

WINTER 2023

THE ARMY'S OFFICIAL PROFESSIONAL BULLETIN ON SUSTAINMENT

HIP-POCKET GUIDE

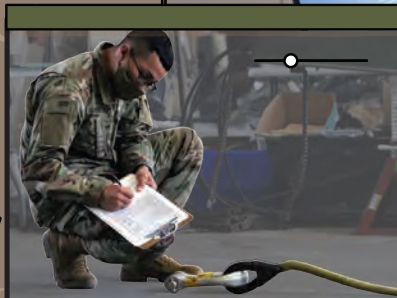
**DEVELOPING
ARMY
LEADERS**

SEE
Page 6

ARMY SUSTAINMENT

WWW.ALU.ARMY.MIL/ALOG

supply
chain
organization



standardized
assessments



self-development

blended
learning
environment

economy
of
force

EDUCATION MODERNIZATION

IN THIS ISSUE

- 4 SUSTAINING THE ARMY OF 2030**
By Gen. Ed Daly
- 6 THE ART AND SCIENCE OF EDUCATING TODAY'S SUSTAINERS FOR TOMORROW'S OPERATIONS**
By Lt. Gen. Charles R. Hamilton, John E. Hall, and Mike Crozier
- 9 SUSTAINMENT EDUCATION MODERNIZATION**
Building the Army of 2030
By Maj. Gen. Mark T. Simerly
- 13 COMMENTARY: CALL TO SERVICE**
Innovation Needed to Improve Recruiting, Retention
By Capt. James J.W. Clarke
- 16 BUILDING A MODERNIZED SUSTAINMENT CULTURE THROUGH PROFESSIONAL EDUCATION**
An Interview with Sydney Smith, President of Army Logistics University
By Mike Crozier
- 20 PREPARING FOR COMPLEXITY**
Educating Sustainers by Modernizing the Captains Career Course
By Maj. Elvin J. Fortuna
- 24 THE ANNISTON PATHWAYS PROGRAM**
A Model for Future Work-Based Learning
By Col. Eric A. McCoy and Thyris D. Banks

- 28 LOGISTICAL DISCIPLINE**
Preparing Multifunctional Noncommissioned Officers for Large-Scale Combat Operations
By Command Sgt. Maj. Jimmy Sellers
- 32 TACTICAL IMPACT FAR FROM THE POINT OF NEED**
Transforming Sustainment Operations Through Tele-maintenance
By Col. Charles A. Fisher
- 36 GLOBAL FORCE INFORMATION MANAGEMENT**
Objective Environment Provides Integrated, Data-Centric 21st Century Capabilities for the Army
By Maj. Cory Scharbo, Lori Mongold, and Andrew St. Laurent
- 38 PERSONNEL ACCOUNTABILITY & GREAT POWER COMPETITORS**
Techniques from the European Theater
By Col. Angel R. Estrada, Maj. Gamaliel Rodriguez Montanez, Maj. Jon Michael King, and Command Sgt. Maj. Amador Aguillen Jr.
- 42 ESSENTIAL TRAINING**
Sustainers Must Prepare for High-Intensity Conflict
By Maj. Michael G. Anderson and Capt. Megan J. Wood
- 48 AVIATION PERSPECTIVE**
Learn Difference Between Operational Readiness Rates, Ready-to-Launch Rates
By Chief Warrant Officer 4 Onwah Campbell

- 52 EDUCATING AGILE AND ADAPTIVE SUSTAINMENT NONCOMMISSIONED OFFICERS**
An Interview with Command Sgt. Maj. Marissa Cisneros, Logistics Noncommissioned Officer Academy Commandant
By Mike Crozier
- 56 FUTURE OF DATA EDUCATION WITHIN ARMY SUSTAINMENT**
By Col. Bob Spivey, Lt. Col. Doug Fletcher, Maj. Brian Johnson, and Dr. William Smith
- 60 EDUCATING THE NEXT GENERATION OF SUPPORT OPERATIONS PROFESSIONALS**
By Maj. Jonathan Kalczynski and Maj. Etta Wheeler
- 63 SUSTAINING SOLDIERS**
By 2nd Lt. Rayna Catino
- 66 COMMENTARY: ARMY LOGISTICS SURVIVABILITY AGAINST MULTIDOMAIN THREATS**
By Lt. Col. Ross M. Hertlein
- 70 NATIVE FURY 2022**
Distributed Sustainment, Mission Command Across the CENTCOM Theater
By Maj. Gen. Michel M. Russell Sr., Lt. Col. M. Shawn Abbott, and Capt. Taylor J. Goodwin

- 73 EVOLUTION OF ARMY CIVILIAN LOGISTICS EDUCATION IN A MULTIDOMAIN OPERATING ENVIRONMENT**
By Dr. Robert J. Neeley
- 76 LIQUID LOGISTICS**
Fuelers Build Unit Readiness for Large-Scale Combat Operations
By Maj. Derek J. Castelluccio and Chief Warrant Officer 2 Omar J. Stoddard
- 80 COMMENTARY: MANAGING CAREER DEVELOPMENT TO MEET FUTURE OPERATIONS**
By William T. Smith, Ph.D.
- 82 LEVERAGING DATA ANALYTICS TECHNOLOGY IN JOINT LOGISTICS EDUCATION**
By Lt. Col. Heath A. Mullins, Lt. Col. Matthew Strickland, Lt. Col. Nathaniel J. Groves, and Air Force Maj. Michael D. Rajchel
- 86 BEYOND THE HORIZON**
By Chief Warrant Officer 4 Timothy K. Sprague
- 90 MULTIFUNCTIONAL LEADERS**
New Blueprint for Logistics Officers
By Capt. Lakesa Cobb, Capt. Erica Gaughan, and Capt. Eric Schnell



READ ARMY SUSTAINMENT ONLINE

For current and past
issues of Army
Sustainment Professional
Bulletin, go to



WWW.ALU.ARMY.MIL/ALOG



ON THE COVER

Education Modernization is the theme of the Winter 2023 Army Sustainment Professional Bulletin. Sustainment training consists of academics, tactical, and physical rigor to develop intelligent and resilient leaders capable of thinking critically and operating in a degraded environment. (Cover design by Sarah Lancia)

BOARD OF DIRECTORS

MEMBERS

Maj. Gen. Mark T. Simerly (*Chairman*)
Commander, Combined Arms Support Command

Lt. Gen. Charles R. Hamilton
Deputy Chief of Staff, G-4, Department of the Army

Lt. Gen. Robert L. Marion
Principal Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics, and Technology

Lt. Gen. Christopher O. Mohan
Deputy Commanding General, Army Materiel Command

Lt. Gen. Paul A. Chamberlain
Military Deputy to the Assistant Secretary of the Army for Financial Management and Comptroller

Lt. Gen. R. Scott Dingle
Army Surgeon General

EX OFFICIO

Brig. Gen. Michael Siegl
Quartermaster General

Brig. Gen. Michael B. Lalor
Chief of Ordnance

Col. Beth A. Behn
Chief of Transportation

Col. Jason T. Edwards
Commander, Army Soldier Support Institute

Brig. Gen. Christine A. Beeler
Commanding General, Army Contracting Command

Brig. Gen. Anthony (Tony) McQueen
Commanding General, Army Medical Research and Development Command

ARMY LOGISTICS UNIVERSITY

Ms. Sydney A. Smith
President

Mr. Richard C. Myers Jr.
Civilian Deputy

Col. Gregory K. Gibbons
Commandant/Military Deputy

STAFF

Amy N. Perry
Editor

Frank Badalucco
Associate Editor

Robert DelBane
Assistant Editor

Sarah Lancia
Visual Information Specialist

This medium is approved for the official dissemination of material designed to keep individuals within the Army knowledgeable of current and emerging developments within their areas of expertise for the purpose of enhancing their professional development.

By Order of the Secretary of the Army:

JAMES C. MCCONVILLE
General, United States Army
Chief of Staff

Official:


MARK F. AVERILL
Administrative Assistant
to the Secretary of the Army
2304637



PB 700-23-01
VOLUME 55, ISSUE 01
WINTER 2023

PHONE: 804-765-4754 (DSN 539-4754)
WEBSITE: WWW.ALU.ARMY.MIL/ALOG

Army Sustainment (ISSN 2153-5973) is a quarterly professional bulletin published by the Army Logistics University, 2401 Quarters Road, Fort Lee, VA 23801-1705.

Mission: *Army Sustainment* is the Department of the Army's official professional bulletin on sustainment. Its mission is to publish timely, authoritative information on Army and Defense sustainment plans, programs, policies, operations, procedures, and doctrine for the benefit of all sustainment personnel. Its purpose is to provide a forum for the exchange of information and expression of original, creative, and innovative thought on sustainment functions.

Disclaimer: Articles express opinions of authors, not the Department of Defense or any of its agencies, and do not change or supersede official Army publications. The masculine pronoun may refer to either gender.

Reprints: Articles may be reprinted with credit to *Army Sustainment* and the author(s), except when copyright is indicated.

Distribution: Official (Army-funded) subscriptions to *Army Sustainment* (for organizations and individuals with a professional or operational need for this publication) can be requested through our website or by calling or emailing our offices. Subscribers should submit address changes directly to *Army Sustainment* (see address below). *Army Sustainment* also is available at <http://www.army.mil/army-sustainment>.

Postmaster: Send address changes to:
EDITOR ARMY SUSTAINMENT/ALU/2401
QUARTERS RD/FT LEE VA 23801-1705.



CALL FOR SUBMISSIONS

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

SUBMISSION GUIDELINES FOUND AT:
www.alu.army.mil/alogs/submissions.html



ARMY SUSTAINMENT PROFESSIONAL BULLETIN READER SURVEY



The Army Sustainment Professional Bulletin Survey takes just 5 minutes or less to complete but will provide critical feedback that will help us improve our publication. Provide input on the type of content you get the most out of and the ways in which you access that content, so we can better deliver the right content to the right place at the right time for you, our readers.

<https://survey.tradoc.army.mil/EFM/se/0F3923D301284B2C>



Sustaining the Army of 2030



■ By Gen. Ed Daly

It has been a great honor to serve as the Army Materiel Command's commanding general and our Army's senior sustainer these past three years. As I reflect on my career of over 35 years, I take personal

and professional pride in how much our sustainment enterprise has accomplished and the critical role we have played in support of the Army and joint force. Our ability to project, position, resupply, and sustain combat power from installations and organic industrial base depots, arsenals, and ammunition plants to the tactical points of need throughout the world has provided our warfighters a strategic advantage in every exercise and operation, across all phases of integrated deterrence/campaigning, in crisis and conflict.

To our tremendous professionals serving in key functional and multifunctional support organizations at echelon throughout our Army, thank you for spectacularly delivering sustainment

readiness in support of worldwide operations each and every day.

These past three years have brought no shortage of challenges, and in every situation, you have proven your significance, resilience, and agility. When the COVID-19 pandemic shook our nation, the sustainment enterprise went to work producing, distributing, and delivering critical personal protective equipment, vaccines, and therapeutics. In Afghanistan, not only did we sustain combat power for the Army and joint forces, but we also supported Operation Allies Welcome, establishing and providing temporary housing, medical, and logistics services to the departments of State and Homeland Security for Afghan special immigrants and their families.

In the past year, the support this enterprise has provided to Ukraine and our NATO partners and allies has been nothing short of phenomenal, delivering more than 10,000 pieces of equipment and millions of rounds of ammunition worth more than \$8 billion, all while maintaining the readiness of our Army. These examples barely scratch the surface. From significant growth in participation at Project Convergence, providing the Sensor-Shooter-Sustainer linkage to increase speed, range, and convergence in support of building the Army of 2030 and designing the Army of 2040, to the critical support provided during the DEFENDER series of exercises, to rotational support to combat training centers and (Pacific) Pathways, the list goes on and on.

The theme of this edition is Education Modernization: Building the Army of 2030, and I can unequivocally attest the sustainment enterprise is fully aligned with transformation efforts and with the National Security Strategy signed by the president in October 2022 that emphasizes modernizing and strengthening our military, specifically "to be lethal, resilient, sustainable, survivable, agile, and responsive" in support of Army and joint force multidomain operations. Secretary of the Army Christine Wormuth addressed the future of Army sustainment as a key function in building the Army of 2030 during her opening remarks at the Association of the United States Army's annual meeting last

October. She made it clear that to succeed on the future battlefield and continue to dominate the land domain, "We've got to sustain the fight across contested terrain for both short, sharp operations, as well as protracted conflicts."

We are committed to continued innovation in our approach to modernizing the sustainment warfighting function across doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy in both organizational design and materiel development, integrating capabilities including autonomous distribution, unmanned aerial and ground resupply, atmospheric water generation/extraction, modernized energy and power generation platforms, advanced manufacturing/3D printing, modernized watercraft such as the maneuver support vessel (light and heavy), and more to achieve freedom of action, extend operational reach, and prolong endurance. To that end, we are postured to build a contested logistics cross functional team (CFT), focused on sustainment capabilities, while maintaining support to all other CFTs and portfolios. From the readiness of the strategic support area to setting the theater, we must continue to execute anticipatory, agile logistics, informed by data, to provide strategic depth of materiel and all classes of supply.

The future of our enterprise is bright, and I have 100 percent confidence in the next generation of

sustainment leaders. We have stood on the shoulders of giants. Their legacy continues in the ordnance, transportation, quartermaster, human resources, and finance Soldiers and professionals who ensure the sustainment warfighting function is at the forefront of our Army's transformation efforts as we build the Army of 2030 and design the Army of 2040. It has been my absolute honor and privilege to serve shoulder-to-shoulder with all of you in this great Profession of Arms. People First! Winning Matters! Army Strong!

Gen. Ed Daly serves as the commanding general of Army Materiel Command (AMC). He served three years as the deputy commanding general of AMC in his previous assignment. He managed the day-to-day operations of the Army's logistics enterprise and served as the senior commander of Redstone Arsenal, Alabama. He served as the commanding general of Army Sustainment Command at Rock Island Arsenal, Illinois, and as AMC's deputy chief of staff, overseeing the roles and functions of the headquarters staff.

The Art and Science of Educating Today's Sustainers for Tomorrow's Operations



■ By Lt. Gen. Charles R. Hamilton, John E. Hall, and Mike Crozier

Lt. Gen. Charles R. Hamilton, the Deputy Chief of Staff, G-4, and John E. Hall, the Assistant Deputy Chief of Staff, G-4, sat down with Army Sustainment to offer their thoughts on the evolution of the Army Sustainment Enterprise's approach to train and educate its entire professional workforce for future operations in accordance with current doctrine.

Historically, the Army has leveraged unit-focused, top-down training and education to prepare its sustainers for joint operations geared toward a single adversary in a targeted theater. How will the changing future operational environment impact the development and delivery of sustainment education to best support the Army of 2030?

Hamilton: We need to be prepared to change and subsequently reinforce how we fight and sustain large-scale combat operations across multiple domains, and that all will start with training and education. Delivering predictive and precision logistics will be central to how we reconsider modern formation protection to sustain warfighters at echelon, and all of this will be done in a potentially disconnected and contested environment. Training and education are both influenced by our perception of what the next large-scale fight will require, with the understanding that a more holistic — and not strictly top-down — approach is necessary.

