliberate and candid discussions of the future of theater sustainment both internally and with external partners at echelon. Particularly in the Indo-Pacific Theater challenged by its tyranny of distance, one phrase that dominated the discussion was "predictive logistics." Although not a doctrinal term, predictive logistics can be loosely defined as forecasting sustainment gaps and the ability to stage materiel in locations and quantity to anticipate and decisively respond to warfighters needs; it involves real-time consumption trends and locations of multi-modal assets and infrastructure to enable logistics forecasting. The next logical questions are: if predictive logistics is the whole of the equation, what are its parts? What does the road look like to predictive logistics? As fighting and winning our nation's wars is the end and predictive logistics is a way, then the means to achieve this objective entails five tenets explored at 8th TSC that can better posture the U.S. for successful deterrence. They are access, pre-set agreements, agile sustainment, dynamic forward posturing, and leveraging technology. These five areas are not designed to capture the totality of tasks, but their nuances cannot be ignored when solving sustainment deficit forecasting.

## Access

First, partnerships or theater security cooperation are unrivaled strategic advantages critical to theater posture. The theater is laden with strategic opportunities such as training a ready, combat credible force and building a network of partner nations with the additional goal of strengthening alliances and partnerships. Deepening ties with host nations and collaborating with combined partners provides theater logistics assurance to win in a complex environment.

Prevalent to the theater, logistician

is maintaining regional engagements in order to present competitors with multiple dilemmas and to strengthen capacity for deterrence. For several generations, the U.S. leveraged access to the Indo-Pacific region with in-depth relationships with other countries by contributing to multilateral exercises. However, as important as the existing relationships are, the U.S. will benefit from more than what currently exists. Maintaining additional access through fostering international relationship is important national security work and is primarily done through diplomatic channels. The TSC finds itself in a unique position as an instrument to open a subtle door of humanitarian assistance and disaster relief coupled with U.S. Defense security cooperation activities. In this vein, sustainers deepen their relationships through natural disaster relief efforts, disaster management exchanges, rotational forces and combined training exercises by testing reception, staging, onward movement (RSOI) and force projection capabilities. These inter-relationships invoke acceleration of combined rapid contingency response and contribute to the potential of more access in the region.

## Pre-Set Agreements

Second, if U.S. diplomacy efforts allow for country access, the agreements leveraged in support of other operations such as the aforementioned disaster relief can provide growth opportunities. Throughout multiple deployments, theater sustainment planners have seen firsthand how the lack of pre-positioned supplies is a disadvantage. Pre-set agreements, in the form of operational contracts, enhanced defense cooperation agreements, or foreign military sales, are ways to rotate and maintain critical materiel, medical and installation platforms. Pre-set agreements open the door to infrastructure investments, such as the establishment of seaports, airports, roads, rail, and basing. Despite the U.S. military's advantages relative to any potential military ad-

versary, the U.S. military's strategic lift capability may be constrained based on massive requirements. Increased investment in these pre-set agreements now will help to meet future needs better as future adversaries' capabilities improve over time.

## Dynamic Forward Positioning

Another tenet involved in this situation is dynamic forward posturing, where power projection provides logistic support to joint and combined forces and will initially rely on immediately available operating stocks and pre-positioned war reserve stocks. Specific to the Indo-Pacific region, the distance between the U.S. and the region, or from the strategic support area to the joint security area, creates sustainment challenges. Imagine an LSCO in its 30th day, with U.S. military members unable to continue the fight because they have used up their fuel, munitions, and subsistence resources and the replacements are still many hours or days away. Warfighting resources stored in smaller, more "forward," configurations realize the potential to improve readiness. General Gustave Perna, Commander of U.S. Army Materiel Command stated in his Army Sustainment article in 2017 "Providing Materiel Readiness in a Joint Battlefield" that "force projection... entails Army pre-positioned stocks that are configured to strengthen national defense and build capacity."

Commodity readiness is only effective when it is well placed. The tyranny of distance is a dominant factor from the strategic support area to the Indo-Pacific theater, across 5,000 miles from the factory to foxhole and 5,000 miles retracted from foxhole to factory. Establishing footprints is the incentive for theater planners to broadcast deterrence abilities in the future LSCO fight.

Furthermore, in line with the Army Posture Statement 2019, army pre-positioned stock (APS) should be configured for combat and placed in other countries through security co-



operation efforts to ensure the right capability is at the right location. Today, the U.S. Army has multiple locations in the continental U.S., overseas, and afloat where equipment and materiel have been pre-positioned for future use, ideally reducing response times. Recently, Army Chief of Staff, Gen. James C. McConville, opined that pre-positioned stocks were "absolutely critical" to readiness. His statement highlights just how critical these pre-positioned supplies and forward posturing are to the military's readiness and effectiveness.

### Agile Sustainment

The sustainment tenet that binds all others is the integration of agile sustainment to ultimately provide freedom of maneuver to the joint force during contingencies. Agile sustainment includes nesting all the precepts of theater sustainment and commodity management. It encompasses munitions, fuel, strategic lift, contingency contracting, medical, human resources, engineering, and materiel readiness. Theater sustainment planners identify requirements, critical items, and services needed, force structure planning, time-phased force, and deployment data development, and joint reception, staging, onward movement, and integration requirements to meet demand from theater entry and operations, to redeployment and retrograde. Agile sustainment is the cornerstone presupposition thought process to a successful joint crucible harbored with the National Defense Strategy. The U.S. generates efficiencies by coordinating and integrating service, agency, and other capabilities to meet the theater commander's requirements.

### Leveraging Technology

Finally, across the joint force, patterns of emerging technology have materialized. Agencies involved in accelerating innovation include Army Futures Command, Defense Advanced Research Projects Agency, Army Sustainment Command and INDOPACOM logistics common

operating picture (LOGCOP) analysts, where programs such as Rapid Fabrication via Additive Manufacturing, unmanned aircraft systems Battle Damage Assessment Diagnostics, Unmanned Logistics Delivery Systems, tactical data systems management and technology for casualty evacuation response are at the cutting edge. One particular initiative of interest is a LOGCOP, one with real-time sustainment and supply chain system situational awareness, utilizing AI to predict from enterprise to tactical formations. Theater sustainers have a tremendous amount of equipment and people to move – from Emergency Deployment Readiness Exercises to RSOI to APS draw to railhead, convoys, and strategic air and vessel movements. The 8th TSC is at the cutting edge, where it works directly with enterprise, collaborating and focusing efforts on the capability to anticipate increments and decrements to warfighter readiness (fuel, ammo, medical, and maintenance) as well as where those supplies are needed. The ultimate goal is for the Strategic Support Area's leadership to see the same LOGCOP as the theater sustainment command, so that we can optimize acceleration of communication that is accurate in time and space. With all stakeholders capturing the same sight picture across echelons and in any global security environment, the efficiency and effectiveness of implemented systems will be measured by lives saved on the battlefield.

The U.S. National Defense Strategy calls for resilient and agile logistics. Therefore, the U.S. military must collectively move towards the offered "predictive logistics" coherence, one where a joint and whole-of-government effort are applied. With access to and agreements with countries, theater sustainment planners can depend on forward postured assets towards predictive logistics, where distribution and resupply missions are better synchronized with planned resupplies versus unplanned resupplies. Coupled with the advantages of an agile sustainment approach and

increased awareness through technological LOGCOPs, the road to predictive logistics is a driving force to improve responsiveness to warfighters' needs. Our forces, while applying the five subjects in a recursive thought process, will help sustain the advantage over competitors.

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# Winning

## *THE FUTURE*

# Sustainment Fight

■ By Lt. Col. Paul Bonano, Maj. Casey Seckendorf, and Command Sgt. Maj. Ruth Drewitt

Over the past decade, the focus of Army operations and training readiness has made a clear shift from fighting counterinsurgency to focusing on winning in a decisive action environment. Threats from the growing desire of major regional powers and adversaries to deny U.S. freedom of action and influence in critical areas of the world have forced the Army to adapt and prepare to win against a near peer, highly lethal force. In 2017, doctrine solidified this shift publishing Field Manual (FM) 3-0 Operations, to address the challenges of fighting a near-peer threat and prevailing during large-

scale combat operations (LSCO). The sustainment community's ability to adapt our priorities and training focus to win in this highly contested, lethal environment is critical to defeating our nation's enemies.

More than six years ago, the Army adopted the decisive action training environment for use at combat training centers. Since then, our sustainment formations, both brigade support battalions (BSBs) and combat sustainment support battalions (CSSBs), have made substantial progress operating in this highly contested, dynamic, and lethal environment. But there is still work to be

done. Leaders in our sustainment formations must first understand what it takes to fight and win in LSCO and then must reprioritize their training plans to tackle this enormous task. So, in the spirit of winning, here are the top four areas recommended for BSB commanders to focus their training plans to master the fundamentals for their crucible event at the Joint Readiness Training Center (JRTC) in preparation for the next fight.

### **Mission Command**

One of the greatest challenges observed at JRTC is the BSB commander's ability to effectively



Staff from 1st Brigade Combat Team, 82nd Airborne Division, take part in a combined arms rehearsal during decisive action rotation 19-08.5 at Fort Polk, Louisiana, July 24, 2019. The rotation serves to enhance the deployment readiness of 1BCT and supporting units in preparation for the assumption of responsibility as the Army component of the Global Response Force in the fall of this year. (U.S. Army photo by Sgt. Michelle U. Blesam)





The sustainment community's ability to adapt our priorities and training focus to win in this highly contested, lethal environment is critical to defeating our nation's enemies.

command the brigade's sustainment formations and maintain a visualization and understanding of the current fight. A lack of training on and experience with mission command systems (MCS) is often the culprit. But, of course, it is pointless to discuss BSB mission command challenges without first discussing the command relationship between the BSB and forward support companies (FSCs), so let's start there.

There is no 'correct' answer here. On one hand, it is true that dissolving the attached relationship between the FSCs and their maneuver battalions gives the BSB commander the ability to mass sustainment effects at a place and time to achieve the brigade commander's intent. We also know that aligning all sustainment assets under the command and control of a single commander increases the speed at which the desired sustainment effects can be achieved. But what it also does is increase the communication between the FSC commanders and the BSB commander on the battlefield, which ultimately increases the speed of situational awareness, shrinks the BSB commander's decision cycle, and most importantly, increases sustainment responsiveness.

During exercises at the JRTC, FSC commanders struggle on their own with how to task organize their formations between the brigade support area (BSA), the field trains command post (FTCP), and the combat trains command post (CTCP). A wrong move here and sustainment is easily de-synchronized at all echelons. With BSB commander direct oversight, FSCs are getting it right more often.

On the other hand, BSB commanders don't have to own the FSCs to influence them. Yes, relationships matter, and BSB commanders with their staffs must set the conditions early to build those relationships and increase mutual trust. Effective units, regardless of the sustainment command relationships, must train together, manage talent across the BCTs sustainment formations, and

inculcate sustainment tactical standard operating procedures. BSB commanders must make building these relationships a priority in their training plans to achieve success.

Now, returning to command and control systems, units and leaders remain challenged with the effective use of logistics information systems (LIS) and (MCS). BSB signal officers and Soldiers have struggled to maintain the battalion's upper tactical internet (TI) systems. There is a clear gap in training proficiency and BSBs tend to fall lower on the brigade priority list for support to their upper TI systems. Brigade combat teams (BCT) routinely rely on voice chat rooms to pass information across the brigade network during combat operations, and when the BSB is unable to maintain their mission command systems, it predictably leaves them with a gap in situational understanding. Some brigades have mitigated this by maintaining their joint battle command-platform (JBC-P) as an alternate (and redundant) means of communicating, but that remains the exception. Signal officers, non-commissioned officers, and Soldiers in BSBs require additional training and opportunities to operate their TI systems.

Finally, BSB battalion XO's and S3s have a tendency to become myopic on the battle array of BSB internal units and fail to adequately battle track the rest of the brigade during both offensive and defensive operations. This leaves a gap in the units' situational awareness of the BCT fight and significantly increases response time to react to emerging requirements, such as a CL V emergency resupply, or providing a timely response to a request for a mass casualty evacuation to a higher level of care. Battalion operations officers, along with their battle captains and NCOs, must be trained and ready to ensure the BSB TOC is capable of maintaining brigade-wide situational awareness to ensure success. Operations officers often fail to realize it is their job to consistently communicate with their



higher headquarters to pull information from the BCT S3 to enable the BSB commander to see the fight and identify the sustainment challenges. This backs the BSB into reaction mode and eliminates their ability to anticipate emerging maneuver battalion requirements in both the offense and defense.

### Creating Shared Understanding

Understanding the evolving needs of the BCT in the current and next fight requires a thorough understanding and visibility of the BCT's current sustainment posture. There are three important tools that can help anticipate needs and remain responsive: Logistics status reports (LOGSTATs), logistics synchronization meetings (LOGSYNC), and the logistics common operating picture (LOGCOP). These three pillars work in concert to provide commanders and staffs at all levels in the BCT a shared understanding of their sustainment posture and can ultimately drive critical decision points. Yet units routinely struggle to either understand or maintain one or more of these critical pillars.

### LOGSTAT

A good logistician can reasonably forecast the needs of supported units over a short duration. However, a number of operational variables makes it increasingly more difficult over time without supported unit input (such as LOGSTAT). Having a clear, concise, and easy to fill out document greatly increases the probability that the BSB will receive the report from supported units every day. To ensure accuracy, battalion executive officers (XOs) must be involved in validating reports and synchronizing sustainment with the rest of the war-fighting functions (WfFs). A common mistake units make is to come to JRTC with a very robust LOGSTAT report that tracks all the way down to the number of yellow smoke grenades expended in the last 24 hours by each company, only to find out too late that a LOGSTAT

is only as good as the accuracy of the data and frequency of its submission.

When units are restricted to tactical communication systems, it becomes very difficult to get data from across the formation. It is always recommended that BCT S4s and support operations officer (SPO) take an honest look at the LOGSTAT and ask themselves, "What is the minimum amount of information I need in order to be successful?" The best possible LOGSTAT can be scratched out by an infantry platoon leader on an MRE carton and, once compiled, can be sent by the battalion S4 on a single push over FM radio. That may be over-simplifying the problem a bit, but the SPO and the S4 need to realize they have a lot of capable professional sustainers who can be successful with minimal data as long as it is on time and accurate.

### LOGSYNC

Executing an effective LOGSYNC to maintain situational awareness is arguably the single most important imperative to maintaining a synchronized sustainment fight. This daily engagement between the battalions and the BSB SPO is used to validate unit sustainment requirements which drives all resupply operations. Yet there are units who seem to find a multitude of reasons to cancel their LOGSYNC and still others who struggle to get participation due to ineffectiveness. The good news is units who struggle to achieve success here can easily overcome their challenges. Units across the BCT want to feel comfortable that they will not run out of critical commodities at the decisive point in an operation. So a short, targeted LOGSYNC that adds value through predictable sustainment operations and confirms when units will receive their next resupply is extremely desirable to everyone. Here are some tips for success: establish a format that can easily be shared over lower tactical internet mediums such as JBC-P or FM, so units who cannot attend in person or who do not have access to upper tactical in-

ternet systems can participate. Then rehearse it until you get it as succinct and as effective as possible, over FM or JBC-P because, at some point, that will be your only form of communication. Finally, execute this critically important synchronization engagement every day at all costs; without it, units become desynchronized very quickly.

### LOGCOP

Who owns the BCT LOGCOP? Where is it maintained? Can you achieve a shared understanding across the BCT without upper TI? BSBs consistently struggle with maintaining both analog and digital COPs. For digital COPs, the ideal situation is for the brigade and BSB to have a shared sustainment COP that informs both the brigade and BSB commander and enables decision making. The format should be driven by the BSB commander, maintained by the SPO, and shared with all units across the BCT. For analog COPs, the BSB and brigade will most likely have a slightly different version, based both on geographic separation as well as real time access to different information. That's OK, and it can be reconciled as often as needed. Finally, each element of the COP needs to have an owner assigned to collect and update information as necessary and to provide analysis when needed.

### BSA Defense

In the next fight against a near peer threat, BSBs will be required to successfully defend themselves and sustainment assets without the augmentation of a combined arms force. While units at JRTC have achieved varying degrees of success defending the BSA, there remains a common gap in proficiency among all units with regard to the very basic individual level tasks.

Units lack the basic principles of establishing a unit defense while establishing and enforcing priorities of work. Many leaders and Soldiers within sustainment formations have

limited proficiency with crew-served weapons, anti-tank assets, and Air Defense Artillery (ADA) assets. Their experience with emplacement, capabilities, limitations, and shortfalls of each system in establishing BSA security is minimal. Units and leaders are challenged establishing a BSA defense and defending against a Level I threat. Soldier skills and NCO tasks such as building fighting positions to standard, developing range cards and sector sketches, developing and de-conflicting fields of fire, establishing wire obstacles, camouflaging equipment to standard, implementing a sergeant of the guard to enforce discipline and to ensure Soldier's remain vigilant and alert to pull security, and the use of terrain to facilitate a good defense have rarely been observed. Units do not develop work/rest cycles for guards, which leads to fatigue and complacency. This often makes the BSA a "soft target" and disrupts sustainment flow throughout the brigade.

Units consistently demonstrate a lack of proficiency with crew-served weapons. Those Soldiers assigned M2s, M240s and M249s are generally proficient, but the remainder of the formation is clearly untrained. This becomes a significant challenge when Soldiers are wounded, on a rest cycle, or performing their primary MOS functions. Additionally, units fail to train for or plan on defeating an armored or air threat, and most disregard the AT-4 and Stinger equipment allocations issued to the BCT during RSOI operations. Anti-Armor and ADA weapon systems remain largely afterthoughts.

Leaders at all levels lack the basic principles of engagement area (EA) development—which is neither trained nor prioritized. Units fail to understand the benefits of wire obstacles and how to tie them into their defense plan. Wire obstacles rarely evolve to more than a single strand of concertina wire, and few leaders know how to properly emplace triple strand wire obstacles. Units often task the HHC commander to

run a base defense operations center (BDOC) but fail to identify division of responsibility between the BDOC and S3 which causes confusion. Additionally, most HHC commanders and first sergeants lack the experience and knowledge of the key tasks to run a BDOC. While they successfully accomplish the basics (360 degree security and a minimal communications plan), their failure to incorporate EA Development, establish listening posts/observation posts, establish a reconnaissance and surveillance plan, or establish a communications plan between individual fighting positions, entry control points, sergeants of the guard, BDOC, and battalion TOC, leads to BSA defense failure against Geronimo's professional army.

All of these tasks must be trained and well rehearsed during unit training at home station prior to arriving at JRTC. The goal here at JRTC is to ensure leaders and units are ready for war now, and it will help units get to the next level, regardless of training proficiency upon arrival. But arriving without a basic understanding of these tasks significantly hinders the unit's opportunity to take proficiency to the next level.

### Concept of Support

Army Techniques Publication (ATP) 4-90 tells us that the role of the BSB is to support the brigade's execution of operations by providing logistics support. However, most BSBs have not truly trained and rehearsed the execution of that mission during LSCO. BSBs often do not have the opportunity to rehearse the echeloning of sustainment support, from the CSSB, through the BSB, FSC, and, finally, to the company until they get to JRTC. To truly stress the BSB's systems, it requires the entire BCT and the CSSB to participate in a BCT or above level operation. Any opportunity to maximize these opportunities during BCT level training events should never be missed. At home station, it is too easy for FSCs to go to the garrison

water point, fuel point, ammunition supply point and resupply themselves during training, eliminating the need to synchronize with the BSB SPO during maneuver battalion training exercises. Units who enforce a strict sustainment support structure, from the Division Support Area through CTCs during home station training do markedly better here at JRTC than those that do not.