For instance, we know we will have to rethink how we deliver supplies in the future, which becomes increasingly complicated in a multidomain battlespace. Advancing our predictive and precision logistics capabilities by training our workforce to execute data-enabled sustainment will ensure we can deliver supplies to a dispersed unit before they're needed.

Hall: Recent updates to Field Manual (FM) 3-0, Operations, assert that combat formations frequently bypass enemy forces, so sustainment forces must be ready to protect themselves in that future environment. Naturally, these changes will drive a holistic review of FM 4-0, Sustainment Operations, to ensure our sustainment doctrine reflects the Army's operational needs at echelon. We've already started that revision process and anticipate publishing an updated FM 4-0 in early 2024. As Hamilton mentioned, training sustainers to deliver predictive and precision logistics will enhance their ability to protect and sustain area of operation. Sustainers must be

trained in both the art of maneuver and the science of logistics delivery, rooted in our understanding of how we can leverage our enterprise data to inform faster and more reliable decision making at echelon. Army Logistics University (ALU) is putting us as an Army Sustainment Enterprise on a sustainable glidepath toward that end-state through a targeted data education strategy baked into their curriculum for military and civilian logisticians.

Over the course of the last decade, how has the Army Sustainment Enterprise adapted its technical logistics training to account for the emphasis placed on data analytics skills?

Hamilton: If you look at the last 7 to 10 years, dominated mostly by counterinsurgency operations in a single theater, we became accustomed to delivering sustainment from an established forward operating base to a point of need. We know supporting multidomain, large-scale combat operations will not come with that stable luxury; the battlefield will be much faster and more complex, replete with fires. As Hall mentioned, using data to inform decisions at and across echelons is the crux of the issue. Training has been adapted to account for the reality that each logistician needs to have the knowledge and skills in their hip pockets to understand, interpret, assess, and communicate insights they can glean from our massive streams of enterprise data.

Hall: The technical science of logistics and sustainment — with data analytics at its core — is used to inform

and influence the art of command. From the civilian perspective, technical training is more available and aims to be more broadening in nature because we realize the value those analytical skills bring to the table for our warfighters. The first advice I'd offer to any logistician, whether you're a civilian or not, is to make yourself a technical expert in what you do daily — understanding that analytical expertise will inform commanders and help them make decisions with the resources they have at their disposal. Training has adapted over time to account for that large-scale, fast-paced future fight wherein rapid and reliable analytics expertise will be a game changer.

How does striking the balance between the art and science of sustainment delivery shift throughout a service member's or civilian's career?

Hamilton: From start to finish, you need to have a healthy balance in both, and much of that balance is driven by leadership and how they may choose to emphasize one or the other to influence decision-making processes. The goal of being predictive and precise while applying targeted analysis to a given situation is to make challenging decisions at echelon much easier for commanders. The scientific aspect is easy to envision through modernized capabilities such as advanced manufacturing and autonomous aerial resupply. Our ability to appropriately field those capabilities for commanders involves that balance of science and art. We must be ready to identify and use cases

with the most positive impact on our warfighters based on experience and our perception of the future fight. More often than not, this balance will be contextually fluid. Weighing art over science for one scenario may not be the optimal decision for the next, and vice versa.

Hall: Striking a balance that may be situation-dependent is key, and I think the scientific perspective today is much more challenging. We have more tools to help us analyze and make those decisions than we've ever had before, but this also comes with a huge opportunity. Those tools — everything from open-source software to enterprise resource planning systems — allow us to be more predictive and precise within the scientific realm of logistics even when our principles remain the same. I want to reemphasize the importance of ALU's efforts ensuring we as an Army have a strategy to train our logisticians to capitalize on all these tools now and in the future. Having an adaptive curriculum that allows our logisticians to pair their functional, domain-specific knowledge with the data analytics skills we need to sustain the future force is exactly what we need now to meet the Army and joint force's needs in multidomain operations.

Is there an archetype Army sustainment professionals should reflect on as they develop new skills and progress throughout their careers? Have updates to doctrine and our logistics tactics, techniques, and procedures altered this over time?

Sustainment Education Modernization

| Building the Army of 2030

Hamilton: This has absolutely evolved over time, but we don't blindly compare the modern sustainer to their past counterpart. The modern sustainer must possess holistic operational knowledge and understand how to support multiple operations in dispersed theaters. Sustainers need to also be fully synchronized with maneuver commanders, as well. The bottom line is we're all called to be stewards of our profession. You have to be well read, well trained, able to operate in all domains, and prepared to fully integrate with those warfighting functions you're called to support.

Hall: There's not necessarily one archetype that a great sustainment professional will fit. Rather, I would say successful sustainers are grounded in the science of logistics and committed to understanding the art of command while broadening their skills over time. This has been consistently reflected in doctrine. From the civilian purview in the logistics career field, we've worked over the last 10 years or so to create many more opportunities for civilians to leverage the education system to expand their skillsets and, ultimately, compete for Senior Service College slots later in their careers. This follows a different pattern than those leveraged for service members, but the outcomes have the same end-state in mind. From the Army's standpoint, we need to make sure we effectively communicate and advertise what the system offers so people understand how and why they can and should seek those broadening educational opportunities.

Knowing what you do now about the Army's approach to training, education, and leader development, what advice would you offer your younger selves first embarking on their Army careers?

Hamilton: I would tell a younger version of myself to continue to advocate for impactful education for our NCO corps. NCOs are absolutely the backbone of the Army, and their experience and educational capabilities are invaluable at the strategic, operational, and tactical level. If you're a lieutenant arriving to meet your platoon, then you can rest assured you're being given an amazing opportunity to learn from a platoon sergeant who has been in the Army for nearly 10 years, if not more. On the flip side, if you take that sergeant's experience over multiple assignments they have had at varying echelons and train them at the strategic level, then you're simply bolstering an already incredibly strong NCO corps. The bottom line here is you will learn an immense amount from the people around you and their experiences, and they will look to learn from those you bring to the table.

Hall: I'd like to echo Hamilton's comments about our NCO corps. In my past life, I was a foreign affairs officer in Latin America, where I was embedded with several of their armies that did not have an NCO corps to speak of. The difference in their readiness versus our own was shocking because of the advantage we have, thanks to the experience of our NCOs. In offering advice to a younger civilian version of myself, I'd

emphasize the importance of civilian leader development in ensuring we can recruit, train, develop, and retain the very best. Leaders at echelon need to be prepared to offer those broadening and learning opportunities to their workforce, meaning they need to be prepared to release them to go take a course or go to school. We need to send high-caliber people to available courses, although it will certainly hurt when you, as a leader, release them to seize that opportunity. However, I truly believe this will benefit the person in question and the Army as we best train, educate, develop, and retain a world-class logistics workforce that supports our warfighters better than any other organization.

Lt. Gen. Charles R. Hamilton currently serves as the Deputy Chief of Staff, G-4. He most recently served as the Assistant Deputy Chief of Staff for Operations, G-4 3/5/7. Hailing from Houston, Texas, Hamilton enlisted in the U.S. Army. Upon completion of basic and individual training, he was assigned to Fort Hood, Texas. In February 1988, he graduated from Officer Candidate School as a distinguished military graduate and was commissioned as a second lieutenant in the Quartermaster Corps. He earned a Bachelor of Science in business administration from Virginia State University and master's degrees in public administration from Central Michigan University and Military Studies from Marine Corps University. He is also a graduate of a Senior Service College Fellowship — Secretary of Defense Corporate Fellows Program.

John E. Hall currently serves as the Headquarters Department of the Army Assistant Deputy Chief of Staff, G-4 (Tier 3), responsible for Army logistics plans, policy, and programs. Prior to this assignment, Hall served as the Deputy to the Commanding General, Combined Arms Support Command. Hall is a graduate of the U.S. Army War College and holds a Master of Arts in Latin American studies from Stanford University, California, and a Bachelor of Arts in political science from Arkansas State University.

Mike Crozier is a strategic analyst in the Army G-4's Logistics Initiatives Group. He holds bachelor's and master's degrees from Georgetown University.



■ By Maj. Gen. Mark T. Simerly

As the Army modernizes how we fight, what we fight with, and who we are, we must invest wisely in educating sustainment professionals to provide holistic sustainment capabilities across a multidomain environment. It requires sustainers to rapidly describe what happened, diagnose

why it happened, and apply the analytical competencies and skills that enable them to prescribe optimal actions that account for interrelated effects across the industrial base, the global distribution system, and the complex, multidomain battlefield. Additionally, all sustainment warriors must be tactically proficient and mentally resilient to adapt and thrive in large-scale combat operations (LSCO).

We are modernizing education across all cohorts to ensure professional military education (PME) and officer and warrant officer initial military training systems are responsive to acquiring and integrating new technologies while maintaining a distinct focus on sustainment fundamentals, leader development, and the knowledge, skills, and behaviors expected of sustainment leaders as part of the combined arms team. We recognize the importance of continuously assessing our education system

to expertly develop our leaders and keep pace with unmatched technological advancements. Our education system must be the foundation upon which training and experience build and enable sustainment leaders to operate successfully in any environment.

Redefining Rigor

As part of the Combined Arms Center (CAC) effort to increase competency and performance outcomes in the learning environment, Combined Arms Support Command (CASCOM) is developing a framework for rigor in sustainment PME. Starting with the Basic Officer Leadership Course (BOLC), we are implementing a three-pronged approach that includes academic, tactical, and physical rigor. The combined experience of the three rigor components is designed to develop intelligent and resilient leaders capable of thinking critically and operating in a degraded environment.

Rigor has been deliberately modulated throughout BOLC to achieve four main outcomes. Students must be physically capable of moving rapidly and fluidly, under load, in a simulated combat environment. Academically, students must think critically in complex environments. Tactically, students must competently and confidently apply individual and collective skills to operate as a warrior and a member of a team at the platoon level. Lastly, resiliency to stress is achieved by increasing, decreasing, and combining the three aspects of rigor throughout the course.

Sustainment Common Core

The ability to conduct sustainment operations in contested theaters before and during armed conflict requires a community of professionals capable of effectively integrating the sustainment warfighting function (WfF). Regardless of specialty, every sustainer must understand how functional tasks and systems relate and connect to ensure freedom of action, extended operational reach, and prolonged endurance. Our education system must maximize every opportunity as we develop logistics and sustainment leaders for multidomain operations. We must provide Army officers, warrant officers, and NCOs with the foundational knowledge of core logistics and sustainment functions required to operate in current and future operational environments. Through the integration of Sustainment Common Core, CASCOM will arm students with a foundational understanding to make

immediate contributions as a part of combined arms teams in LSCO environments.

Introducing Data

Future conflicts will be highly complex, lethal, mobile, and rapidly evolving, accelerated by emerging technologies like artificial intelligence, machine learning, nanotechnology, and robotics. The multidomain environment demands and requires our forces to become more integrated, precise, predictive, and adaptive. Leaders can no longer make decisions in silos. The future battlefield will involve multilayered and interconnected domains, requiring Soldiers to find relationships between seemingly unrelated data streams. They must intrinsically consider many factors across multiple domains and leverage data to enable immediate and lasting military advantage.

Army Logistics University (ALU) is developing a program of sequential and progressive levels of data education embedded in PME for officers, NCOs, and civilians throughout their careers. Additionally, talent management will identify exceptional sustainers and connect them with the right opportunities to create sustainment data specialists. This approach will include expanding existing PME and functional courses, developing exportable interactive multimedia instruction (IMI) and programs of instruction (POIs), assessing civilian academic programs for equivalency, and increasing access to advanced academic degrees. The proposed

approach will be practical rather than theoretical, blending math and computer skills with sustainment WfF requirements.

The Adjutant General (AG) and Finance and Comptroller Schools are leading multiple data analytics training and education efforts. Data analytics is incorporated into the AG Captains Career Course (C3) with 32 hours of instruction that cover data literacy, analytics, and visualization using Power BI, macros, and Excel formulas. Finance has incorporated the Basic Analytics Course into BOLC and is piloting the implementation of the Intermediate Data Analytics Course into the C3. Their NCOs and Advanced Individual Training Soldiers receive hands-on General Fund Enterprise Business Systems training and introductory basic data analytics training, soon transitioning into a full 40-hour block of instruction. They continue to partner with the University of South Carolina and have developed online options for data analytics courses that ensure widespread availability.

Joint Education

In partnership with the Joint Staff J-4, ALU continues to expand joint logistics educational opportunities. The Joint Logistics Course provides intermediate-level officer, senior NCO, and Department of Defense civilian logisticians an understanding of organizations, authorities, and processes associated with the joint logistics enterprise and the ability to apply joint logistics

doctrine in a joint, interagency, and/or multinational environment.

We are in midstream in developing the Joint Sustainment Planners Course (JSPC) and in the early stages of developing a Joint Data Course. The JSPC will focus on joint planning and operationalizing logistics information and plans to support the commander's intent in a dynamic environment. The core audience would include combatant command logistics planners and planners from service headquarters that directly support joint logistics operations such as Army theater and expeditionary sustainment commands. The Joint Data Course will focus on creating common logistics visualizations and conducting analytics using service-specific logistics systems and information available in Advana.

Logistics (LOG) BOLC Redesign

Since 2018, CASCOM has trained newly commissioned lieutenants to be multifunctional logistics officers. The decision to train this way was predicated on how logisticians at all ranks are being managed. Many lieutenants do not serve in their basic branch in their first assignment, frequently serving in other logistics positions before they attend the career course. We recognized we must train logistics lieutenants to be capable of operating in the way they are being employed.

In early 2021, ALU began redesigning the LOG BOLC course with branch proponents. The

redesign shifted focus to LSCO, implementing the Training and Doctrine Command (TRADOC) U.S. Indo-Pacific Command scenario throughout the course. This scenario drives all lesson plans and practical exercises. The redesign effort didn't stop in the classroom. New physical fitness standards, including a 12-mile ruck march and 4-mile run, were incorporated to help inculcate the winning warrior mentality. Dinings-in, physical readiness training challenges, and other extracurricular events are all executed from operation orders the students must write have all been implemented. The course builds toward a three-week field phase, which includes range operations, weapons employment, and land navigation. The phase culminates in a 96-hour opposition force driven exercise where lieutenants establish and defend field sites and conduct logistics convoy operations in support of a maneuver battalion. The course has been redesigned academically, physically, and tactically to modernize the logistics lieutenants' capabilities and warrior mentality.

Captains Career Course Redesign

The Logistics (LOG) C3 is implementing a modernized POI to which it will transition in April 2023. Significant updates include the addition of a distance learning prerequisite, enabling the resident course to incorporate new data, supply chain, and threat lessons to better prepare officers to conduct logistics and sustainment operations supporting LSCO in a multidomain environment. The resident portion

Our education system must be the foundation upon which training and experience build and enable sustainment leaders to operate successfully in any environment.

of LOG C3 remains a permanent change of station course scheduled for 20 weeks and three days.