The concept of support is, by far, the biggest challenge brigade support battalions have during their rotations. Given the BCT's short planning timeline and the amount of parallel planning conducted at every echelon, the concept of support is often de-synchronized with the brigade's maneuver plan. It is imperative that the SPO, the BDE S4, and the BDE S3 logistics planner all stay closely synchronized to ensure the framework of the concept of support is built around the maneuver plan. Under the supervision of the BSB commander and BDE XO, the concept of support also needs to include the BDE Surgeon and BDE S1 in order to build a cohesive sustainment plan. This all seems very straight forward, but all too often a BCT receives a division order 96 hours prior to execution and everyone immediately retreats to their comfort zone to plan their part, resulting in a poorly stitched together and often infeasible sustainment plan. While the ground distribution plan is generally well executed, units routinely fail to maximize the use of aerial resupply methods due to low proficiency and a lack of training in sling load and Low Cost/Low Altitude air drop operations.

### Sustainment Rehearsals

Too often it seems sustainment rehearsals are an afterthought. At most, units will have one decent rehearsal prior to the first phase of the operation, but subsequent rehearsals fall off significantly, both in content and participation.

One of the main contributing factors is the lack of time between the brigade's OPORD and the execu-



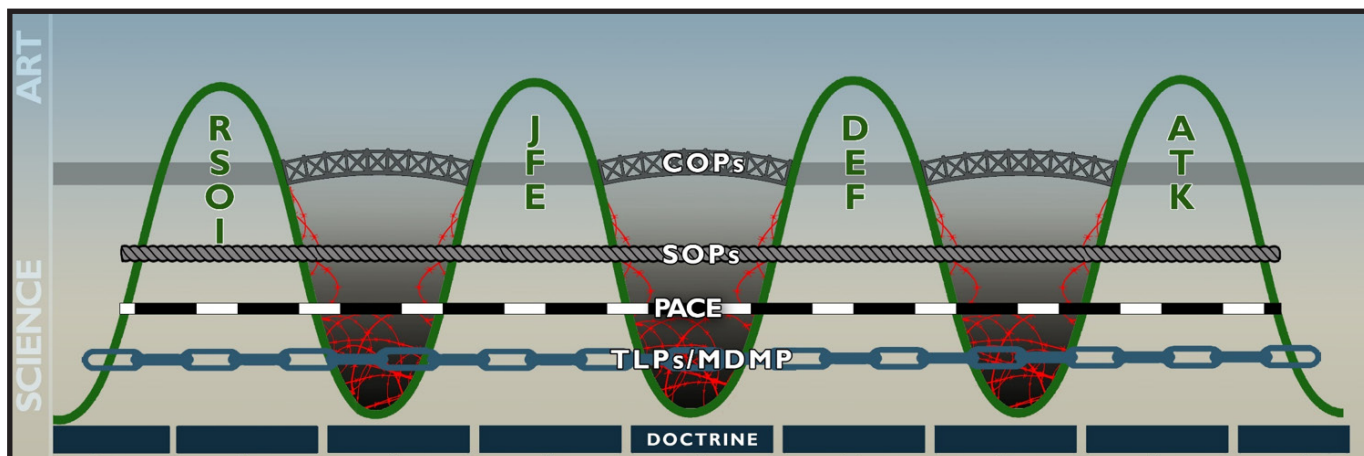


Figure 1. Into the Valley of Death—Avoiding the Pits of Transition in Operations: A 25-Year Analysis from the JRTC Operations Group, 2018, Joint Readiness Center Operations Group, Fort Polk, Louisiana.

tion of the mission. In a dynamic environment such as JRTC, this is completely understandable, however, units often attempt to conduct sustainment rehearsals without the depth of detail needed to achieve a shared understanding. In order to have effective sustainment rehearsals, units should identify the critical pieces of information that need to be understood across the BCT. At a minimum, topics should cover the brigade's sustainment distribution plan, location of key sustainment nodes, CASEVAC plan, location of medical and command and control nodes, route statuses in the AO, and timing of any external resupply, especially aerial delivery in all phases of the operation, to include during transitions.

As a general observation, the level of brigade leadership involvement seems to directly correlate with the effectiveness of the rehearsal. If the BCT commander is there, it will almost certainly mean battalion commanders will be there, which means the right people can ask the right questions.

### Use of Configured Loads

Synchronization does not exist between the BCT engineer and the brigade engineer battalion (BEB) to build an SOP for CL IV pre-configured loads in support of the BCT defense, which creates friction for

the BSB to establish an effective distribution plan. While maneuver battalions often fail to identify their CL IV requirements for the defense more than 48 hours in advance, BSBs often fail to anticipate those requirements and fail to prompt the brigade engineer or BEB to set an SOP for pre-configured loads or to call forward enough CL IV to meet last minute requests from the rest of the BCT.

Success at both JRTC and in the next fight depends heavily on the training plans set by the BSB commander. All operations must be trained and rehearsed, and the lessons each organization learns must survive organizational leadership transitions. Too often a unit comes through JRTC well trained and led to fight and win during LSCO, only to see the same unit return 24 months later, with new leadership, and a sharp drop in proficiency. As depicted in figure 1, when SOPs that are not passed on over time units are forced to remain focused on overcoming the science of operating in this environment. This does not allow units to rise above the common pitfalls to elevate their thought processes to the operational art of warfare. The BSBs ability to operate in this rigorous, realistic, and relevant environment heavily depends on preparation. All units should visit the CASCOM

Sustainment One Stop website and, specifically, their sustainment virtual playbook for more on each of these topics and more.

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*An Infantry Soldier with 3rd Armored Brigade Combat Team, 4th Infantry Division, pulls security inside a cleared building during a joint situational training exercise in Jordan on September 2, 2019, with the Jordan Armed Forces and other partner nations as part of Eager Lion. Eager Lion, U.S. Central Command's largest and most complex exercise, is an opportunity to integrate forces in a multilateral environment, operate in realistic terrain and strengthen military-to-military relationships. (U.S. Army photo by Sgt. Liane Hatch)*

## Sustainment Trends Observed at JMRC

■ By Capt. Geoffrey S. Utter and Capt. Sean W. Thomas

Today's operational environment requires a shift in how sustainers prioritize training objectives for the next fight. We must adjust our approach to protection and communication planning to counter technological advances and additional threats recently posed by other domains such as cyber and electromagnetic warfare. Incorporating the following insights observed at the Joint Multinational Readiness Training Center (JMRC) into the unit training plan will help prepare logisticians to prevail in multi-domain operations.

Sustainment units at brigade level and below typically do not adapt to protection considerations in an operating environment relative to large-scale combat operations (LSCO). At the company and battalion level, leaders neglect survivability considerations during mission analysis for base support area (BSA) site selection. Long-range precision fires pres-

ent a significant threat to traditional BSAs, which are typically concentrated and have limited mobility. Observer coach/trainer (OC/T) teams at the JMRC, located in Hohenfels, Germany, regularly observe rotational training units (RTU) employ large, consolidated exposed footprints that do not mitigate vulnerability to enemy fires. Observations indicate RTUs tend to favor a BSA composition based on ease of sustainment over other warfighting functions. BSBs generally establish their BSA in close proximity to main supply routes and have failed to fully utilize camouflage netting for parked vehicles, sleeping areas, and tactical operations center (TOC) locations. This makes BSAs easily identifiable and prime targets for indirect fire attacks, chemical attack, and special purpose forces operating in the brigade rear area.

One of the best practices identified during a recent JMRC rotation

was a BSB's innovative employment of base defense clusters to disperse assets and reduce the risk of enemy detection. Dispersal, a key survival technique, creates a smaller target mass for enemy sensors and weapons systems. Proper dispersal reduces casualties and losses in the event of an attack and makes enemy detection efforts more difficult. Rather than one consolidated base site, units should consider establishing a base support cluster (BSC), a collection of bases, geographically grouped for mutual protection and ease of command and control (JP 2280 3-10, Joint Security Operations in Theater). BSCs allow for a unit's personnel and assets to be spread throughout numerous locations and therefore mitigate some of the threat from massing of fires from enemy artillery. Less effort is also typically required to conceal BSCs due to their decreased size. Smaller, concealed footprints are less susceptible



to enemy observation and indirect fires. Traditional consolidated BSAs typically require additional manning for security requirements compared to smaller BSCs. Conducting a dispersed base cluster does warrant challenges. Coordinating fires, concealment, equipment readiness, and proper individual training are paramount to the success of establishing a BSC. Sustainment units rarely demonstrate proper use of claymores and obstacles. Individual, hasty, and deliberate fighting positions are not built to standard. Many BSBs do not utilize their authorized Ravens for early warning or area reconnaissance and are not authorized anti-armor capability. Fiscal Year 19 Standards in Training Commission (STRAC) does authorize the ammunition for sustainment gunnery, however, most sustainment units are unaware of this update, which has caused “ammunition harvesting” within the brigade to facilitate training. Training Circular 4-11.46, Convoy Protection Platform (CPP) Collective Live Fire Exercises, references cross-leveling from other training events to allocate ammunition for sustainment gunnery. This consequently leads to insufficient qualified CPP for convoy security, or CPPs are prioritized for base defense resulting in capture or destruction of logistics packages. These issues are compounded when portions of the formation lack a full understanding of the enemy and friendly situation within the rear area and brigade area of operation.

These shortcomings reinforce the need for survivability training as well as warrior tasks and drills. Refinement of BSB tactics, techniques, and procedures (TTP) and knowledge should cover:

- BSA/BSC site selection and identifiable terrain that is suitable for cover/concealment and ease of access
- BSA/BSC displacement procedures
- Properly camouflaging equipment and foot prints to avoid enemy unmanned aerial reconnaissance; leveraging natural cover and

concealment

- Maintaining light discipline and operating in blackout conditions

- Decreasing TOC's digital signature; placing OE-254s away from TOCs and command posts, at least a terrain feature away when possible

- BSAs developing internal quick reaction forces (QRF) into their base defense plans; rehearse movement-to-contact

- Proficiency at conducting call for fire and identifying in company sector sketches grid coordinates possible enemy positions

- Mastering command and control of forward logistics element (FLE) operations while supporting the brigade's maneuver forces

- Training and qualification with assigned weapon systems (M4, M240B, M2)

- Proficiency with communication assets Multiband Inter/Intra Team Radio (MBITR), RT-1523 radios, joint capabilities release (JCR) force tracking systems; units should be well versed in analog systems—recommend using analog as primary and digital as secondary; establishing appropriate PACE plans by Warfighting Function, reverse PACE (ECAP) and add to TACSOPs

- Reporting procedures.

- Knowledge of employing obstacles and early warning devices (claymores, trip flares)

Proficiency with communication equipment is equally crucial between BSC sites separated by terrain features in an environment often contested by enemy electronic warfare capability. While command post nodes (CPN) or tactical communications nodes (TCN) JCRs emit lower signatures, they can be jammed and are still vulnerable in a near-peer threat environment. Higher emissions from FM radios can be diminished with frequency hopping, reducing transmissions and spacing units across clusters. Further, FM jamming and compromise can be mitigated below the brigade level through use of signal operating instructions (SOI), which

are predefined countermeasures to facilitate continued use of FM networks when compromise occurs. Ultimately, redundant communications provide leaders a wide array of options to meet requirements.

To effectively compete against near-peer competitors, company and field grade sustainers must ensure survivability of their formations. During CTC rotations, forward support companies (FSC) possess the potential to counter the effects of degraded direct support assets in the short term. However, persistent loss of BSB assets in a sustained campaign can pose significant degradation to brigade combat effectiveness. Staffs need to prioritize fires, communication, and protection planning on par with sustainment, rather than as an afterthought. Trends at JMRC indicate several advantages employing BSCs during LSCO based on terrain and near-peer capabilities. Reversing the atrophy of traditional warrior tasks will also greatly increase chances of survivability. The intensity of LSCO requires a shift in all aspects of warfighting to meet the threat of near-peer adversaries. Significant work is still required to train sustainment personnel at the tactical level to meet these challenges.

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Observer coach trainers from the Bronco team at the National Training Center, Fort Irwin, Calif., prepare, advise, counsel, and train rotational Soldiers Aug. 21, 2017. The National Training Center provides a tough, realistic, joint and combined arms training that focuses on the battalion task force and brigade levels. NTC has been used as the premiere training center and has continued the legacy to ensure the U.S. Army remains prepared to face any adversary. (U.S. Army photo by Spc. Sarah K. Anwar)





# Early results testing the new CASL at NTC improves readiness

■ By Lt. Col. Fenicia L. Jackson, Capt. Karina Cuenca, and Chief Warrant Officer 3 Daniel Austin

Recently, the National Training Center (NTC) witnessed the first armored brigade combat teams (ABCTs) deploy with their common authorized stockage listing (CASL), the way Headquarters, Department of the Army (HQDA) intended deployed brigades to fight. The following observation reflects data from a total of ten ABCTs, to include seven active duty units and three National Guard units. To date, five ABCTs arrived and trained to win utilizing their CASL, with over 4,000-line items, instead of drawing the

NTC rotational authorized stockage listings (ASL) as was standard with units for years prior to CASL employment. The objective of implementing CASL was to increase overall readiness and guarantee mobility of a system designed to enable units to fight and win in austere environments.

The observations of observer, coach trainers (OC/Ts) at the NTC are mostly positive, but some challenges present opportunities for units to develop in future rotations. Furthermore, the units in future rotations will continue to provide ad-

ditional data points for comparison, enabling OC/Ts to refine current observations.

## Findings

Since implementation, a combination of five active duty and National Guard units arrived and trained at the NTC utilizing their CASL. While operational readiness (OR) rates for those five units trend higher, when compared to five similar units who drew the NTC ASL, the analysis will benefit from an expanded sample size. Those five units who arrived to the



NTC with their CASL started the rotations with an average OR rate 8 percent higher and culminated their 14-day rotation with an average OR rate 9 percent higher than ABCTs who did not employ CASL.

OC/Ts at the NTC additionally observed other impacts of the CASL on unit readiness prior to the start of training. Reception, staging, onward movement, and integration (RSOI) can be just as stressful as the decisive action fight that the units are preparing for. During RSOI the brigade support battalion (BSB) prepares themselves for a 14-day force-on-force and live fire rotation, while still providing support to the BCT.

BSBs that bring CASL gain efficiencies by eliminating the need to inventory the NTC ASL, which takes up to a week to complete. Supply support activities (SSA) that save themselves the additional time of inventorying the NTC ASL apply that time more productively to build readiness within their formations.

Prior to CASL deployment, BCTs were required to sign for one of the two NTC forward rotational Authorized Stockage Listings (SLOC: WDP1 or W0B1), but this requirement was a burden on time and it did not allow units to capture consumption history for future stockage determination. Deployment Exercise (DEPEX) DODAACs were used to requisition parts and they were sterilized after each rotation.

During the regeneration phase, the SSA is not required to inventory the CASL. Inventories of the CASL during regeneration, while highly encouraged, are conducted at the commander's discretion. When they draw the NTC ASL, they are required to inventory it prior to turn in, which takes up to an additional week. In total, bringing home station CASL can save the SSA two weeks, which they can use instead to conduct maintenance and other readiness enhancing actions for the brigade.

Another positive impact units experience when they bring their CASL to the NTC, is that they can

fill most, if not all, of their shortages when they arrive. At home station, units may face budgetary constraints or may not be a priority unit to fill requisitions, but as the rotational unit at the NTC they are likely to fill their authorized to forecast zero balance lines at one of the several Fort Irwin SSAs, significantly reducing the transportation costs and time associated with those replenishment items. This benefit allows units to redeploy to home station or forward deploy to a follow-on mission with close to 100% percent of their CASL. Units may even be able to fill documents opened prior to arriving at the NTC. With use of the CASL, a unit can forward deploy from the NTC without having to cancel document numbers for items ordered prior to rotation. Units maintain open documents and, once processed, the Class IX will ship wherever the CASL is located. Previously, if units were deploying following an NTC rotation, they needed to cancel and reorder parts in order to receive them at their new Department of Defense Activity Address Code. This extended equipment downtime, and negatively affecting equipment readiness.

The CASL offers commanders proximity reach of available items required to supply and sustain the BCT. This reach allows commanders to accept more tactical risk with the confidence that the sustainment enterprise can maintain readiness and keep up with the operational tempo.

Training at the NTC with the BCT's organic assets gives leaders at echelon the opportunity to assess how well the CASL supports their mission and its performance in austere environments. Units cannot replicate the training offered at the NTC at home station. Most ASL performance metrics and data collection are based on home station demands. Use of CASL at the NTC gives commanders a better idea of how their equipment and their SSAs will perform in a deployed environment. The implementation and use of CASL at the NTC encourages

readiness, by forcing units to train as they fight. It also creates an opportunity for data collection as the Army continues annual reviews for future stockage determinations and impacts to overall readiness.

While most observations on the effectiveness of CASL are positive, the biggest challenge units face with the implementation is the mobility and lift capacity shortfalls associated with the addition of the equipment in the BSB. Units have little to no issues getting CASL to the NTC by rail or line haul, despite substantial transportation costs, but they experience significant challenges displacing the brigade support area (BSA) with up to 18 field pack-up containers and 35 container roll-in/out platforms for the CASL, in addition to all the other classes of supplies BSBs are expected to haul and distribute. Designed to be a single lift system, BCTs are not equipped, according to their modified table of organization and equipment (MTOE), to transport the CASL in a single lift. CASL transportation requires very deliberate planning on behalf of the BSB staff.

The BSB can move its CASL and supplies but not in a single lift, and the process is inefficient because of the BSB's MTOE shortfall. BSB organic transport would require multiple turns by the distribution company. Units at the NTC rely heavily on external support from combat sustainment support battalions (CSSB) and the support brigade, however unit planning and coordination of transportation movement requests (TMR) are usually reactionary. Delayed planning of CASL movements result in SSA downtimes of up to 24 hours. These timelines affect the BSBs' responsiveness to CL IX flow and regeneration of combat power. When the CASL stays behind because the BSB staff failed to adequately plan, they incur the responsibility to plan for additional security and life support as the SSA waits on transportation from the CSSB to echelon them forward to the new BSA.



A general analysis of the mobility index, utilizing FY19 MTOE for an ABCT, BSB, or distribution company, suggests that it would require three trips by the general supply platoon to move the entire CASL with organic assets. The analysis includes a few basic assumptions. The analysis assumes that the unit is at full strength, both on personnel and equipment, and that the element responsible for transporting all general supplies is not also responsible for transporting other commodities concurrently. The three trips include two trips requiring all 12 load handling systems with trailers and the third trip only requires three systems with trailer.

Observations at the NTC are that Soldiers who make up the general supply platoon and operate the SSA are responsible for more than just the transportation of CASL. They are usually also responsible for transport of CL IV and other miscellaneous items, which vary greatly depending on the phase of the operation the BSB is preparing to support. Also, BSBs generally arrive to the NTC between 70-80 percent strength on personnel, which further exacerbates transportation shortfalls.

### Recommended TTPs

Planners within the BSB should always consider the additional support requirements incurred with the CASL and retain it as a planning factor during the mission analysis step of the military decision-making process (MDMP). Planners should anticipate a displacement of the BSA and communicate their needs with the CSSB/SB early and often. They should submit TMRs in anticipation of a planned movement and later change the destination if necessary, but they should not wait until the BSA starts to displace to coordinate additional support. When requesting external support, units should consider how many other units the CSSB is supporting and who the main effort is. At the NTC, rotational BCTs are usually never the main

effort, and BSBs must be aware that even CSSBs have capability shortfalls within their organizations.

Transportation coordinators within the support operations section with the assistance of the distribution company commander, should maintain accurate running estimates of the BSBs transportation assets and have a good understanding of the BCT's priority of supplies. Even when CSSBs support BSA displacements, BSBs typically must conduct more than one turn with organic assets.

Units should set priorities when considering what equipment to move first. Even with the best-laid plans, the BSB may encounter transportation shortfalls. Knowing what supplies and CASL containers are priority for movement ahead of time is important. If the entire CASL cannot move in a single lift, identifying a combination of the most important supplies and fast-moving parts will alleviate stress to the maintenance process and to the SSA.