The CAC and Army University designed and implemented distance learning as part of the C3 Common Core. The distance learning course includes a course introduction and five modules: Army Profession, Mission Command, Operations, Operations Process, and Training. Officers register for distance learning through the Army Training Requirements and Resource System and complete the training through the Army Learning Management System (ALMS) before arrival at LOG C3. The course can be accessed by searching the ALMS course catalog for "Captains Career Common Core (9-00-23 (DL))."

Warrant Officer PME Modernization

As part of an overarching CAC initiative, we are modernizing Army warrant officer PME to establish a more effective and efficient continuum of education tailored to develop military occupational specialty (MOS) centered on technical and tactical expertise. We will provide PME focused on MOS-specific employment, which increases learning across modalities and supports all Army compos. It will meet Army warrant officers' personal, functional, and career professional developmental requirements and is nested with the Army People Strategy. The end-state is a career-long continuum of training, education, and skill assessments, centered on MOS and branch technical and

tactical knowledge and skills that enable Army warrant officers to provide the needed expertise and meet the demands of Army 2030.

NCO PME Modernization

Throughout fiscal year 2022, ALU's Logistics NCO Academy (LNCOA) led a digitization effort for NCO Common Core Competencies NCO (CCC) lessons, a TRADOC initiative. ALU LNCOA began delivery of a multi-phased approach that capitalized on the latest technology by utilizing a blended learning environment (BLE). The BLE is modernized learning that delivers NCO CCC to Advanced and Senior Leader Course NCOs, arming them with tools that refine their leadership skills and multiple core competencies such as leadership, readiness, operations, program management, training management, and communication. NCO CCC directly supports the Chief of Staff of the Army's Golden Triangle and the Sergeant Major of the Army's This is My Squad. The ALU LNCOA served as the pilot for NCO CCC execution from October 2021 through May 2022. On Oct. 1, 2022, we began executing the approved lesson plans. More than 851 NCOs have participated in the synchronous virtual learning environment.

Modernizing Civilian Logistics Training and Education

We are actively partnering with the Army Civilian Career Management Activity — Logistics Career Field and U.S. Army Materiel Command teams to modernize civilian logistics

education. More specifically, we are redesigning functional courses, integrating distributive learning, blended learning, and introducing IMI into the delivery strategy. We are developing the Data Analytics Instruction Learning Strategy to be similar to our military courses. Our intent is to develop civilian education that is relevant, value-added, and cost-effective while ensuring Department of the Army Civilians are afforded training and education opportunities that meet the enabling force competency requirements and contribution to multidomain operations.

As we prepare for the next fight, CASCOM will continue modernizing sustainment education to maintain momentum, extend reach, sustain forces, and provide commanders with decision dominance on the complex future battlefield.

Maj. Gen. Mark T. Simerly serves as the commanding general of the Combined Arms Support Command at Fort Lee, Virginia. He previously served as the commander of the 19th Expeditionary Support Command. He was commissioned as a lieutenant of Air Defense Artillery and awarded a Bachelor of Arts Degree as a Distinguished Military Graduate from the University of Richmond. He holds a Master of Science in national resource strategy from the National Defense University and a Master of Military Arts and Sciences Degree from the Army Command and General Staff College.

Call to Service

Innovation Needed to Improve Recruiting, Retention
By Capt. James J.W. Clarke

The call to service is, often, going unanswered. Army Chief of Staff Gen. James McConville acknowledged the daunting challenge facing Army recruiters when he described the quest to find recruits as a "war for talent." By all accounts, the Army is not winning this war. This decline is occurring despite the potential for recruits to receive up to \$50,000 in combined enlistment incentives. Unfortunately, money alone is not enough to turn the tide.

If the Army is to win this war for talent, it must innovate on the recruitment and retention battlefield. The Army must reach

back further and start investing in America's youth to help raise the percentage of individuals eligible to serve. Next, the Army must change its recruiting strategy by reintroducing the American people to the meaning and importance of serving in uniform. This campaign should show potential recruits the benefits and challenges of life as a Soldier while also attempting to win over the families of those recruits. The Army needs to continue to identify and address retention problems, as our inability to retain talented individuals compounds our recruiting woes.

Sustainers must acknowledge the fundamental requirement for

sustainment is manpower, and that requirement starts with us. A logistician's mission is to support the warfighters, and if they aren't in place, well trained and ready to fight, what is supplied does not matter.

If the Army wants more people to come through the door, it must first increase the number of people in line outside. During a visit to Fort Leonard Wood, Missouri, earlier this year, McConville said, "Right now, only 23 percent of Americans are qualified to serve their country," while fewer still have any desire to lace up a pair of combat boots. The Army needs to look for ways to invest in the development of the



Director of the Mission Command Center of Excellence at Fort Leavenworth, Kansas, Brig. Gen. Jason Slider recites the Oath of Enlistment with four recruits at the Professional Armed Forces Rodeo in Topeka, Kansas, Oct. 22, 2022. (Photo by Pfc. Joshua Holladay)

next generation, funding programs that educate, exercise, and energize youth to live up to their full potential. This is no simple task, which is why the military should partner with preexisting programs, bolster their resources, and tweak their offerings to ensure the physical and moral education being offered meets the Army's goals. Investing in these programs will help build the line outside, increasing the percentage of eligible young Americans to serve. This investment aims to increase the

recruiting pool's size by reducing the number of children who would be disqualified from service because of their physical condition, previous drug use, or prior encounters with the legal system.

Increasing the size of the population eligible to serve is a necessary first step, but it must be paired with a modern recruiting program if the Army is to win this war for talent. The existing recruiting program involves

thousands of professional and passionate Soldiers going to schools and local communities to entice young people to serve. While effective in the past, the reality of the present dictates we find a new method. McConville also stated that a staggering 83 percent of the young men and women who come into the Army are from military families. Many of these individuals never needed a recruiter to tempt them into service, for they were already connected to, and familiar

with, the military. The Army must seek to reintroduce military service to the average American, because as the American public grows ever more disconnected from military service, and the number of military families with children available to serve continues to decline, recruiting woes will only increase.

We must reach youth who have yet to become familiar with the Army. One possible way would be to combine traditional recruiting efforts with regionally aligned demonstration teams. Demonstration teams would expose the average American to what a day in the life of a Soldier involves, including physical training, vehicle maintenance, air assault operations, and force-on-force training. The goals of these demonstration teams would be to educate and inspire, giving the recruiters a chance to show, rather than just tell, what the Army is. When young people watch the Blue Angels or the Thunderbirds, many think they would also one day like to soar through the sky piloting a jet. Demonstrating Army capabilities in communities across the nation can inspire the next generation to join the Army formation one day.

The Army must do more than simply inspire the youth of America to serve; it must also educate and motivate the older generations to encourage military service. The Army is missing an important part of the recruiting puzzle by failing to target those who would help influence the decisions of potential

recruits. Army professionals must educate those well over the recruitment age about the myriad benefits of military service. Through this education, more recruiters are created, dramatically increasing the likelihood that a young man or woman will come knocking at the Army's door to sign up to serve or simply to learn more. McConville says we must be more than a military family business; we must be an American family business. If the Army is to become an American family business, it must start by reaching out to the American family, not just the American child.

As the Army seeks to bolster recruiting, it should simultaneously work to retain our talented Soldiers better since each Soldier who leaves creates another vacancy for recruiters to fill. The Department of the Army Career Engagement Survey provides clear evidence of why Soldiers leave while suggesting some critical areas of improvement. The top reasons to leave the Army are the effect of deployments on family or personal relationships, the impact of Army life on significant others' career plans and goals, the impact of Army life on family plans for children, and the degree of stability or predictability of Army life.

Failing to address these issues does more than simply cost us Soldiers in the short term; it also dramatically increases the recruiting challenges in the long term. When disgruntled service members leave the military because one of these

issues was not properly addressed, they are unlikely to encourage the children of their new community to volunteer to serve. Instead of a positive influence, motivating a young person to join our formation, we have a negative one, advising the youth of America about how poorly they were treated while in uniform. Each person we lose to one of these issues does considerably more harm to our recruiting mission than we acknowledge.

Our recruiting challenges are not going away, but the all-volunteer force may, if it continues down the present course. Today's war for talent is on and it's being fought with yesterday's equipment and tactics. The Army must adapt and innovate by investing in youth, modernizing how it educates and connects with the average American, and doing more to support and empower those already in the service.

Capt. James Clarke is currently a student in the Logistics Captains Career Course. He previously served as the executive assistant to Maj. Gen. Deb Kotulich, an aide-de-camp to Maj. Gen. Gavin Lawrence, and as a logistics element commander deployed to Eastern Syria. He was commissioned as a quartermaster lieutenant and awarded a Bachelor of Arts as a Distinguished Military Graduate from Harvard College.



Building a Modernized Sustainment Culture through Professional Education

An Interview with Sydney Smith, President of Army Logistics University

■ By Mike Crozier

Since April 2021, Sydney Smith has served as President of Army Logistics University (ALU), which comprises three colleges and a Noncommissioned Officer Academy for military and civilian logistics leaders at Fort Lee, Virginia. A 1992 graduate of Davidson College, Smith was commissioned as a quartermaster officer through Davidson's Reserve Officers' Training Corps program after completing a Bachelor of Arts in Psychology. Throughout her career in uniform, Smith commanded at multiple echelons and served in varying staff assignments both at home and on deployment to Afghanistan, Iraq, Korea, and El Salvador. She now oversees ALU's workforce of more than 500 logistics professionals tasked to train, educate, develop, and certify the Army's logisticians to meet the sustainment needs of the Total Army and joint force. Army Sustainment sat down with the former

director of the Combined Arms Support Command's (CASCOM's) Fielded Force Integration Directorate to discuss the challenges and opportunities facing ALU as it prepares the next generation of the Army's logistics leaders.

ALU has expanded greatly since its inception in 1954 as a 12-week Army Supply Management course. How has its mission and scope changed over time to meet the educational needs of the Army sustainment enterprise?

The evolution of ALU from the 1950s onward has really tracked the evolution of logistics as a science and key enabler of the warfighting function writ large. From the industrial base in the strategic support area to the very far tactical point of need, there's been a shift in how we view each sector of sustainment as inherently

interconnected. Everything from supply sourcing to final delivery and maintenance needs to be integrated, but in the past, most approaches were segmented; your procurement and distribution channels may have been divorced, for example. The same held true for training and education, which only emphasized disconnectedness. ALU has adapted over time, most notably in the 1960s, 1990s, and the present day, to nest with guidance from Army Materiel Command (AMC) and Training and Doctrine Command (TRADOC). AMC has helped us tailor and target our education to a diverse logistics workforce, and TRADOC has helped us deliver that training to a broader scope across the Army. For instance, in 1991, the Combined Logistics Officer Advanced Course was established to provide integrated training across logistics branches. ALU was

then established, as we now know it, in 2009 to further synchronize and deliver professional military education (PME) for those three logistics branches: ordnance, quartermaster, and transportation. Our next evolution integrated other key sustainment functions, such as human and financial resources, into our training methodologies, which also account for a more data-enabled force. Moving into 2023, I'm excited to say we will redesignate ourselves as Army Sustainment University to reflect this more holistic approach, as well.

You have served as ALU's president since April 2021. What have been some of your key accomplishments during that tenure? What are you most looking forward to in 2023 in terms of academic programming across ALU's three colleges and its Noncommissioned Officer Academy?

The criticality of in-person learning can't be overstated, but we're still taking advantage of those learning opportunities that can and should be delivered virtually for the benefit of our students.

As I mentioned earlier, our ability to integrate logistics training and education has been a major foundational accomplishment of the ALU team. In 2021, we made a concerted effort to identify a common curriculum across the three logistics branches to implement within the Logistics Basic Officer Leadership Course. We revamped the program of instruction that firmly aimed to build multifunctional logistics lieutenants prepared to operate across echelons regardless of their branch. That curriculum is tactically focused and progressive in nature, preparing lieutenants to hit the ground running

when they arrive in their platoon. Feedback thus far has been positive, but we will continue to listen and refine moving forward to ensure our students leave ready to act decisively to enable sustainment delivery in contested scenarios. Another key initiative has been our approach to data analytics training and clearly identifying the competencies our workforce will need moving forward to enable multidomain operations. We've coordinated with the Army's Chief Data Officer to help us set the foundation for what the curriculum needs to look like and how it must be ready to adapt



Army Logistics University (ALU) President Sydney A. Smith and Command Sgt. Maj. Marissa Cisneros converse with Diane Williams (right), widow of past ALU President Michael K. Williams, following a memorialization ceremony on July 1, 2021, renaming the multipurpose room at Heiser Hall as the Williams Multipurpose Room. Williams died in May 2020 while in office. He became ALU president in 2016. (Photo by T. Anthony Bell)

quickly. Our end goal is to incorporate comprehensive data analytics education across all our schools by 2028. Additionally, our enduring relationships with AMC and the Army Civilian Career Management Activity (ACCMA) have been pivotal in ensuring our PME exhaustively accounts for civilian needs in lockstep with those of our Soldiers. From courses covering supply chain optimization and Army Campaign Plan operationalization, our partnerships with AMC and ACCMA have been pivotal in how we train our civilians in their technical profession.

From your perspective as ALU's president, how do you approach delivering a curriculum that strikes an appropriate balance between the art and science of sustainment?

That balance requires constant attention and management; it's a fluid issue based on a given educational context. I'll guide the conversation toward the doctrinal perspective and the need for our training to be agile as we've evolved as an institution over time from the 1950s onward. To balance the art and science of leader and technical education is to be agile while meeting the needs of the Army as they evolve in new operational contexts. The key to this is synchronization across the logistics branches, the greater modernization enterprise, and the field writ large. ALU's Board of Directors contains the three logistics branch commandants, so I'm able to bring educational challenges directly to those leaders to seek guidance on how we can adjust the curriculum to find that balance based on what they see as pressing needs or gaps in the field. These updates become common across our suite of PME and are approved by CASCOM leadership. Our instructors, too, play a pivotal role in this process, so we know it's absolutely critical we invest in their development and modernization, as well. Training future leaders to be agile and adaptive begins with their instructors and their broad technical understanding of Army doctrine and its supporting strategic initiatives. We're also working to remove barriers between developing a curriculum and its delivery by our instructors. This will help us adapt to changing requirements in the field, within doctrine, or even specific to materiel.

ALU is called to train and educate roughly 20,000 logisticians annually from the U.S. and more than 80 partner nations. What are some of the key challenges and opportunities that come with that massive footprint? How did the on-set of the COVID-19 pandemic in March 2020 impact your pedagogy?

COVID-19 forced us to fundamentally change the way we delivered on our mission as an educational institution, and we certainly weren't alone. With that challenge, however, came the perfect test for the ability to adapt and experiment to keep our focus on our students. The scope of what we do didn't change, but our media for delivery simply had to shift. We were able to transition rather seamlessly into a fully virtual classroom environment while noting some key advantages in flexibility thanks to that delivery. We're now leveraging a blended learning environment that can account for opportunities where in-person learning can and should be executed to optimize leader development. After conducting an internal analysis examining blended learning and student outcomes, we were able to conclude that maintaining that balance would continually benefit our students. The criticality of in-person learning can't be overstated, but we're still taking advantage of those learning opportunities that can and should be delivered virtually for the benefit of our students. We've been able to meet the needs of our combatant commands (CCMD) more effectively through virtual, sometimes asynchronous, delivery. Instead of a two-week course in person, we can adjust that course to span one month for CCMD staff to participate from afar using half days of instruction while still meeting their mission needs in theater. As we carry these lessons forward into 2023, I'm excited to see how we'll continue to build that sustainment culture across the Total Army that ensures our education keeps pace with modernization.