Units should switch logistics modernization program search matrix to search Fort Irwin SSAs first in order to reduce customer wait times while at the NTC. This will enable the system to search local SSAs before searching on the national level.

While an expanded sample size is necessary to confirm correlational use of the CASL and higher OR rates, OC/Ts look forward to coaching and training future rotational units on ways to optimize use of their CASL. With plans to expand use of CASL across the Army, OC/Ts will make more discoveries alongside their BCT counterparts and get the opportunity to coach BSB staffs through MDMP, reminding them of all the planning factors associated with the CASL lift requirement. Units will inevitably rise to the occasion and continue to develop solutions to their commanders' problems, but the principal improvement the Army should make is addressing BCT transportation shortfalls. The

single, but monumental, task of adjusting BCT personnel and equipment MTOEs to support the single lift of CASL will round out HQDAs mission "to increase readiness and ensure mobility, which will allow the Army to fight and win in austere environments."

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# Pipelines Hoselines Fuel Bags

## *Great Contributors to Winning Large-Scale Combat Operations*

■ By Chief Warrant Officer 3 Jeremie Coleman Sr.



A petroleum specialist from 61st Quartermaster Battalion demonstrates the layout of a full Inland Pipeline Distribution System at the event. Petroleum specialists from First Army Division West, 13th Expeditionary Sustainment Command, along with the Fort Hood Soldier for Life—Transition Assistance Program, hosted eight petroleum companies from Houston and San Antonio, Texas and other partner cities of Fort Hood June 21, 2019. (Photo by Sgt. 1st Class Kelvin Ringold)







For the Army to maintain a balance between the momentum of maneuver and the delivery of fuel to combat platforms influencing the fight, less familiar delivery and storage methods are required.

The Army is the Department of Defense's executive agent for Class IIIB (bulk petroleum/oil). For the last several years of the 17-year prolonged conflict, the Army has operated on a Forward Operating Base concept, receiving fuel support from the Defense Logistics Agency's contracted supply and distribution system. When the United States Central Command started rebuilding efforts in Iraq in 2015, the Army leadership realized how difficult it is to get bulk fuel into resource-constrained environments that are contract-centric with restrictive ground movement and force management levels. The Army's warfighter exercise program further highlights the difficulties that will be faced distributing fuel on tomorrow's decisive action battlefield. During warfighter exercise (WFX) 19-4 conducted at Fort Hood, Texas, recently, the scenario played out against a near-peer competitor with long-range artillery that can target Corps' Support Area Command Posts. At the III Corps sustainment rehearsal for WFX 19-4, the III Corps Deputy Commanding General for Support, Maj. Gen. Felix Gedney, provided clear context for the importance of class IIIB when he stated, "Having fuel will not win the battle but running out of gas will lose the war, so don't let the tanks go dry."

For the Army to maintain a balance between the momentum of maneuver and the delivery of fuel to combat platforms influencing the fight, less familiar delivery and storage methods are required. Pipelines, assault hose lines, and fuel bags are essential sustainment multipliers to winning large-scale combat operations (LSCO).

### Our Sustainment Challenge

LSCO are intense, lethal, and brutal, and present the greatest challenge for our Army as described in Field Manual 3-0. In February 2018, at the Army Leader Exchange, Lt. Gen. Michael Lundy, current Combined Arms Center commanding general,

said, "In order to win in large-scale combat operations we have to be able to present multiple dilemmas to an adversary across all domains (land, air, maritime, space, cyber, and virtual) and be able to get more positions of relative advantage faster. We must identify how to achieve combat power overmatch at the right time and place." To gain a relative advantage faster, timely logistics must be provided to our combat forces.

Our greatest sustainment challenge with fuel is distribution along extended lines of communication within restrictive routes of mobility. As the name implies, fuel is bulky, fluid and heavy. Fixed and rotary wing transport of fuel delivers limited quantities and, when supplying an armored corps, is similar to filling a 55 gallon barrel with a tea cup. The environments that the Army must operate in are commonly contested with austere operating conditions, limited distribution assets, extended lines of communication, limited energy resources, restricted supply routes, unimproved roads, and may require access through multiple countries (recent examples include Operation Atlantic Resolve and the Trans-Arabian Pipeline). Despite the complexity of the operating environment, sustainers must deliver fuel to the ground and aviation forces operating in the area of operations.

The techniques used to overcome our challenges in petroleum supply operations are found in Army Techniques Publication (ATP) 4-43, Petroleum Supply Operations. The principal audience for ATP 4-43 is personnel of all grades and levels performing in petroleum supply positions. A bulk petroleum distribution system is a combat enabler composed of equipment needed to provide bulk fuel to using units throughout a theater of operations. This system includes ocean tanker loading and unloading facilities, storage terminals, pump station, the Inland Pipeline Distribution System (IPDS), tank vehicles, and tank cars. The Offshore Petroleum Distribution System





*Sgt. Joshua Smith, a petroleum supply specialist with 135th Quartermaster Company, 87th Combat Sustainment Support Battalion, 3rd Infantry Division Sustainment Brigade extends a fuel hose from a spool during a training exercise at Fort Stewart, Ga., Feb. 24, 2017. The hose would be suspended over a stream using an assault hoseline system, which allows Soldiers to transfer fuel across obstacles like rivers and roadways. (U.S. Army photo by Sgt. 1st Class Ben K. Navratil)*

(OPDS) is the responsibility of the U.S. Navy, and it provides bulk fuel to the high-water mark on shore where their system will interface with the Army or Marine Corps' bulk petroleum distribution system.

### **Warfighter Exercise Fuel Distribution Challenges**

*Available Assets:* During mission analysis, the 13th Expeditionary Sustainment Command (ESC) fuel and water section identified every petroleum unit and their associated bulk fuel platforms authorizations that we could use to execute the inland fuel distribution plan. Type of

fuel units included Petroleum Support Companies, Composite Supply Companies, 5K POL Transportation Companies, Petroleum Pipeline Terminal Operating Companies and a Quartermaster Battalion. Fuel assets within these units deemed critical to the bulk fuel theater distribution mission included the 5K tankers, fuel system supply points, assault hose lines and the IPDS. However, although we had a plethora of fuel capabilities, the greatest task would be to effectively employ all of our assigned units and equipment in a way that would best support units operating within the Joint Operation Area.

*Increasing Lines of Sustainment:* As units move closer to pre-determined objectives, sustainment lines of communication will inevitably increase as a result. The competing demands for multiple commodities to be delivered at the same place at the same time also play a factor in sustainment lines of communication. Increasing and prioritizing the movement of commodities becomes critical in ensuring that commanders' needs are met to maintain momentum. Although within the task organization we had a robust tanker truck capability we understood that the question was not, "Do we have enough mobile dis-



tribution assets?” but rather, “How would time, space, and terrain impact our ability to deliver timely bulk fuel to our customers?”

**Restrictive Terrain:** Within this particular operating environment, we had to consider various terrain constraints that would hinder our ability to rapidly deliver bulk fuel to the forward operating units. Moving a convoy of 5K tankers or positioning pipelines across mountainous terrain has a high potential of becoming problematic. What should take a few hours could easily become a full-day operation and, in turn, risk units supporting the tactical fight forward becoming critically low on bulk fuel. In addition to traveling across mountainous terrain, the requirement to cross rivers and streams adds an additional problem set to terrain constraints. It is imperative that we have a comprehensive plan that includes refueling upon completion of the wet gap crossing (WGX).

**Route Congestion and Crossing Point Congestion:** As demand increases and more commodities are called forward to support current and future requirements while damaged combat platforms and other supplies are retrograded, routes will become overly congested and some commodities will risk being cut due to the limited road network our distribution platform capabilities can support.

## Solving the Problem

**Synch Matrix:** Using the Combined Arms Support Command approved quick logistics estimation tool we were able to forecast bulk fuel requirements for the divisions within the Corps. We then used the forecasts to program out 96 hours to 120 hours to de-conflict equipment availability and route restrictions to ensure the ESC could support the forward momentum. We would routinely validate requirements based on a 12-hour logistics status submittal timeline that enabled us to refine standing transportation movement orders as units either validated and/or updated their daily bulk fuel

requirements.

**Flexible Task Organization:** The task organizations must be adaptable to the current mission and operating environment. In conjunction with our ESC Support Operations logistics syncs the identification of increased or decreased requirements within units would drive task organization change recommendations for the ESC commander to approve or disapprove during the daily decision board. It is imperative to continually review capability requirements across the force to ensure enough time is provided from task organization change approval to the time the capability is required at the new location to allow for movement of the unit.

## Force Multipliers

**IPDS:** IPDS is defined as a multi-product system consisting of both commercially available and military standard petroleum equipment. It is a deployable International Organization for Standardization container configured, general support, bulk fuel storage and pipeline system that can be assembled by military personnel, and when assembled into an integrated petroleum distribution system, provides the military with the capability required to support an operational force with bulk fuels.

In austere environments where bulk fuel facilities do not already exist, the tactical petroleum terminal (TPT) will store and provide the required quantities of fuel. The IPDS is used to move bulk fuel as far forward in the theater as practical. The developed theater consists of existing bulk fuel facilities that may or may not have to be augmented to provide the required quantities of fuel. If the system has to be augmented, the IPDS pipeline and TPT fuel units will be used. Distribution equipment includes the equipment used to transport fuel throughout an area of operations to the using units.

Our plan during WFX 19-4 included constructing IPDS as far forward as possible to relieve approx-

imately 288 personnel and 144 tankers from the road networks which gave us the flexibility to meet other mission requirements.

**OPDS:** The OPDS was designed by and for the U.S. Navy, for use with the Army's IPDS or with the Marine Corps' tactical fuel system. The petroleum products are delivered from the offshore tanker to forces onshore where ports or terminal facilities are damaged, inadequate, or nonexistent such as joint logistics over-the-shore operations. Each tanker is manned by a civilian merchant crew. As the operation progressed we planned to call forward the OPDS in order to provide bulk fuel to a separate location where no existing bulk fuel infrastructure was available. However, the OPDS has the capability to provide a daily bulk fuel push that exceeds what most ground combat operations require.