Mike Crozier is a strategic analyst in the Army G-4's Logistics Initiatives Group. He holds bachelor's and master's degrees from Georgetown University.

Feature Photo
Army Logistics University (ALU) President Sydney A. Smith answers a question regarding the relocation of ALU students as a result of Operation Allies Refuge in the Williams Multipurpose Room at Heiser Hall on July 28, 2021. (Photo by T. Anthony Bell)



Preparing for Complexity

Educating Sustainers by Modernizing the Captains Career Course

■ By Maj. Elvin J. Fortuna

In increasingly uncertain and rapidly changing environments, sustainment is a complex activity that Army Doctrine Publication 4-0, Sustainment, requires the “coordination, integration, and synchronization of resources from the strategic level through the tactical level.” In multidomain operations, the cognitive demands on captains required to sustain Army forces will only continue to increase. The modernized Captains Career Course (C3) for fiscal year 2023 better prepares officers to meet the increased cognitive demand of the multidomain battlefield by implementing a blended

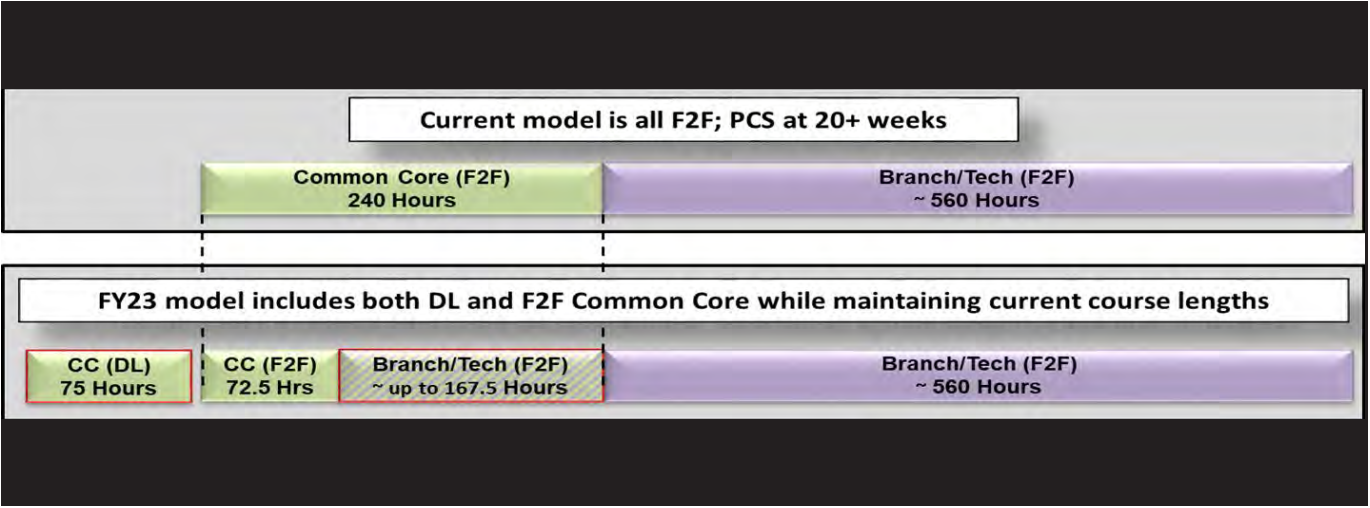
learning model for professional military education.

Modernization Planning

The Combined Arms Center directed Army University to lead the C3 modernization effort for fiscal year 2023 to better train and educate captains preparing to deal with the challenges of multidomain operational environments, now and in the future. Army University, through its Office of the Vice Provost for Academic Affairs, was the proponent of the common core for the C3, while schools and centers would remain responsible for their branch-specific curriculum.

Modernization is a continual process that involves synchronization across the Army enterprise. In educational modernization, this synchronization involves a constant dialogue between key enterprise stakeholders. Army University conducted design and deliberate planning from January to November 2021 for the C3 modernization effort. Key stakeholders included Human Resources Command, Training and Doctrine Command, the Combined Arms Center, and representatives from schools and centers.

A significant challenge during planning became how to balance



Current and FY23 distant learning (DL) and face to face (F2F) models. (U.S. Army Graphic)

standard requirements for all active duty officers while allowing schools such as Army Logistics University to grow experts in branch-specific knowledge and skills. Army University looked to various models to provide flexibility without sacrificing their education quality. Army University considered many options during planning, including temporary duty versus permanent change of station statuses for course attendees, course length modifications, and changes to online and blended modalities.

As planning continued, it became clear to the planning team that a blended learning model brought many benefits and allowed for quicker implementation of the modernization initiative. By creating interactive multimedia instruction (IMI) for a distributed learning component that complemented the instruction done in residence, Army University could implement the modernized course in fiscal year 2023 without changes to course length or mode of attendance.

The schools and centers agreed to the concept, and there was a unity of effort toward three deliberate outcomes for the C3

Modernization Effort Outcomes

The first outcome of the modernization effort was to streamline the common core for all C3s. The common core for fiscal year 2022 consisted of 240 hours of face-to-face instruction. In a 20-week course such as Logistics (LOG) C3, the common core would take almost a third of the available time for instruction, which is critical time needed to educate sustainers. Army University identified redundancies and kept only necessary learning objectives.

Army University reduced the C3 common core by over a third, resulting in a redesigned common core of 147 hours. These 147 hours of instruction remained in the five-module structure from the fiscal 2022 common core. The Army Profession, Mission Command, Operations, Operations Process, and Unit

Training Management modules were reduced in length, with significant reductions to the Operations Process module.

The second outcome of C3 modernization was implementing a blended learning model. Seventy-two and a half hours of the common core consisted of learning objectives at the lower levels of Bloom’s revised taxonomy of learning objectives: remembering and understanding. The related lessons were removed from face-to-face instruction and converted into IMI. Shifting to a blended learning model has the added benefit of aligning distributed learning across all components; active duty and reserve components will now take the same IMI on the Army Learning Management System (ALMS).

The new IMI is available on the ALMS as of Oct. 1, 2022, for identified officers slated to attend the C3 in residence in fiscal year 2023. The new distributed learning requirement ensures all officers have

a common understanding of critical concepts before learning more advanced skills and knowledge.

Army University deliberately chose a blended learning model for the modernization effort. Blended learning is a model in which developers combine face-to-face instruction with online learning, whether asynchronous or synchronous. In the 2013 edition of Teachers College Record, Dr. Barbara Means and others found that learners learned best in blended learning environments and that blended learning was more effective than either purely online or in-person learning. By using a blended learning model, Army University expects improved individual learning outcomes for all captains.

The last outcome of the modernization effort was more time allocated back to schools and centers to teach branch-specific knowledge and skills. By implementing a distributed learning common core and realigning and streamlining learning objectives, Army University reallocated 167.5 hours of instruction back to schools and centers. This additional time allows schools such as Army Logistics University to expand the breadth of topics covered. It also allows schools and centers to investigate critical topics specific to their specialties.

The reallocation of time back to schools and centers enables higher levels of learning done in collaborative environments. Topics such as sustainment in

multidomain operations, strategic base connections to the tactical level of sustainment, and leadership and management of sustainment organizations require more than rote memorization and recall. By focusing time in the schoolhouse on the application instead of simply remembering and understanding, captains are better prepared to arrive at their next unit of assignment and practically use their knowledge. In other words, the modernized C3 increases knowledge transfer from the school to the field.

Implementation and Impacts

The common core distributed learning elements of the C3 are available on the ALMS. Officers must enroll in and complete the 39 lessons before attending the resident phase of the course. Army University designed the distributed learning lessons for completion as self-development during the time an officer is promotable to captain. Officers will have 18 months or more to complete the lessons and allow officers and their leaders to balance their requirements with unit priorities.

Officers attending their respective C3s in person, such as LOG C3, will see the modernized curriculum implemented in the classroom as early as April 2023. Officers will experience a shorter but rigorous common core component in residence. Additionally, officers will go much more deeply into applying branch-specific skills and knowledge throughout the resident phase.

Conclusion

Multidomain operations in contested, uncertain, and complex environments demand higher levels of cognition from officers involved in the sustainment warfighting function. The modernized C3 is a significant step toward preparing captains to synchronize, coordinate, and integrate sustainment in this new environment. By transitioning to a blended learning model and creating the space needed to go in-depth into the complexities of the sustainment warfighting function, captains will arrive better prepared to fight and win on the battlefields of the 21st century.

Maj. Elvin J. Fortuna is currently serving as an instructional designer in the Office of the Vice Provost for Academic Affairs at Army University. Since July 2021, he has contributed to the Army’s Captains Career Course modernization effort to transition toward a blended learning model. He is a doctoral student in Michigan State University’s Educational Psychology and Educational Technology program. He holds a bachelor’s degree in philosophy from the University of Maryland, College Park, a master’s in management from the University of Maryland, University College, and a Master of Arts in higher education administration from the University of Louisville. Fortuna is a demonstrated master logistician who has deployed in support of Operations Iraqi Freedom and Enduring Freedom.

Feature Photo
Logistics Basic Officer Leadership Course students practice an improvised litter technique utilizing uniform blouses and tent poles at Fort Lee, Virginia, on Dec. 10, 2019. (Photo by Maj. Chris Lancia)

The Anniston Pathways Program

A Model for Future Work-Based Learning

By Col. Eric A. McCoy and Thyris D. Banks

As we shape the Army of 2030, military and civilian leaders continue to acknowledge our system of education has drastically changed, and the use of technology in education has subsequently gained widespread popularity. Modernization is not limited to facilities. To prepare our Army for multidomain operations, we must modernize equipment, technology, and people. The modernization of people, particularly in the areas of training, recruiting, and personnel management, is entering a new frontier.

Learning will never be the same. COVID-19 has contributed to the process of digitization in education in a dramatic way, and many of

the advantages of online, flipped classrooms, and blended learning are being applied and increasingly appreciated throughout the entire education system. The modernization

of education accelerated by the pandemic has made students, education professionals, and community stakeholders use, learn, and understand modern education technologies and tools in effective ways. Anniston Army Depot (ANAD), Alabama, has not been immune to these challenges. However, it has a unique permeation of the federal Pathways Program, outlined in the Code of Federal Regulations, 5 CFR Part 362, that has enabled the depot to effectively partner with our local and state government to maintain a pipeline of talented workers.

It is a known fact that maintaining a highly skilled workforce can be a challenge for any industry. A workforce analysis conducted by ANAD 24 years ago revealed that based on projected retirements, neither our local recruitment area nor the local technical colleges would produce enough qualified applicants in the depot's skilled trades areas. The unforeseen agitation yielded an invaluable gem, the ANAD Career Academy Co-Op Program (Technical College Trades). Established in 1999, this program serves as an example of work-based learning programs for government, business, and academia.

Background

The depot's recruitment efforts in the initial co-op program were focused on mechanics, machining, and welding areas, expanding in 2006 to hydraulic/pneudraulic and in 2007 to electronics. The demand for co-op students helped increase enrollment in our two local technical

colleges. However, these efforts were not producing enough qualified applicants to address our projected hiring needs.

In response, the co-op developed a three-phased program. Students are recruited either through the high school program (Phase 1) or directly through the technical college program (Phase 2). Once students have successfully completed their technical college course of study, they are eligible for noncompetitive conversion to a permanent position based on space availability. The permanent positions are targeted to the journey level of their trade (Phase 3) noncompetitively.

Once the selection phase is complete, students are required to complete two weeks of onboarding. This involves a myriad of training and instructions such as personal protective equipment issue and training, Sexual Harassment/Assault Response and Prevention, equal employment opportunity, suicide prevention training, environmental and hazardous waste safety, cardiopulmonary resuscitation and cardiac arrest defibrillator training, lean processes and concepts, voluntary protection program, Occupational Safety and Health Administration, and Army regulatory guidelines, which include fall protection, machine guarding, confined space, welding operations, etc. Students leave the two-week orientation well-versed in Army Values, safety protocols, and how to navigate in an industrial environment.

The ANAD Pathways Program operates morning and afternoon sessions. Depot skilled journey level employees are used as trainers to provide on-the-job training. Students are recruited from 47 high schools in 11 counties. The program recruits high school students from public, private, and home-schooled students within a 55-mile radius. The primary purpose of the 55-mile radius is for student safety. Upon graduation from high school, students transfer to Phase 2 of the program, where students attend Gadsden State Community College. Tuition and books in this phase are funded by the depot. During this phase, students also receive on-the-job training in the shop area they will be assigned upon graduation.

Pathways interns in the technical college program are converted to a career-conditional appointment in a wage grade position with a target grade. After successful completion of a one-year trainee period at each grade level from entry to midpoint to target-performance level, they are eligible for promotion to the next grade, based on the series and specified target grade. Students in wage grade positions are eligible for promotion to Student Trainee (Laborer), WG-3501-04, after completion of three semesters of vocational study leading to a certificate or diploma and one period of Student Trainee (Laborer) work experience (320 hours). The promotion decision is made by the supervisor based on completed academic requirements and successful demonstration of skills outlined in the training plan.



Two student trainee laborers in the Pathways Technical College program reassemble troop seats for a Stryker vehicle at Anniston Army Depot, Alabama, on April 12, 2021. (Photo by Mark Cleghorn)

Over the years, students have competed in SkillsUSA, which is a partnership of students, teachers, and industry working together to ensure America has a skilled workforce. We help each student excel. As a nonprofit National Education Association, SkillsUSA serves middle school, high school, and college/post-secondary students preparing for careers in trade, technical, and skilled service occupations. Students from the Anniston Army Depot Career Academy at the high school and technical college levels competed at the local, state, and national levels, winning numerous medals. This exemplifies the quality of instruction and training students receive in the program.

Pathways in the COVID Environment

The pandemic created unique and unprecedented challenges. During

the recruitment process, many schools conducted classes through remote learning, making it difficult for counselors and career coaches to assist students navigating through USA Jobs to submit the required material in students' resumes. To help with these challenges, we consistently maintained contact with principals, teachers, counselors, and parents throughout the hiring process. We extended the application submission for several additional weeks to ensure students had opportunities to apply for consideration to the program. We also permitted students to interview remotely, where in the previous years, all interviews were conducted in person only.

In preparation for the incoming class, we implemented safety protocols to mitigate student and instructor exposure. Since we cannot conduct training of this nature online, the

depot took measures to ensure a safe learning environment. Students were temperature checked daily, and classrooms were thoroughly sanitized twice daily. The faculty went to great lengths to ensure parents all recommended protocols were followed to minimize student exposure.

Pathways and the Modernization of the Organic Industrial Base

At its peak, the high school co-op program operated a morning and afternoon session and had a capacity of 60 to 100 students annually, depending on a two-year projected workload requirement. In the immediate future, ANAD will introduce the High Velocity Training Center to our workforce, which will allow the depot to upskill its current team members and train the pipeline for our incoming workforce. This will dramatically decrease the training

time to get our artisans up to speed and help modernize the way we do business. The High Velocity Training Center will utilize some of the newest technology, such as virtual welders and training methods, to improve workforce capability. We anticipate cost savings by cutting down on materials and helping our workforce utilize their full potential with a better understanding of their day-to-day missions.

Partnering with Alabama

To enhance the Pathways Program outreach and ensure the program's involvement with changing patterns and shifts in the workforce climate, ANAD partnered with the Alabama Workforce Council in the fall of 2015. This launched Alabama Works, a program that stands for opportunity, innovation, accountability, and inclusion with the vision of a better future for Alabama in which community, business, and industry are supported in a collaborative process to build prosperity through the opportunity of meaningful work and a growing economy. The goal is to recruit, train, and empower a highly skilled workforce driven by business and industry needs and to be the competitive advantage for Alabama's economic growth, whether for employers, job seekers, or students. The partnership yielded the Pathways Program's participation in Worlds of Work Career Expo, a three-day career expo at the Oxford Civic Center in Oxford, Alabama, giving more than 8,000 middle school and high school students from seven area counties a hands-on look at more than 100 different career

options available where they live. The success of work-based learning is a team effort, requiring collaboration among many stakeholders including employers, education institutions, and diverse state agencies. Integrating work and education increases the value and authenticity of training programs, providing employers with the skilled workers they need to keep economies moving forward.

Impact on Readiness

The ANAD Pathways Program has the visibility and complete support of partners in federal, state, and local government. The program is used as a model for industry and education working together to solve training and workforce revitalization issues. Regional businesses and military installations have visited to benchmark the program and capture best practices. The program was the first educational partnership in Alabama between the federal government, the State Department of Education, and a local school system. State education officials continue to recognize the ANAD Pathways Program for its innovative approach to work-based learning and workforce revitalization.

The Pathways Program allows depot management to evaluate all participants before conversion to a permanent position. ANAD has the option of not hiring any potential employee that has shown unsuitability or may no longer be required based on changes to depot workload changes due to operational requirements. Participants are introduced to depot safety culture early in their career, familiarizing themselves with

safety data sheets, hearing and eye protections, and safety lockouts.

As a result of the Pathways Program, graduates are better integrated into ANAD operations when they are converted to permanent positions, requiring less supervision and faster integration into the depot workforce. Many graduates have gone on to become supervisors or leaders among the wage grade workforce, while others have furthered their education by obtaining bachelor's and master's degrees or transitioning from skilled trades into various professional arenas within the Department of the Army or the corporate environment. The ANAD Pathways Program is a critical enabler for workforce development. It will continue to provide innovative means for training the future mechanics and artisans of the Army's organic industrial base.

Col. Eric A. McCoy currently serves as the commander of Anniston Army Depot. He has a bachelor's degree from Morgan State University and master's degrees from Central Michigan University, Georgetown University, and the U.S. Army War College. He is a graduate of the U.S. Army War College, the U.S. Army Command and General Staff College, and Combined Arms and Services Staff School.

Thyris D. Banks currently serves as the Chief of the Business and Support Operations Division, Directorate of Strategic Planning at Anniston Army Depot. A native of Alexander City, Alabama, Banks is a 1988 graduate of Auburn University and attended Mississippi College. Receiving his commission in 1987 through the Army ROTC Program at Auburn, he served as a military intelligence and Acquisition Corps officer.

Feature Photo
Alexa Mize, a Pathways Program trainee at Anniston Army Depot, Alabama, operates the Okuma M560-Vertical Milling Center, which modifies a transmission valve body on Sept. 12, 2022. (Photo by Mark Cleghorn)



Logistical Discipline

Preparing Multifunctional Noncommissioned
Officers for Large-Scale Combat Operations

■ *By Command Sgt. Maj. Jimmy Sellers*

Earlier this year, nominative command sergeants major and sergeants major across the Total Army developed the definition for the term multifunctional NCO. In the end, it was agreed a multifunctional NCO is a senior noncommissioned officer who possesses broad experience and can fulfill several functions or roles in the logistical discipline.

The need for this definition stems from our enabling responsibilities as a sustainment enterprise in the push toward the Army of 2030. I had the privilege last year to participate in and listen to several sustainment forums and Army senior leader discussions regarding the importance of developing an agile and adaptive force for the future. From the start of those discussions, the importance of developing multifunctional NCOs

for large-scale combat operations (LSCO) became abundantly clear. Lt. Gen. Charles Hamilton, Deputy Chief of Staff, G-4, and I agree the Army enables its total readiness by putting its people first, and this extends across the service's backbone — its NCOs. Continued investments in tailored leader development programming and education will ensure our sustainment NCO corps is postured to persistently meet the needs of our Army's warfighters in the complex and evolving environment of future warfare across domains. With this in mind, I believe it is important to develop this further by defining and messaging what the term multifunctional truly means to the NCO cohort.

As the G-4's sergeant major for two and half years, I learned an immense amount of information about the Total Army Analysis (TAA) process. TAA is commonly

referred to as the Army's pacing process that takes us from the Army of today to the Army of the future. The TAA process makes it clear the Army's force structure is ever evolving. For the sustainment community, this dynamic requires decision makers to anticipate requirements for where adjustments to force structure may be required. Changes to our force structure present an opportunity for the sustainment community to ensure we are resilient to shifts that may alter how we deliver critical sustainment support.

By establishing a culture of multifunctional NCOs throughout the Army, we will develop the expeditionary and operational mindset required to sustain the force to fight and win in combat. Similarly, multifunctional NCOs must be critical thinkers who possess and display the requisite knowledge, skills, behaviors, experiences, and, most importantly, desire to serve in positions that extend beyond their traditionally assigned military occupational specialty (MOS) positions.

I've always given NCOs the following advice: get comfortable with being uncomfortable. This boils down to NCOs being able and willing to serve in positions of greater responsibility and scope. Positions like drill sergeant, recruiter, NCO Professional Development System instructor, or observer/coach/trainer are great examples. These positions provide an opportunity for NCOs to excel, gain confidence, leverage untapped potential, and develop areas of expertise to access later in their careers. Among many other benefits, experiences gained in the force-generating domain help an NCO build upon foundational knowledge, ensuring they become a subject matter expert in their given field. Upon completing the aforementioned broadening assignments, successful multifunctional NCOs compete to serve in MOS immaterial positions, such as operations, support operations, or as logistics NCOs within a battalion, brigade, division, or corps level staff.

A strong grasp and understanding of Army doctrine are foundational to the success of a multifunctional NCO. Understanding Army Doctrine Publication 4-0, Sustainment, is vital to understanding the fundamentals

central to setting the joint strategic support area. By familiarizing yourself with doctrine, you'll be equipped with the knowledge necessary to fully operationalize the principles of sustainment: integration, anticipation, responsiveness, simplicity, economy, survivability, continuity, and improvisation. Additionally, through a series of scheduled career assessments, adept multifunctional NCOs display the attributes attained from learning the sustainment and NCO common core competencies (CCCs). By design, the CCCs are woven into the Logistics NCO Academy program of instruction to be progressive, sequential, and designed to develop multifunctional NCOs who are successful regardless of the position in which they serve.

The education attained through the professional military education system, coupled with varying operational experiences across MOSs, will build and continually develop the pedigree of high-performing NCOs capable of fighting and winning in LSCO across all domains.

Command Sgt. Maj. Jimmy J. Sellers currently serves as the Command Sergeant Major of Army Materiel Command. He graduated from all levels of the Noncommissioned Officer Professional Development System, culminating with the Nominative Leaders Course. He has a master's degree in management and a bachelor's degree in business administration. He is also a graduate of the Force Management Course, Senior Enlisted Joint Professional Military Education Course, and Legal Orientation Course.

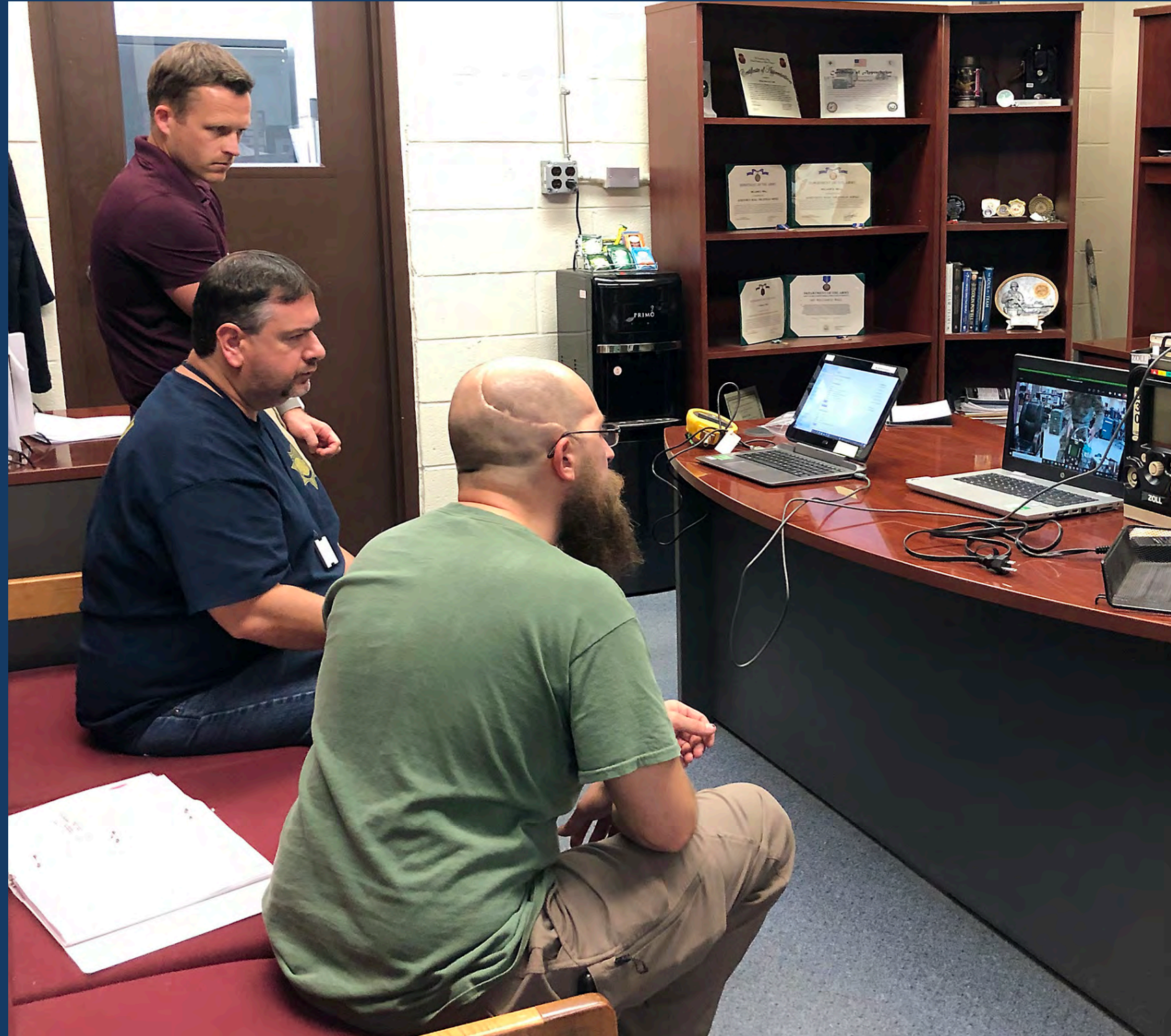
Feature Photos

Top: Sgt. Rolando Vazquez, 524th Combat Sustainment Support Battalion, 25th Division Sustainment Brigade, 25th Infantry Division, finishes the ruck march on Schofield Barracks, Hawaii, May 13, 2021. (Photo by Pvt. Daniel Proper)

Bottom: Sgt. Teion Middleton, a human resources sergeant with the Headquarters and Headquarters Detachment 82nd Finance Battalion, Task Force Diamond, makes a 9 line medevac request on a handheld microphone during the tactical evacuation care portion of the Soldier of the Quarter competition held on Camp Arifjan, Kuwait, Dec. 21, 2022. (Photo by Spc. Ryan Scribner)



Master Sgt. Xavier Vargas, the noncommissioned officer in charge of the 369th Sustainment Brigade's operations, documents discussions of those who competed in the brigade's NCO and Soldier of the Quarter competition at Camp Arifjan, Kuwait, Dec. 21, 2022. (Photo by Staff Sgt. Sebastian Rothwyn)



TACTICAL IMPACT

Far from the Point of Need

Transforming Sustainment Operations
Through Tele-maintenance

■ *By Col. Charles A. Fisher*

A Russian barrage of long-range missile strikes beginning in February 2022 wreaked immediate havoc on Ukrainian military assets and civilian infrastructure. Quickly repairing damage to the sovereign nation's weapons systems became paramount to Ukraine's ability to stave off further invasion deeper into 2022. As the Ukrainians have employed long-range fires in response to the Russian invasion at a rate not even the U.S. Army has utilized in recent years, maintaining the various American-manufactured systems within the confines of international policy has demonstrated the necessity for sustainment delivery far from the tactical point of need. To answer the call, the 405th Army Field Support Brigade's Tele-Maintenance and Distribution Cell-Ukraine (TDC-U) has established operations outside the battlefield in NATO territory, leveraging secure video and chat channels to guide Ukrainian counterparts through the entire maintenance process of weapons systems they may find unfamiliar. From Javelins to 155 mm howitzers, the TDC-U demonstrates how tele-maintenance alters the ways in which the Army sustainment enterprise successfully operates in contested and dispersed environments.

Tele-maintenance, or the use of any telecommunication system to perform maintenance actions remotely, has seen a resurgence in popularity within the Army following the Ukrainian response to Russia's invasion. By connecting technicians in the field with additional resources as far away as the strategic support area, maintainers can leverage knowledge present across their next-level maintenance center and even the original equipment manufacturer anywhere in the world. Effectively utilizing tele-maintenance mitigates readiness risk when maintenance teams on the ground experience a weapons system breakdown on an unfamiliar platform. Those teams no longer need to operate in isolation. Rather, they can quickly and securely connect with other maintainers and technicians up the echelon stream to make corrective actions and reinstate mission capability.

Historically speaking, tele-maintenance is not a novel Army concept. Its employment dates to the late 1990s when Communications-Electronics Command (CECOM)

leveraged commercial off-the-shelf systems to enhance equipment maintenance in the field. CECOM's program, consisting of only a small video camera and supporting modem to test varying electronic devices, aimed to reduce the number of emergency repair teams deployed in the field while increasing their maintenance efficiency. The intent of modern approaches, like those levied to enhance materiel readiness in Ukraine, diverges from those of the 20th century and runs parallel to those of the past.

In 2021, specialists at the Army Medical Materiel Agency piloted a new tele-maintenance program, where depot-level maintainers connect with field-level Soldiers using already available and familiar video teleconferencing systems, such as Microsoft A365 and the Department of Defense's Global Video Services platform. The video teleconferencing process allows depot-level support to maintain complex medical devices at the workbench of the forward-deployed medical maintenance activity without additional burden and at the pace of need.