The Navy Off-Shore supply ship that was available for our use was capable of providing 1.7 million gallons per day from up to eight miles offshore in all bottom conditions in significantly higher sea states than the old system. These new ships utilize dynamic positioning, which requires no anchoring system. The vessel can maintain ship position within two meters using thrusters and screws. In less than 48 hours, the crew can run the full length of conduit ashore from the ship's bow, run a float hose to a tanker from the ship's stern and be ready to begin pumping fuel. The system is installed by civilian crews with the assistance of naval support personnel. The ship provides the hose and pumping capability for a separate fuel tanker, which provides petroleum product for transfer to shore.

**Assault Hose Line System (AHS):** When reviewing the mission of having to execute a WGX we considered the AHS as a viable option until the IPDS could be fully constructed. Using this concept enabled us to position fuel across the WGX in preparation of providing fuel to units as they cross the WGX. Petroleum units use assault hose lines over short dis-



tances to replace or supplement vehicle delivery. This reduces the number of trucks on the main and secondary supply routes while ensuring petroleum requirements are met efficiently and effectively. The lines must be patrolled sufficiently to reduce and mitigate sabotage and theft. Generally, hose-lines can be installed rapidly and be in an operational condition in much less time than pipelines. The AHS is a mobile petroleum distribution system used to transfer large quantities of fuel between temporary bulk storage sites at varying distances up to 2.5 miles over various terrains for one AHS.

*Assuming Divisional FSSPs:* In efforts to decrease sustainment lines of communication for bulk fuel we implemented a plan that called for our forward sustainment brigades (SBDEs) and their associated combat services support battalion to emplace their on hand fuel system supply point (FSSPs) while multiple bulk fuel pushes were synchronized with the theater supporting SBDE to provide fuel to the tankers and to the emplaced FSSPs. This enabled units to have increased bulk fuel stocks readily available and to conduct the initial build of a future Logistics Support Area fuel farm, convoy support center and/or a rapid refueling point. A rear area supporting SBDE would provide a replacement FSSP(s) to the forward operating sustainment unit prior to them moving to their next objective. Additionally, a rear operating sustainment unit would take command of the emplaced FSSP and increase capacity and stocks as necessary.

### WFX 19-4 Lessons Learned

*Creative Planning and Submittal of Requests for Forces:* Designing a bulk petroleum distribution network for a theater that will meet the warfighter's ever evolving requirements will require out-of-the-box critical thinking. We must always use doctrine as a guide, but experience and ingenuity are paramount to developing robust support plans. During

WFX 19-4, thorough mission analysis and planning efforts that occurred prior to executing the exercise helped to successfully sustain theater class IIIB stocks above 84 percent and prevented any major shortfalls. We used existing Host Nation facilities and pipelines to augment our bulk fuel distribution network, enabling us to deploy our assets farther forward where over 95 percent of the bulk fuel requirements were generated. If your current task organization does not already have sufficient capabilities, submit requests for forces to higher headquarters. Our ability to request additional units that brought fuel transport, pipeline, FSSPs and replacement fuel bags capabilities served to be very beneficial in maintaining adequate fuel inventories across the theater.

*Rehearse the Plan:* As sustainment plans are developed, Rehearsal of Concept (ROC) Drills allow sustainers to better visualize and understand the plan and to identify potential shortfalls. We were able to refine our plan after executing multiple sustainment ROC Drills, allowing us to focus on sustainment of bulk fuel 96 hours and beyond.

*Review the Plan:* We continued to review our plan and daily asked the question, "Who else needs to know?" As new requirements emerged, we quickly disseminated all known information across the commands that ensured we all had a shared understanding of a fluid bulk fuel distribution plan.

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Designing a bulk petroleum distribution network for a theater that will meet the warfighter's ever evolving requirements will require out-of-the-box critical thinking. We must always use doctrine as a guide, but experience and ingenuity are paramount to developing robust support plans.



# Winning War Using Capabilities of the Sustainment Enterprise: FRA

■ By Chief Warrant Officer 4 Clinton Coonce

In support of the Army Materiel Command's (AMC) efforts to support combatant command operational plans, United States Army Tank-automotive and Armaments Command's G-3 planners and enterprise stakeholders have prepared a deployable capabilities planner's guide in order to identify planning data, considerations, and limitations when establishing the forward repair activity (FRA). Tasked organizations will conduct assessments and quarterly inventories of identified deployable capabilities and FRAs via readiness reporting in order to validate requirements to support war-time theater requirements. When deployed, the FRA will be under the operational control (OPCON) of the Army field support brigade (AFSB) in theater.

The FRA concept of operation is to provide key details on all capabilities residing within the activity. There are six readiness factors attributing to whether or not an FRA is set to move forward like any other unit: core functions, battle roster, personnel readiness, equipment-on-hand readiness, equipment readiness data and training data. The first four levels can be seen within the FRA planner's guide.

An overseas FRA may be established by AMC when it has been determined, in coordination with the appropriate theater commander, that forward depot support by depot personnel or by contractor logistic support operations is needed to sustain mission critical systems or components. The sustainment maintenance capability an FRA would bring to the fight would be instrumental to winning our nation's wars and sustaining combat power on the battle field.

An FRA is AMC-resourced, directed and controlled activity operated by contractors or organic personnel that provides sustainment level support forward of the depot. During War Fighter Exercise 19-4, the 13th Expeditionary Sustainment Command support operations materiel readiness branch's main focus was on reconstitution of combat power on the battlefield. As the Army moves from counterinsurgency operations to large-scale combat operations (LSCO), the FRA was a primary area of focus in efforts to regenerate combat power within a short period of time. For training purposes, the timeline was every 12 hours, so many variants of combat platforms would become fully-mission capable. The catch was there had to be many battle loss or battle damaged equipment at the FRA for repair or overhaul.

Looking at the dynamics and makeup of the FRA, it is comprised of teams from Rock Island Arsenal, Illinois; Red River Army Depot, Texas; Sierra Army Depot, California; Anniston Army Depot, Alabama; Program Executive Office Ground Combat Systems; Program Executive Office Combat Support & Combat Service Support; Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense; and Pine Bluff Arsenal, Arkansas, which are the main contributors to the success of reconstitution of combat platforms. Ultimately, the FRA is there for sustainment-level maintenance but it has the ability to provide field level maintenance as well. These support teams also have the ability to regenerate combat power on ground versus sending equipment stateside which would ultimately take the equipment out of

the fight for an extended period of time.

A Stryker sustainment forward support team can reconstitute six vehicles per month but requires 28 vehicles in the distribution pipeline and at least 12 at the repair facility. This is all proposed as an example and shouldn't be taken as a guarantee because it is all dependent on the availability of parts. The tracked vehicle forward depot support team is OP-CON to the AFSB. This team can perform minor repairs and 11 major repairs within seven days. Though this may seem easy, it requires a lot of resources.

The requirements to have an FRA on ground during LSCO are extensive. The ability for the FRA to reconstitute equipment relies on the ability of the corps support area (CSA) and theater support area to be able to provide all the enablers necessary such as power, water, lift capability, storage, and hard structure work space. All these factors have to be taken into consideration when securing an area.

If you look at the dynamics of what levels of maintenance are available from as far forward as the forward support company all the way back to the CSA, there is no sustainment support at the brigade support area or division support area. This could all be remedied by placing elements of the FRA as far forward as the division support area (DSA). Doctrine doesn't specify where on the battlefield the FRA has to be located, so placement of the FRA in the DSA would allow sustainment level maintenance to be conducted far forward of the CSA and would allow a quicker turn-around time on non-mission capable equipment.





*Anniston Army Depot heavy mobile equipment mechanics prepare a 6.5 engine at the TACOM Life Cycle Management Command Forward Repair Activity in Kuwait. (US Army photo)*

The FRA is designed to reconstitute combat power by conducting an overhaul on battle-damaged or battle-lost equipment. In reality, this could take anywhere from four to six months to get one combat platform back into the fight. This may seem like a long period of time, but consider the alternative: placing the BL equipment on a ship for return back to the depot, having it overhauled, and then placed back on a ship for return. Providing the overhaul capability on the battlefield saves the warfighter and combatant commanders more than two months of transit time.

FRA's are authorized at the AMC major subordinate command commander's discretion to facilitate information technology (IT) repairs by the warranty vendors. FRA's should take action to become original equipment manufacturer certified warranty providers. Field maintenance will be performed on automation systems hardware when it does not violate the warranty. The FRA capabilities of providing IT repairs and sustainment maintenance save valuable time and resources so that equipment can be returned to the fighter without delay.

One aspect of the FRA that was not covered is addressing where all the contractors or organic personnel will come from. The FRA requires 391 personnel, based on the planner's guide. If a war was to kick off today with a near-peer adversary, are there 391 contractors or personnel ready to get their hands dirty on foreign soil and in an extremely hostile environment? This is something that would have to be addressed in contracts before the hiring process where there is currently no enforcing method to compel contractors to deploy as part of their duties.

WFX 19-4 provided the following dilemma: if a brigade combat team loses more than half of its main battle tanks, what are the mechanics working on? These mechanics can be sent to the FRA to help support the reconstitution effort until combat power is regenerated to where they can be utilized within their own unit. Having more mechanics does not always equal more output. There are always factors, such as bay space and lift capabilities, preventing additional equipment from being worked on at a given time. If mechanics were sent to the FRA, they could be uti-

lized to pull serviceable line-replaceable units or parts from battle loss or battle-damaged equipment, which would speed up the process for the contractors.

Imagine hundreds of battle loss main combat platforms and other equipment, sitting at a maintenance collection point totally destroyed and the Combatant Command commander demanding combat platforms worldwide. The Army only has so many of these combat platforms so the only way to get more is to repair the damaged ones to combat readiness state.

The FRA is the solution to sustainment maintenance on the battlefield. This element is going to build combat power. The FRA and the individuals within that structure are going to be the ones who contribute greatly to successful LSCO.

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# Blockchain for military logistics

■ By Brig. Gen. Mark T. Simerly and Daniel J. Keenaghan

*Emerging technology gives logisticians opportunity to enhance support to the warfighter with increased secure data sharing.*

Innovation is driven by the potential to solve existing problems in new ways. The development of blockchain technology offers increased data confidence and data availability that can help shape future military logistics and planning.