As the Army modernizes for the complex and dynamic nature of the future operating environment across echelons, minimizing the number of repair teams deployed while ensuring they can execute their maintenance tasks in hours instead of days serves as a critical indicator of our readiness posture. With the Army's recent shift from counterinsurgency (COIN) to large-scale combat operations (LSCO), the demand for tele-maintenance will naturally grow due to the number of platforms needed on a dispersed, contested battlefield. Recent updates to Field Manual (FM) 3-0, Operations, codify multidomain operations into our warfighting doctrine and update how we will overcome those challenges posed by near-peer adversaries now and in the future.

FM 3-0 calls for larger formations to serve as primary units of action, like the brigade combat team, and identifies those assets critical to constructing dispersed base clusters in the rear area to support logistics operations in the close area. With dispersed logistics, the Army will not be able to rely on a central maintenance facility in the close area. Thus, our ability to leverage tele-maintenance will ensure platform readiness for small units operating far from their central command post. According to FM 3-0, Russia may



William Wall, shop supervisor at the Army Medical Materiel Agency's Medical Maintenance Operations Division at Tobyhanna, Pennsylvania, assists in providing tele-maintenance support to members of the 51st Medical Logistics Company on July 14, 2021. (Photo by Rachel Mummau)

employ pre-conflict activities to deny access to strategic and operational logistics support. With this assumption in mind, it will be vital to keep platforms operational as close to the forward line as possible. Tele-maintenance, when coupled with similar initiatives that deliver readiness at the tactical point of need, like advanced and additive manufacturing, will enable rapid forward repair of combat platforms that may not have been feasible in the years of COIN.

An Army prepared to fight and win in LSCO will be sustained absent the large, static logistics centers present during COIN operations during the last twenty years. The future Army sustainment enterprise will be agile, adaptive, and prepared to execute logistics on behalf of dispersed units operating at the extent of contested lines of communication. The Army is modernizing with transformational change front of mind, and key supporting

initiatives, such as advancing our tele-maintenance capabilities, ensure we maintain the collective momentum necessary to chart a sustainable strategic path forward to deter, deny, and defeat in competition, crisis, and conflict.

Col. Charles A. Fisher currently serves as the director of the logistics initiatives group for Department of the Army, G-4. He enlisted in the Army as a combat engineer in 1992 before accepting an ROTC scholarship to the University of Central Florida in Orlando. He graduated in 1997 as a distinguished military graduate and then commissioned in the quartermaster corps. He holds a Bachelor of Science in health services administration from the University of Central Florida, a Master of Business Administration from Embry-Riddle Aeronautical University, a Master of Science in global supply chain management from Syracuse University, and a Master of Strategic Studies from the Army War College.

Feature Photos
William Wall, shop supervisor at the Army Medical Materiel Agency's Medical Maintenance Operations Division at Tobyhanna, Pennsylvania, assists in providing tele-maintenance support to members of the 51st Medical Logistics Company on July 14, 2021. Also pictured are biomedical equipment technicians Frank Cali and Vito Rizzo. (Photo by Rachel Mummau)

Global Force Information Management

Objective Environment Provides Integrated, Data-Centric 21st Century Capabilities for the Army

■ By Maj. Cory Scharbo, Lori Mongold, and Andrew St. Laurent

The Army is transforming its warfighting capabilities to become a technologically agile and digitally driven force. The intent is to innovate and modernize to improve current capabilities and to posture the Army for the future. The total force needs to evolve at a pace faster than current and future adversaries.

The Department of the Army Capabilities Management Office-Strategic Operations directorate (G-

3/5/7) is developing an enterprise-level information technology capability that will fundamentally transform how the Army coordinates and synchronizes global force management (GFM) across all levels of war to man, equip, train, sustain, deploy, and redeploy forces in support of our national objectives. Scheduled to launch in fiscal 2024, the Global Force Information Management (GFIM) Objective Environment (OE) will fundamentally transform how the Army develops the future force and

provides for the current force. GFIM OE will transform the capabilities of 14 legacy systems into a single, enterprise-level, web-based solution to better support risk-informed decision making in a volatile and resource constrained operational environment.

Why is the Army transforming to GFIM OE?

The conduct of essential force management functions in today's GFIM portfolio of legacy systems is characterized by, and is dependent

upon, significant manual input from force managers and manipulation of data as that data is extracted from one system and reentered or inputted into another system. This labor-intensive process impacts the timeliness and accuracy of information to support senior leader decision making in response to dynamic force and resource requirements. The deployment of GFIM OE will minimize the requirement for manual input and manipulation of data by system users, enabling force managers to devote more time to the critical analysis and assessment of system data to better support force management related decisions.

To support warfighting transformation and achieve information advantage, the total Army requires a transformational change to the system and processes used to execute Deploy to Redeploy and Retrograde (D2RR) and meet its service responsibilities. To support multidomain operations (MDO) at home and abroad, the Army must incorporate technologies and integrate artificial intelligence and machine learning to automate processes and eliminate manual actions and sources of error. The goal is to deliver a cloud-based enterprise capability that develops the future force while providing for the current force and a common operating picture of the total Army across D2RR.

With the deployment of GFIM OE, the Army is upgrading its system to fully enable MDO and create the capability, readiness, availability, and employability data needed for dynamic force employment as envisioned in

the latest National Security Strategy. This transformational capability will position the Army to achieve and sustain information dominance in the digital age by maximizing the use of best-of-breed technologies, automating and adapting D2RR workflows based on rapidly changing needs, and inserting artificial intelligence and machine learning capabilities to eliminate manually intensive processes or workarounds.

GFIM OE is a priority for the Army

The Secretary of the Army identified GFIM OE as a top enterprise business priority for Program Objective Memorandum 23-27 implementation. GFIM OE will provide an automated, integrated, and interoperable enterprise environment integrating force structure, readiness, mobilization, and deployment, along with requirements validation data to meet service and GFM requirements. As the Army transforms its warfighting capabilities to meet the challenge of MDO, it must also transform how it manages forces and generates readiness. GFIM OE will provide a common operating picture of the total Army in real time, which is an essential part of information advantage (enabling data-driven decision making) and winning in the MDO environment.

GFIM OE will collect, store, transport, produce, use, and protect core sustainment data into a cohesive common operational picture resulting in a coherent, reliable, and multifunctional approach to rapidly integrate and synchronize

information. As such, the system will provide commanders with extended operational reach and freedom of action to provide multiple options for the U.S. GFIM OE will also integrate sustainment capabilities with allies and partners, modernize sustainment force structure to reflect the Army of 2030, and establish a secure logistics data infrastructure.

Department of the Army Capabilities Management Office-Strategic Operations Enterprise (DAMO-SOE) is currently leading GFIM OE implementation. For more information go to <https://www.army.mil/damo-so>.

Maj. Cory Scharbo currently serves as the Chief of Staff for HQDA G-3/5/7 DAMO-SOE, Pentagon, Washington D.C. He previously served as the Force Management Officer with 1st Infantry Division Headquarters, Fort Riley, Kansas. He was commissioned as an infantry lieutenant and completed the Army Command and General Staff College. He holds a Master of Arts in Strategic Studies/National Security from American Military University.

Lori Mongold currently serves as the Division Chief for Headquarters Department of the Army (HQDA) G-3/5/7 DAMO-SOE, Pentagon, Washington D.C. She previously served the Army Force Management Support Agency, the Joint Force Headquarters/Military District of Washington, and the Army Reserve. She holds a Bachelor of Arts in psychology, English, and theatre from Bridgewater College.

Andrew St. Laurent currently serves as the Deputy Division Chief for HQDA G-3/5/7 DAMO-SOE, Pentagon, Washington D.C. He previously served as Deputy Product Lead for Program Executive Office Enterprise Information Systems (GFIM Portfolio), Army Requirements Oversight Council Branch Chief at HQDA G8, Force Structure Division Chief at Army Cyber Command, Deputy J5 at Joint Task Force United Assistance, and Force Management Chief for Task Force 101. He holds a Master of Science in logistics management from Florida Institute of Technology and has deployed in support of Operations Iraqi Freedom, Enduring Freedom, and United Assistance.

PERSONNEL & ACCOUNTABILITY & GREAT POWER COMPETITORS

Techniques from the European Theater

■ By Col. Angel R. Estrada, Maj. Gamaliel Rodriguez Montanez, Maj. Jon Michael King, and Command Sgt. Maj. Amador Aguillen Jr.

Accountability systems, rapidity, deception, and a multitude of locations are the crucial points of combat force employment in great power competition. Most Soldiers deployed to the Middle East over the past 20 years are familiar with personnel accountability. Millions of service members went through staging areas in Kuwait and Kyrgyzstan. They arrived in a theater of operations, and personnel accountability teams (PATs) scanned them into databases with their military identification cards. Accountability occurred in a centralized, intermediate area outside of the combat zone. This added time to force flow and delayed moving service members into the fight. Once scanned into the theater, the joint logistics enterprise transported these personnel into the combat zone or task

force assembly area. Army and joint doctrine have prescribed this concept of combatant force staging as taking place outside of a combat zone. Forces then cross a national border into the fight. However, the doctrine never prescribed this as the only method.

Funneling troops through a centralized point outside the theater is a proven method relevant today against a great power competitor. Acting as a go between, a waypoint provides a much needed buffer to a great power competitor's wide-area security countermeasures. It provides a haven for friendly forces to receive, stage, integrate, and provide onward movement to inbound combat forces. It is prudent to continue employing these intermediate locations to stage combat forces. However, there are other ways to employ PATs to gain an



advantage. One such method used in Europe over the past five years is the wide-spread deployment of mobile, expeditionary teams at multiple aerial debarkation reception sites.

Combat force accountability is a core task the 16th Sustainment Brigade (16SB) trains on and constantly provides. As the tactical center of gravity for Army sustainment in Europe, 16SB routinely positions accountability teams across the continent. These teams are often within range of an adversary's multidomain fires complex, as part of the Army's fight tonight and speed of assembly missions. Reception sites are typically aerial nodes within two to eight hours of the inbound force's assembly areas; flights are typically comprised of 300 to 600 personnel at a time. The 16SB's accountability teams prepare and move with 48 hours' notice and position at the aerial ports up to 12 hours before flights land. These accountability teams are responsible for scanning personnel into the fight. Inbound personnel transition to the movement control teams for onward passage to life support areas, tactical assembly areas, and forward operating sites. The accountability teams process each flight's wave of incoming personnel in two to four hours. Success with this technique is apparent as demonstrated by the deployment and accurate account of tens of thousands of service members through 34 aerial ports across 19 European countries over the last year. The logic behind this system is combat credibility through the rapid placement of U.S. forces and equipment into multiple assembly areas.

U.S. Army Europe and Africa (USAREUR-AF) imposes additional dilemmas on competitors through wide-area placement of reception teams. U.S. adversaries now need to assign named areas of interest at each port and assign assets to monitor those sites. If a regional competitor wishes to act for a measurable effect, it must best decide how to engage its limited resources and determine if their action is worthwhile. Unlike the centralized staging base concept, the U.S. employment of multiple aerial ports does not afford adversaries opportunities for high rates of return on their actions. The centralized staging site affords adversaries the potential to cripple one of a limited bevy of key locations for the inflow of forces, destroy multiple assets, and disrupt U.S. forces before they can assemble. With multiple aerial ports changing based on the situation, adversaries must decide if it is prudent to allocate disrupting, or even lethal, effects of denying significantly fewer U.S. forces at one of those sites.

To make ready for the use of multiple sites, the U.S. and its allies must establish three criteria within the operating environment. One, the operating environment calls for multiple entry options, and these need not be fully developed host nation airports to achieve the desired effect. Two, Army theater sustainment forces require sufficient resources, like accountability and movement control teams, to exercise those options. Three, focusing at the operational level on the speed of assembly creates a wicked dilemma set against adversaries. Sustainment staging actions must



Soldiers from the 16th Sustainment Brigade assigned to the 260th Movement Control Team receive a safety brief from the 838th Transportation Battalion Surface Deployment and Distribution Command as they assist with the transport, offload, and processing of more than 1,250 equipment items assigned to the 2nd Armored Brigade Combat Team, 1st Cavalry Division at the port of Vlissingen, Netherlands, on Jan. 10, 2023. (Photo by Staff Sgt. Daniel Yeadon)

receive, process, and provide onward movement rapidly. Building a succinct staging process reduces the time for adversaries to make decisions and allocate resources to interdict friendly forces. The benefits are combat power generation, freedom of movement, and operational reach.

USAREUR-AF regularly uses more than 30 commercial and military airports across one-third of the continent. Some countries have two or three approved aerial ports within the European theater. The numerous locations afford commanders a diverse range of options. It also keeps opposition forces guessing as to the emplacement of contingency capabilities. Further, diplomatic engagement provides U.S. and allied forces with a potential increase in the number of approved entry locations, amplifying the aforementioned effects.

To conduct these types of missions, 16SB has two human resource companies. These companies are responsible for both postal and personnel accountability. The Army Techniques Publication 1-0.2, Theater-Level Human Resources Support, states a PAT is a squad-sized element. The same manual states that these teams capture personnel accountability data on up to 600 personnel entering, transiting, or departing the aerial port or from an intratheater aerial port daily. The Army places six personnel in each of these accountability squads. The 16SB has nine human resources squads within its two companies, totaling 54 Soldiers. Using a battle-tested method over the past five years, the brigade reformed those 54 Soldiers into 27 teams to account for the same 600 personnel per day apiece. This flexible, two-person method equates to 27 locations

concurrently processing 16,200 troops per day — a force equivalency of an Army division. This method allows the same theater to staff 13 locations, with two teams assigned to each port when conducting 24-hour operations. But what accounts for the sustainment brigade's ability to process the same number of personnel with smaller teams? The answer lies in training, readiness, and mission command to achieve the speed of assembly.

The 16SB must be accurate, quick, and effective during the reception, staging, and onward movement. The brigade seeks its objectives through two means. The first is to employ systems that improve speed and accuracy. Second, the unit eschews tasks that can be accomplished before the reception or during integration at the incoming unit's destination. To achieve rapidity in throughput,

16SB used the cloud-based Deployed Theater Accountability System (DTAS) Manifest Manager as their primary system of record. The stand-alone DTAS program has served as accountability teams' alternate system. Previous support missions show that processing personnel through DTAS improves throughput velocity by 25 to 60 percent and is the most accurate in capturing all facets of data. However, other tasks are also a necessity for inbound troops. Requirements like creating common access cards, updating next of kin, life insurance, spousal notification, and career management records are part of predeployment Soldier readiness processing. These tasks can create issues that stall onward movement. If U.S. military members require these services, the accountability teams identify the deficiencies and notify the parent units of the requirements after the members arrive at their final destinations. These practices ensure the accountability teams fully process arriving troops. It assists in the throughput of the requisite 600 inbound forces, per day and team, off the aerial ports while capturing personnel shortfalls.

What about economy of force situations? Simultaneous deployment of troops and capabilities through multiple locations has the adage of creating multiple dilemmas for an adversarial force. The point is valid, but military deception operations create options for the same desired result. Here, U.S. forces send multiple accountability and movement control teams forward to additional ports, some never used before. The intent

is to open ports that do not have assigned inbound forces. Including these ports in deception planning provides decision makers with options and potential redundancy. Decoy ports set up near planned ingress routes, adjacent locations with no forced flow scheduled, or any combination of the listed options provide a distinct advantage. The resultant move deceives regional competitors, who believe additional troops are entering the theater. The critical factor for planners is number-centric. The amount of accountability, movement control teams, and equipment for these operations is minimal and relatively low-profile. It is comprised of around 20 to 30 personnel, communications equipment, and 10 to 20 troop transport assets or commercial buses. These minimal requirements on a sustainment brigade enable broader military deception operations at three to five sites. As a deception operation occurs, the sustainment brigade can provide initial staging operations for inbound forces at 5 to 10 additional aerial ports. This remains valid as long as the sustainment brigade retains available reception capabilities.

The argument above is not a rejection of the centralized intermediate staging sites outside the adversarial fires and effects range. That concept is tested and remains invaluable in bridging the strategic base to the operational theater to protect U.S. instruments of military power. The aim is to provide a proven exemplar for other theaters with regional adversaries and great power competitors. Using our case study, the incorporation of multiple aerial ports with smaller accountability

and movement control packages is a force and options multiplier. For commanders, this method provides time, controls tempo, and imposes additional dilemmas onto U.S. adversaries.

Col. Angel R. Estrada serves as the commander of the 16th Sustainment Brigade at Smith Barracks in Baumholder, Germany. He was commissioned as a quartermaster lieutenant and was awarded a Bachelor of Science Degree in biology from the Metropolitan University at Puerto Rico. He holds a Master of Science in management from Cypress University and a Master of National Resource Strategy from Eisenhower School, National Defense University.

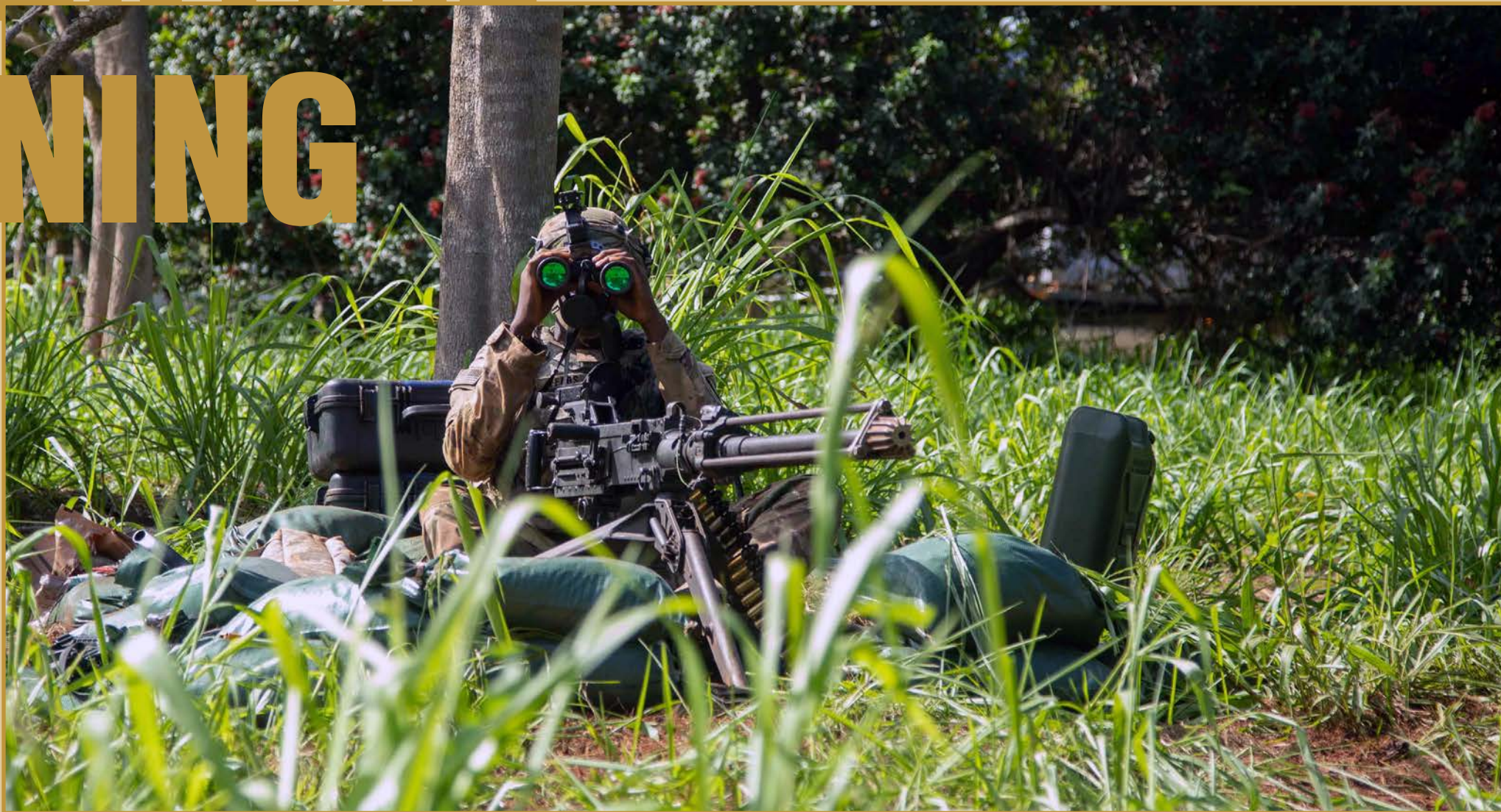
Maj. Gamaliel Rodriguez Montanez serves as the 16th Sustainment Brigade S-1 officer in charge/brigade personnel officer. He was commissioned as a lieutenant of Adjutant General Corps and awarded a management Bachelor of Arts Degree from the University of Puerto Rico. He holds a Master of Business Administration from the Turabo University of Puerto Rico and a Master of Operational Studies Degree from the Army Command and General Staff College's Western Hemisphere Institute for Security Cooperation.

Maj. Jon Michael King serves as the 16th Sustainment Brigade operations officer. He previously served as the 16th Sustainment Brigade's support operations officer (SPO) and the SPO distribution integration branch chief. He holds a Master of Science in business in supply chain management from the University of Kansas and a Master of Arts in military operation from the Army Command and General Staff College's School of Advanced Military Studies.

Command Sgt. Maj. Amador Aguillen Jr. serves as the command sergeant major of the 16th Sustainment Brigade at Smith Barracks in Baumholder, Germany. He entered the Army as a 92A Automated Logistical Specialist. Aguillen holds a bachelor's degree in transportation and logistical management from American Military University. He also holds a master's degree of leadership studies from the University of Texas at El Paso.

Feature Photo
Sgt. First Class German R. Rodriguez-Pena assists 16th Sustainment Brigade Soldiers receive 82nd Airborne and XVIII Airborne Corps Soldiers into theater at Ramstein Air Base, Germany, on March 8, 2022. (Photo by Maj. Gamaliel Rodriguez Montanez)

ESSENTIAL TRAINING



Sustainers Must Prepare for High-Intensity Conflict

■ *By Maj. Michael G. Anderson and Capt. Megan J. Wood*

The Army's small unit tactical sustainers are ill-prepared to conduct required forward supply operations and survive in high-intensity, fast-paced, long-distance large-scale combat operations (LSCO) that could typify future great power conflict. Arguably, the last actual wartime experience in which U.S. military sustainers had to plan and support LSCO was the initial invasion of Iraq in 2003, the last time the U.S. maneuvered multiple division-sized elements as fighting forces. However, Operation Iraqi Freedom I and the previous corps-sized experience in Operation Desert Storm were against non-peer enemies and conducted in a limited contested environment. The U.S. military and coalition controlled the air and sea indisputably and established massive stockpiles of supplies. This would likely not be the case in a future conflict with a near-peer or peer threat like Russia or China. The traditional domains of sea, land, and air will be highly and violently contested, affecting the ability of Army sustainers to support the maneuver of forces. These domains now include cyber, space, and information that will significantly impact sustainment and the ability to get to the theater through disruptive tracking and communication, which provide adversaries early warning.

In the opening phase of the 2022 Russia-Ukraine War, Russian forces accomplished fewer territorial gains and successes than anticipated. While multiple factors influenced this, logistics indisputably played a large role. Combat units ran out of fuel and munitions, while logistics formations suffered losses from enemy actions. Massive logistics convoys remained vulnerable and out of contact with their customers, at times stretching for miles. Ukrainian artillery, small team ambushes, air strikes, and unmanned aircraft system (UAS) attacks devastated these convoys and interrupted the resupply of forward combat elements, directly impacting the operational efforts of the Russian forces.

Practitioners and theorists can debate the semantics of where and how wars, battles, and conflicts are won, but history shows they certainly are, and always have been, a full team effort across warfighters, sustainers, and combat multipliers. Some warfighters' supporting casts are more integral than others, while many combat multipliers provide a critical edge in battle. The combined combat arms formations do their job regardless of whether the rest of the team supports them. In an LSCO environment, where entire combat battalions face destruction in battle due to shortages of fuel or ammunition, or their supporting arms are out of munitions, the U.S. military should strive to attain victory because of sustainment support, not despite a lack of it.

Recognizing the Problem

The previous decade of irregular

warfare atrophied many sustainment skills, limiting experience due to the inherent and predictable known demands of stability and security operations, the stagnant environmental influence and distances, the large-scale contracting of support, and the relatively low demand from the warfighters as compared to high-intensity conflict. A generation of sustainment community leaders came of age in this era, and the next generation joined it. For the smaller forward support elements, it is more a question of refining and honing foundational sustainment skills while instilling and crafting the ability for them to fight and survive. If the sustainers do not possess survivability and the ability to deliver the goods to the end user in a fast-paced, long-distance, and highly contested environment, then how skilled or well-planned the logistical support is matters far less in the end. The fire and maneuver forces will go without the required supplies, possibly lose some of their combat multipliers to other logistical efforts, such as aviation and reconnaissance assets, or lose combat power required for further operations to support, save, and secure their logistical elements. At the very least, it shifts focus from combat operations and, at worst, leads to culmination and operational defeat.

Protecting the Sustainers

A change in mindset and shift in paradigm is required for sustainment protection. Sustainers must be viewed, and view themselves, as direct combat forces. This does not mean they are expected to close with and destroy the enemy, but it does

mean they are trained, equipped, and prepared to enter an engagement with as little outside combat power as possible dedicated to their protection. Self-protection and survivability must become an equally core competency and traditional sustainment competencies. These are legacy skills from the recent counterinsurgency conflicts but also go back to the Cold War conflicts of Korea and Vietnam, which apply in a LSCO fight.

The second step is to properly train and equip sustainers to achieve the organic internal protection and survivability required of them on the fluid LSCO battlefield as they become prioritized targets for enemy deep operations. Threats come from small ambush teams with small arms and rockets, long-range artillery fires, UASs, loitering munitions, and air strikes (rotary and fixed wing). They need dedicated convoy escort equipment to secure logistics nodes and provide security when lines of communication stretch during offensive operations. Additional improvements, possible through the incorporation of newer technologies like leader-follower, can only increase the logistics capacity by freeing personnel to provide security for self-driving supply vehicles, reducing the cost of equipment lost to long-range precision fires. As enemy air assets contest U.S. air superiority, the need to provide maneuver short-range air defense (M-SHORAD) anti-aircraft protection to counter enemy aircraft and UAS to logistics convoys increases.



U.S. Army Soldiers assigned to 225th Brigade Support Battalion, 2nd Infantry Brigade Combat Team, 25th Infantry Division patrol Brigade Support Area 1 on Schofield Barracks, Hawaii, on Nov. 3, 2022. (Photos by Spc. Jeffrey Garland)

This is not to say the solution is to provide multiple new detachments to sustainment units, such as their own artillery or their own combat arms for security. It is meant to provide a democratization of capability, capacity, and training to these formations to allow them to be as self-sufficient in survivability as possible, minimizing the additional assets needed to be assigned to them for protection. For example, M-SHORAD is a capability that cannot be simply given to sustainers; deliberate air defense protection would likely come from an air defense artillery (ADA) unit. However, man-portable air defense systems (MANPADSs), such as

the FIM-92 Stinger missile, can be provided to sustainment units with individuals trained on their employment and use. MANPADSs do not need to be employed solely by ADA occupational specialties. Likewise, reflecting on lessons learned in Afghanistan and Iraq and even more so in the Vietnam conflict, convoy security does not need to be conducted by deliberate security forces such as combat arms or military police. When properly trained, manned, and equipped, sustainment units can employ gun trucks and provide their own close combat security. Importantly, this needs to be reflected in their force structure.

Rather than this being an ad hoc capability or assignment within a sustainment unit, these detachments of sustainers should be specifically trained and equipped as an organic security detail. An additional capability for consideration is the direct incorporation of UASs and loitering munitions into the sustainment formations. The sustainers need multiple reconnaissance-type small unit UASs with trained sustainers assigned to the unit as operators. These UASs would provide the sustainers with the necessary early warning to protect key nodes and convoys. Further development and research applicability for loitering munitions assigned to sustainment formations

provide additional immediate, effective protection. For example, a pair of loitering munitions could be launched and programmed to circle a logistical sustainment convoy with overlapping loops creating a bubble for the traveling convoy. These munitions could be connected to a sensor on a specific vehicle in a convoy around which they base their circling patrols, continually seeking hidden ambushes and neutralizing them once identified. In addition, with the adversaries targeting friendly sustainment as a crucial vulnerability, the counter-UAS capability is also a modern warfare LSCO requirement for sustainment forces.

Suppose the sustainers and their critical sustainment nodes are not protected and cannot survive distribution to units in contact. In that case, the friendly scheme of maneuver is derailed, and operations face early culmination. Limitations on basing and operational reach are directly tied to the survivability and protection of sustainment formations and significantly impact the success of combined arms operations. Without the logistical tail, the teeth cannot continue fighting, and the difficulty and costliness of the battle are increased, with loss as a possible result.

Training the Sustainers for LSCO

In a fiscally constrained environment, maximizing available training is imperative. The sustainment community cannot create new exercises or make themselves a combat training center (CTC)-like event for

themselves. First, they need the end user as part of their exercise. Without the consumer, any training, planning, or drills they do would be purely hypothetical. Too often, distribution is executed as a primarily administrative move to prevent disruption to the larger training event. Not only does the sustainment formation miss out on the tactical coordination and movement experience from that decision, but the unit they support also misses out on the struggles of coordinating actions, link-up procedures, and even impromptu support to tactical sustainment operations. The idea behind this is logistics is a component of training, not simply a supporter of training. Second, they need a vigorous, thinking, challenging opposing force that drives training experiences and the action-reaction dynamic. These circumstances are readily available in current training exercises involving fire and maneuver forces. It only takes a slight change from focusing exclusively on the maneuver and fire units' training to also focusing on the inclusion of specifically sustainment driven training. For the sustainment community, inclusion is typically a secondary effect, functioning as a training aid to the fire and maneuver training audience. In the proposed scenario, the exercise becomes a sustainment exercise with fire and maneuver forces as the training aid. More balance in current training exercises is an easily achievable step, dependent on proper staff planning and leadership emphasis.