Data sharing through a blockchain can increase trust in detailed accounts, improve seamless communication, reduce data variation and mitigate friction points when information transfer needs to be timely and actionable. Further study and development of blockchain technology for use by the U.S. military has significant potential value for developing digital tools to advance advantages in logistics planning within tactical, operational, and strategic environments.

But first, what is blockchain technology?

Blockchain technology is digitally signed and time-stamped data clusters that are published and linked together like a chain, and it allows multiple users to publish at the same time through a secure algorithm in multiple cyber locations without the risk of data manipulation. There is only one version of the data, and all users have the same copy that they can separately review and confirm the authenticity of transactions without changing past authenticated data.

This concept holds significant potential for complex logistics applications in commercial, public and military environments.

## **The Beginning of Government Application**

Across the federal government, agencies are showing interest in block-

chain technology.

An underlying theme reiterated in the Government Accountability Office's Strategic Plan for 2018-2023 includes blockchain as one of the five emerging technologies with the potential to transform society.

In response to the 2018 National Defense Authorization Act, the Department of Defense (DOD) presented Congress with an overview of blockchain research across elements that included a description of potential offensive and defensive cyber applications, an assessment of foreign efforts, and an assessment of federal government use and critical infrastructure networks.

The Department of the Treasury completed a successful pilot using blockchain technology to manage and track inventory assets across a mobile workforce in near real time.

The Department of Health and Human Services has successfully launched the first public procurement blockchain. The model, called Accelerate, includes micro services that enhance distributed ledger technology with machine learning and artificial intelligence and inform more competitive contract pricing, terms, and conditions.

The Defense Logistics Agency (DLA) Troop Support in Philadelphia has learned from these government successes and explored the use of blockchain technology.

## **Problem Solving**

To understand the range of blockchain technologies for tactical sustainment challenges, the military should closely examine the potential of



blockchain solutions to the challenges associated with in-transit visibility, data integrity, additive manufacturing, reporting, operational contracting, and logistic estimation.

For instance, by integrating blockchain within each step of an operation to secure and share data throughout the manufacturing process, including design, prototyping, testing, and production, blockchain may offer the Army a solution it needs to secure the “digital thread” integral to the Additive Manufacturing supply chain.

Blockchain technologies can also support food safety and health care challenges on the battlefield, build health data sharing platforms for increased security and efficiency, track, and trace the food supply chain to prevent food related outbreaks better and to improve the tracking of critical and temperature sensitive commodities such as pharmaceuticals and food.

With the increasing value of, and risk to, tactical data management, the Army should consider implementing blockchain into sustainment information technology architectures and information technology enterprise modernization.

In a secure environment, blockchain has potential for military application at each planning level and across all supply classes.

On the ground at the tactical level, leaders can have greater confidence in knowing what resources are on hand, in-transit, or available to request. This could provide supply personnel with near-real-time visibility for materiel, parts, supplies, and equipment, and it will offer greater order accuracy through smart contracts.

Having greater confidence in pre-positioned materials, movements of capabilities, and conditions improves operational planning visibility needed for success. Materiel traceability can be enhanced and can shape the battlefield for successful conditions.

Additional details would be available on assets in-transit for delivery schedules and warehouse storage planning. Distribution points could also increase their visibility into what lots or parts

could be immediately sourced for high priority pacing items.

Strategically, there can be greater fidelity in communication network infrastructure, forecasting budget requirements, and tracking resources allocated to align with operational plans.

### Potential Applications

In 2017, the U.S. experienced unprecedented destruction in multiple geographic areas due to several natural disasters in rapid succession. The Federal Emergency Management Agency and the U.S. Army Corps of Engineers called upon DLA Troop Support to support humanitarian assistance and disaster relief efforts in response to wildfires on the West Coast and three hurricanes in the Atlantic Ocean.

As part of DLA Troop Support’s mission to deliver optimal global supply chain solutions, hundreds of contracts moved millions of equipment pieces to enable a ready and whole-of-government response. We developed a ‘use case’ for these efforts to explore how blockchain technology could have led to an increase in supply chain effectiveness and efficiency.

More than 62 million power grid items were provided to Puerto Rico in the wake of the Category 5 Hurricane Maria. Although the mission was a success, an assessment of the end-to-end processes uncovered multiple delays, miscommunications, excessive travel costs, a lack of comprehensive end-to-end visibility, and many wasted hours for manual corrections.

Research suggested the possibilities for adaptation and innovation through blockchain could increase effective communication of requirements, planning movement and flexibility, monitoring third party delivery and in-transit visibility timelines, compliance with regulatory demands, and transparency for audit. Cost reductions are anticipated in regards information lags, duplication, personnel, movement times, storage, and inventory losses.

These efficiencies enabled through blockchain technology would provide real, measurable savings and increase

the efficacy of life-saving and recovery efforts.

### Moving Forward

A review of the supply chain’s hurricane support suggests areas for further military research and pilot testing of blockchain applications. As a result, DLA Troop Support is engaging with commercial and government projects that are developing blockchain technology to learn more.

This provides an opportunity to be prepared to contribute to federal standards for military requirements and to remain current on advancing technologies. Pilot considerations for research and development of blockchain will look to increase confidence in data, decrease friction in acquisition communication and enhance data driven decision-making.

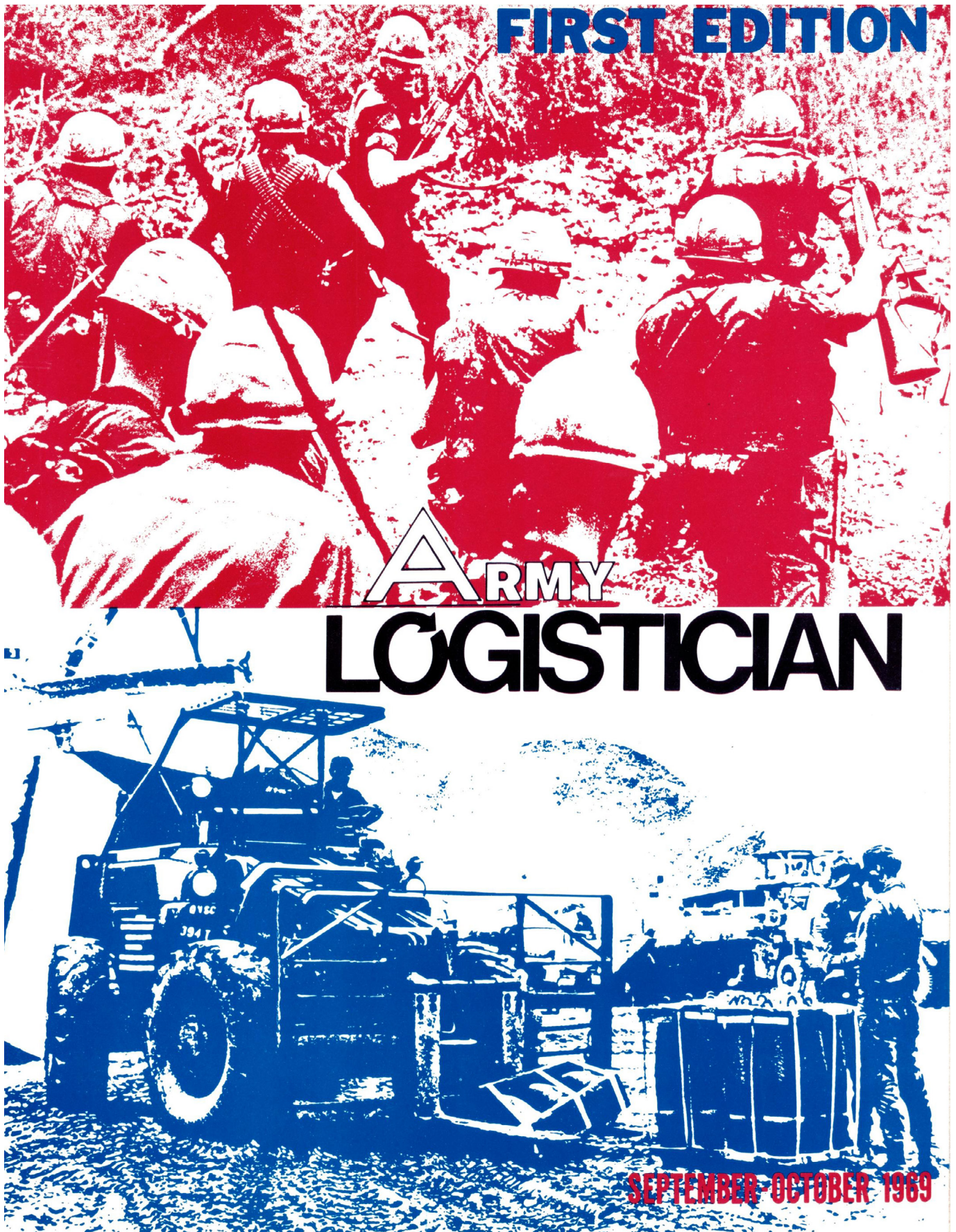
The long-term potential for DOD implementation would significantly shift the abilities of military supply chain and acquisition fields to increase visibility and provide enhanced warfighter support.

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Brigadier General Mark T. Simerly is the commander for the Defense Logistics Agency Troop Support in Philadelphia, Pennsylvania. Under his leadership, the organization annually provides over \$17 billion worth of subsistence, clothing and textiles, construction and equipment, medical supplies, and industrial repair parts for America’s warfighters and worldwide customers. He is a graduate of the University of Richmond and the Industrial College of the Armed Forces.

Dan Keenaghan is the DLA Troop Support Process Compliance Director for audit and process improvement. As an Army Reserve lieutenant colonel, he is an adjunct facilitator for the U.S. Army War College, Center for Strategic Leadership. He is a graduate of the U.S. Military Academy and the Eisenhower School for National Security and Resource Strategy.





**FIRST EDITION**

# **ARMY LOGISTICIAN**

**SEPTEMBER-OCTOBER 1969**



# 50 Years of Service to the Sustainer

■ By Robert D. Paulus and Kari J. Chenault

This issue of Army Sustainment marks 50 years since the publication of the first issue of Army Logistician, the original version of Army Sustainment, in September 1969.

This publication has been dedicated to providing, in the words of 1969's Department of the Army Circular 310-72, "timely and authoritative information on U.S. Army logistics concepts, plans, policies, procedures, operations, and developments to the Active Army, Army National Guard, and Army Reserve."

## Filling a Professional Development Gap

A Jan. 22, 1969, Army Times article announced the establishment of the new publication, stating that "the magazine will improve communication among logistics personnel at all levels, promote their professional development, and increase the level of understanding of the role and importance and challenges of Army logistics."

The article went on to explain that the magazine would fill a gap that the Army Logistics Management Center at Fort Lee, Virginia, had discovered when it investigated the need for an official logistics periodical in 1967 and determined that no existing journal or periodical "could be used to update the information on logistics presented at Army service schools."

Likewise, the Fort Lee post newspaper, The Traveller, reported in a Jan. 9, 1969, article, "In order to keep abreast of his profession, a logistician is required to research a great variety of separate sources, both official and unofficial.... [Army Logistician] will enable the Army Logistics Management Center to fulfill its mission in the field of continuing education of logisticians."

Thus, Army Logistician made its official debut with the 32-page Sep-

tember–October 1969 issue. Since then, thousands of Soldiers of all ranks, Army Civilians, and even defense contractors have sent in articles for publication. The publication became a respected source of information, a professional development resource, and a forum for discussing the latest ideas from the field.

Army Logistician/Army Sustainment has always been produced at Fort Lee at the Army Logistics University and its predecessors, the Army Logistics Management Center and the Army Logistics Management College. Since the beginning, it has been published under the sponsorship of the Army Deputy Chief of Staff, G-4.

Originally, the periodical fell under the Army Materiel Command, which assumed command of the Army Logistics Management Center in August 1962. Both the Army Logistics Management College and Army Logistician were transferred to the Army Training and Doctrine Command in October 1991. The Army Logistics Management College was reorganized as the Army Logistics University in July 2009.

## Early Operations

The founding editor of Army Logistician was Thomas A. Johnson, a former historian at Fort Lee and an Army National Guard officer who retired as a brigadier general. Mr. Johnson was editor for 18 years, and his policies and procedures formed the foundation of the publication's operations and organizational culture throughout its 50 years.

He was succeeded in 1987 by his longtime associate editor, Terry R. Speights, who emphasized professionalism and service throughout his 30 years on the staff and at the helm of the periodical.

In the pre-digital days, an author would mail a proposed article to the

Army Logistician staff in the form of a paper manuscript. An assigned staff editor made changes to the manuscript and then typed a new version for review and editing by senior editors.

The staff editor then incorporated all of the changes and typed up a clean copy of the edited article to mail to the author for review and approval. Once the author approved and returned the article, it was sent to the art department with any proposed graphics.

For many years, Army Logistician had two staff artists to accommodate the workload of producing original art and laying out articles for the printer. With in-house artists just down the hallway from the writer-editors, the periodical had the ability to produce drawings, maps, and charts when a submitted article had few or no suitable graphics.

Throughout its history, Army Logistician/Army Sustainment has used a contract printer to print and mail each issue. But in the pre-digital days, the art staff would prepare physical materials, including article manuscripts, photographs, charts, original artwork, and detailed instructions on how to lay out the issue. The art staff would pack everything up in a big box and ship it to the printer.

The printer laid out the issue according to the instructions and prepared a mockup of the issue, known as the "page proofs," which was mailed back to the publication for review and correction as needed. The marked-up page proofs were returned to the printer, which then prepared a second mockup of the issue known as "the blues." The blues were mailed back for a final review and approval by the editor for printing.

Needless to say, this process, which seems so cumbersome today, required more time, more personnel, and more money. Postal spending was a signif-





Gen. F.J. Chesarek, commanding general of Army Materiel Command, receives the first copy of the "Army Logistician" magazine from Editor in Chief Thomas Johnson, and Col. W. L. Tate, commandant of the U.S. Army Logistics Management Center at Fort Lee, Va., in 1969..

money. Postal spending was a significant line item in the publication's budget, both for shipping materials back and forth between the office and the printer and for mailing tens of thousands of copies of each issue to subscribers.

The art department usually had two artists, and the administrative staff usually had two secretaries. With the growing use of computers from the mid-1980s on (the first software used was called Spellbinder), it eventually became possible to produce the magazine with one art director/designer and one administrative assistant.

### From Magazine to Bulletin

A major change came in 1987 following a Department of Defense study of all department periodicals. Originally aimed at reducing the number of periodicals, the study instead resulted in the introduction of a new category of publication, the professional bulletin (PB). Army Lo-

gistician became PB 700 beginning with the March–April 1987 issue.

One of the features of PBs, designed to save money on production costs, was a prohibition on the use of full color in printing. The upshot of this guidance was that the bulletin for well over a decade was a black-and-white publication with one color permitted on the cover. Full color used extensively throughout the bulletin did not return until the May–June 2002 issue.

### From Analog to Digital

The biggest change in the history of the bulletin mirrored what was perhaps the biggest transformation in the Army over the past decades: the increasing use of information technology and the move to digital operations. Although computers now can be found at every desk in the offices of Army Sustainment and are used in every facet of bulletin production and management, for almost 20 years all

writing, editing, and administrative work at Army Logistician was done on typewriters.

The major move to digital operations came through the initiative of Janice W. Heretick, who served as editor from 1997 to 2006. Beginning with the September–October 1998 issue, Army Logistician was prepared totally by electronic means.

Staff writer-editors began to use prepress software to develop, edit, and save text for articles. The administrative assistant at the time, Joyce W. Pawlowski, was trained to use electronic prepress publishing software to lay out all text and illustrations for each issue. Thus the design and layout process was brought fully in-house for the first time, reducing the role of the printer to simply printing the submitted electronic files and distributing the printed copies.

### From Logistician to Sustainment

A major change in the bulletin's

history was the name change from Army Logistician to Army Sustainment. The change was made with the 40th anniversary issue, September–October 2009. The initial redesign of the publication for its debut as Army Sustainment was produced by the bulletin's contract designer from 2003 to 2011, RCW Communication Design, Inc., of Alexandria, Virginia.

The change extended beyond just a name. The bulletin's focus shifted to include more functions, and a reorganized and expanded board of directors issued a new memorandum of understanding.

The change from Army Logistician to Army Sustainment was advocated by the commanding general of the Combined Arms Support Command, Maj. Gen. James E. Chambers. The idea was to align the bulletin's mission with a significant change in Army doctrine and the resulting establishment of the Sustainment Center of Excellence at Fort Lee.

The revised Field Manual 3-0, Operations, issued in 2008, reintroduced the term "sustainment" (originally used in 1993) as a warfighting function and divided it into the sub-functions of logistics, personnel services, and health service support.

The new Field Manual 4-0, Sustainment, then being drafted, defined "logistics" as including supply, field services, maintenance, transportation, operational contract support, and general engineering support. The manual defined "personnel services" as including human resources support, religious support, financial management operations, and legal support.

So the scope of the bulletin expanded to reflect the broader functions of "sustainment" as opposed to the narrower function of "logistics," and a change of name seemed warranted.

### Refocusing Online Publication

In the early 2000s, Army Logistician moved online with the rest of the world. The first version of the

bulletin's website included html versions of each article, sorted by issue, and pdf versions of back issues. The website had a search function, which made it much easier for readers to find information on specific topics. The digital publication made it possible to reach more readers with fewer printed copies, so the staff was able to reduce the number of hard copies printed each issue.

Several years later, Fred W. Baker III, the editor from 2012 to 2018, decided to expand the bulletin's digital presence beyond simply posting the issues online. He started by sending out a readership survey and, from that survey, found that the bulletin's audience was mainly reading Army Sustainment content online.

The bulletin's website was updated, and the staff began using army.mil to post articles. Using this platform made it easier for other Army offices to read and share Army Sustainment content. It also made it easier for Army Sustainment to share relevant news from sustainment units and commands. The responsive website design also made articles easier to read on mobile devices.

At the same time, the bulletin established a social media presence in order to share Army Sustainment articles and relevant material from other sustainment-related commands and agencies. Readers began receiving articles through Facebook, Twitter, Milsuite, Google+, and LinkedIn. Followers liked, shared, and commented on Army Sustainment articles, which allowed the content to be disseminated even further.

The effect of all of the technological changes on how the bulletin has been produced and distributed over the last 50 years is dramatically illustrated in the diminishing number of copies printed and mailed. Circulation of printed copies of each issue has declined from a high of around 100,000 during the Vietnam War, to roughly 55,000 by 1979, to 35,428 in 1998, 26,826 in 2003, 12,033 in 2010, to 5,344 copies of the September–October 2018 issue.

For a half-century, Army logisticians and sustainers have relied on Army Logistician/Army Sustainment to be a source of information about their professions and have used it as a forum for sharing their own experiences and ideas. Thousands of authors from across the Army and the Department of Defense have contributed to making it a useful professional development medium.

The bulletin published articles on logisticians' role in all the Army's major programs and initiatives. Readers counted on the publication for information on how to sustain the latest concepts, such as AirLand Battle, Force XXI, Modularity, and Multi-Domain Battle.

The approximately 55 writer-editors, art directors, designers, and administrative assistants who have been employed at Army Logistician/Army Sustainment have worked to ensure that the bulletin provided clear and accurate information on Army and Department of Defense logistics and sustainment plans, programs, policies, and operations. The staff strives to serve the sustainment community by providing them with a journal of record and a forum for professional discourse.

From its birth during the Vietnam War, through the end of the Cold War, and through the Army's operations in Central and Southwest Asia, Army Logistician/Army Sustainment has existed for one purpose: to serve and support the Soldier and civilian logisticians and sustainers who make warfighting possible.

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Robert D. Paulus joined the Army Logistician staff in 1979 and served as the bulletin's editor from 2006 to 2012. He has a bachelor's degree in history from Montana State University and a master's degree in recreation and park administration from Clemson University.

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