The blending of virtual, distributed, and live training needs to be maximized largely for the

sustainment community. Combine a command post exercise for the higher headquarters sustainment command, with its broader theater injects and fluid and challenging support, to a tactical field level unit conducting a CTC rotation. Alternately, coordinate a battalion and below field training exercise that conducts actual ground training missions based on the simulations with their higher echelon command conducting a simulated, mission command-focused warfighter exercise. These are more beneficial if over long distances, adding a realism dynamic. The key is maximizing real life impacts that sustainment planners must react to, actual consumption rates, problems, and staff coordination with actual warfighters they will possibly work with in combat, rather than simulations or rehearsals and training in a vacuum separate from the interactions and dealings with actual unit staffs and demands. Extending time at the CTCs also helps pressure the sustainers in their ability to continue supporting the high tempo and demands of LSCO rather than only testing their adaptability to create short-term solutions to carry the unit through an intense but short period of operations to get to the end of the rotation.

For the reserve component, there are additional opportunities to capitalize on. The National Guard has the exportable combat training center (XCTC), which is the equivalent of a brigade combat team's three-week field training exercise to develop platoon-level proficiencies. This incorporates outside echelons

above brigade sustainment assets in a blended digital and simulated manner for the staffs to work with both the combat elements in the XCTC and to stimulate and expand experience of the brigade's logistical elements. The National Guard also conducts Northern Strike (Camp Grayling, Michigan) and Western Strike (Camp Guernsey, Wyoming) exercises that both involve maneuver and extensive field artillery drills and training. These pose an ideal opportunity for sustainers to practice attributes and skills necessary for survival and success in large-scale ground combat. The sustainers can come from miles away, even states away, forcing their commands to manage and support a warfighter's mass consumption and dynamic needs over long distances. From the sustainment staff to the small-unit tactical leaders, plans must account for long distances, anticipating needs, and preparing for enemy contact. These can become simulated once the sustainers make the many miles and enter the training area.

The combined National Guard and Army Reserve encompass a significant percentage of the Army's sustainment community, and it is imperative they are trained. In many cases, they are the first units from the reserve component mobilized in support of the LSCO operational plans, due in part to the predominant percentage of the sustainment force in the reserve component but also because of the low density and high demand of certain types, such as theater opening and operating units. While still acting responsibly within the fiscal

constraints, these units need to be highly trained and highly responsive. The dual-planned Defender exercises, alternately scheduled for Europe and Indo-Pacific regions, are incredible opportunities for these units. While the cost of utilizing reserve component units can be seen as a hindrance and a negative factor for their inclusion, participation in these expensive and high-profile exercises must be balanced with national defense responsibility. Participation in these large-scale multinational exercises is critical because the interoperability between the sustainment community and their interdependency with multinational allies and partners is crucial to success and must be built, facilitated, and practiced. Ruthless prioritization based on planning and logic is not only called for but demanded in a fiscally constrained and dynamic threat environment.

The ongoing conflict in Ukraine demonstrates the distinct vulnerabilities of logistical sustainment in high-intensity LSCO. Russia's losses from multidomain Ukrainian attacks provide a cautionary warning for modern ground forces. It impacted Russian logistical practice. Their lack of protection against Ukrainian multifaceted attacks stalled tactical actions, limiting commanders' options as they ran out of fuel and munitions or replacements. The delayed tactical actions derailed larger Russian operations, upsetting critical timelines and efforts, leading to a change in strategic direction. The Army accepts significant risk if it does not improve its protection and support to the sustainment

forces, with potential tactical setbacks leading to operational disruption with strategic effects. Historically, the sustainment community has proven its ability to protect itself. Even in this evolving character of war, with the proper manning, training, and equipping, the logistics community can protect itself organically, allowing for sustained combat operations. The sustainment community must be a priority for training, equipping, and fielding the latest technology and assets for survival in the multidomain fight. If not, it will not matter how effective, modernized, and trained the combat forces are if the warfighters are not sustained due to losses to the sustainment forces, and the campaign will be lost.

Maj. Michael G. Anderson is a infantry officer with four overseas deployments, including Afghanistan, Kuwait, and East and Central Africa. He's a graduate of the USMC Command and Staff College and a 2022 graduate of the School of Advanced Military Studies. He has a bachelor's degree from the University of Central Florida in history and political science (international relations) and a master's degree from Norwich University in military history. He has published a dozen articles, including in the Journal of Strategic Security, Journal of Advanced Military Studies, and Military Review, and is the author of Muster-ing for War (Army University Press).

Capt. Megan J. Wood currently serves as the Mission Training Center-Leavenworth S-4 officer in charge and previously served as a Forward Support Company Commander. She is a U.S. Army logistics officer with two overseas deployments to Iraq. She is a graduate of the Support Operations Course at Fort Lee, Virginia, and has a bachelor's degree from Rhode Island College in anthropology.

Feature Photo
A U.S. Army Soldier assigned to 225th Brigade Support Battalion, 2nd Infantry Brigade Combat Team, 25th Infantry Division conducts a patrol during an exercise held during Joint Pacific Multinational Readiness Center rotation 23-01 at Schofield Barracks, Hawaii, Nov. 3, 2022. (Photo by Spc. Jeffrey Garland)



Aviation Perspective

Learn Difference Between Operational Readiness Rates, Ready-to-Launch Rates

■ By Chief Warrant Officer 4 Onwah Campbell

Army Regulation (AR) 700-138, Army Logistics Readiness and Sustainability, requires aircraft reporting according to established Department of the Army (DA) readiness goals. Aircraft ready-to-launch (RTL) rates correlate with the mission equipment package. RTL rates allow commanders to determine their capability to accomplish a specific mission. Aviation sustainers must refocus their efforts on reducing the aviation commander's decision-making cycle when determining the ability to execute a specific mission and the ability to execute full-spectrum missions. Sustainers owe DA readiness levels to

consumers of readiness. Consumers of readiness operate within the operations and maneuver directorates, while producers of readiness operate within the sustainment directorates and commands. At echelons above brigade, RTL is a short-term snapshot of the maneuver commander's capability to deliberate mission acceptance. Conversely, sustainment of readiness at DA goals is foundational to providing flexibility, endurance, and extended operational reach. Various joint and Army-specific publications reference these foundational tools, providing the bridge between strategic focus and tactical operations.

Headquarters, Department of the Army Execution Order 157-18 defines the criteria for calculating RTL rates. The Addendum to Gen-19-AMAM-01, Aviation Systems Readiness Reporting Procedures, defines the criteria for calculating logistics readiness rates. The evolution of creep is beginning to imply RTL and operational readiness (OR) percentages are interchangeable. They are not. The determination of both percentages is derived from independent sources. AR 220-1, Army Unit Status Reporting and Force Registration — Consolidated Policies, instructs troops to maintain operationally ready equipment as fully mission capable. Ergo, simply writing RTL/OR is a misrepresentation of both terms. Recalibrating our thoughts will be difficult, but separating short- and long-term responsibilities is a start. The brigade aviation maintenance officer (BAMO) assists logisticians

with this problem set. The BAMO publishes the aircraft daily status report (DSR) to stakeholders, and it can reflect the RTL rate based on the commander's guidance and intent. This daily RTL is for the maneuver force. The Army Enterprise Systems Integration Program portal houses monthly reports showing battalion performance in relation to DA readiness goals. This monthly report is for sustainers.

Sustainers are to examine monthly readiness rates and group limitations to readiness based on systems, supply, training, organization, maintenance, personnel, and doctrine. Development of the why may span different organizations and echelons. Root cause analysis (RCA) requires the examiner to look down and within the reporting organization, horizontally for best practices, and up and out to supporting organizations or industry partners. Failure to develop a long-term approach to resolving OR rates at the enterprise level contributes to a reduction in full-scale capability and increased limitations in understanding true sustainment challenges.

Systems

Automated systems continue to evolve, and consumers depend on them to provide the common operational picture that drives the decision cycle. Manual systems still contribute to the same decision cycle. We need to get better at eliminating redundancy. Stakeholders in the aviation community receive the DSR via a spreadsheet or slideshow attachment. Decision makers at

Acceptance of a certain RTL rate by the operator does not equal the same performance metrics for the sustainer. We must strive to go beyond the now and develop habits that will expand availability tomorrow.

echelon depend on the movement of that manual process through the email channels and up to the interested level. Aircraft Notebook is the system of record for recording rotary wing aviation statuses. Global Combat Support System-Army is the system of record for providing information about movement or repair parts. We are getting better at integrating efforts between the two systems, but we have more work to do. Manual systems sent via email denote RTL rates. DA Form 1352, Army Aircraft Inventory, Status and Flying Time, depicts OR rates. Sustainers must therefore focus on the DA Form 1352 system and not on the daily manual report unless that DSR shows the running monthly DA goals. The integrity of the respective system remains a human factor, and analysis of the RCA requires pertinent consideration.

Supply

Army Doctrine Publication 4-0, Sustainment, defines Class IX supplies. Accountable officers at a

supply support activity conduct an authorized stockage list (ASL) review each year. The demand signal from the supported echelon contributes to the overall outcome of the review. Technical supply officers within the brigade conduct a shop stock list (SSL) review for their demand period. Consumption of repair parts and discipline with the ordering process contribute to the outcome of the ASL and SSL review. Discipline is important. Commanders enforce discipline through the Command Supply Discipline Program (CSDP) as outlined in AR 710-2, Supply Policy Below the National Level. The DA monthly goal for non-mission capable rate due to supply is below 5%. Across the enterprise, the six-month average between May 2022 and October 2022 held steady at 4%. The AH-64 Apache community reflects 5%, and the CH-47 Chinook and UH-60 Black Hawk reflect 4%. This is good news for sustainers. Further analysis shows some troubled areas, but the focus on providing

repair parts at the point of need and at the right time remains high among sustainers.

Maintenance

The DA goal for a non-mission capable rate due to maintenance is below 10%. We demonstrated higher than 19% across the H-60, H-47, and H-64 fleet between May and October 2022. The introduction of the Aviation Maintenance Training Program (AMTP) will address the long-term capability to fix aircraft. We must fully invest in the development of the program to maximize its potential. One factor to consider is the development of a simulator to increase the sets and reps for maintainers. Aircraft systems remain complex, and future aircraft acquisition will add to the complexity. The sustainment base must acquire a simulation system for aviation maintenance. Simulation involving sitting at a computer while using a mouse to point and click is insufficient. The simulator must

be realistic and model activities performed, personnel positions, materiel-handling equipment, and tools used. Inefficiencies of our maintainers could contribute to our 21% non-mission capable rate due to the maintenance average across the enterprise. Advertised turnaround times may not be attainable, given our unfamiliarity with maintenance events. We could be more efficient.

Training

We must empower team leaders with the ability to train those in their charge. Aviation maintainers use problem, people, parts, plan, time, tools, and technical assistance to assess throughput. This includes the intent to train personnel unfamiliar with a task. The risk for the commander is time for task completion. The return on investment is adding a trained Soldier to the formation that could be the next trainer. This is an exponential effort. Whenever possible, commanders must allow additional training of their maintainers. Readiness consumers must establish a minimum requirement for RTL. A reduced RTL today could lead to an increased OR at the end of the reporting period.

Personnel

Personnel assigned does not equal personnel capable of performing the work. Leaders at echelon must get to know personnel within their charge and be prepared to employ them in areas that will lead to their success. This isn't easy, and the enterprise is wrapping our collective

efforts around talent management. Talent management is not a quick win. It intertwines with the AMTP and requires continuous dialogue between the team leader, the senior maintenance evaluator, and the command team. Sustainers at echelon have roles to play in talent management. We must recognize, train, and retain the talent we have.

Organization

The culture within an organization directly reflects its desire to move its performance needle in a positive direction. Use the full extent of AR 1-201, Army Inspection Policy, to evaluate your organization. A staff assistance visit (SAV) is within the inspection program's scope but is not an inspection. Use SAVs to train, assist, and teach lower echelons. It does not produce a formal report of observations and findings. SAVs are not limited to CSDPs and the Command Maintenance Discipline Program. They can provide detailed sustainment assistance and serve as force multipliers.

Doctrine

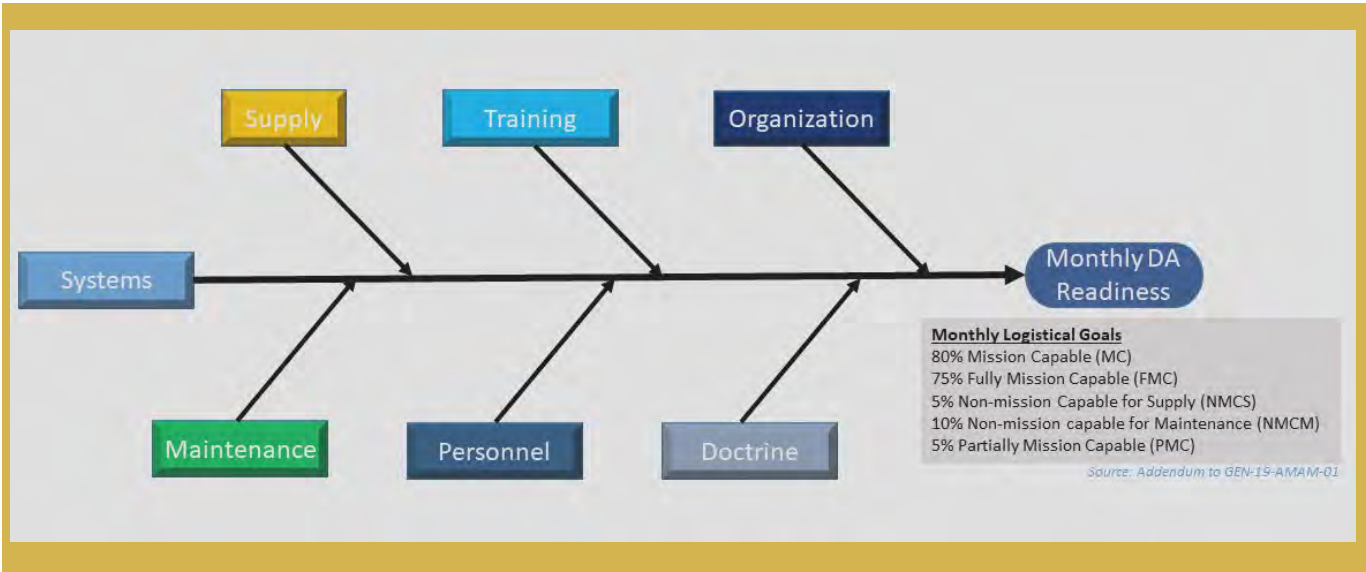
Written directives, policies, and procedures invariably affect the speed and accuracy at which we achieve throughput. Publications accomplish a known task, and a change in the desired outcome of that task requires revisiting the publication. The responsibility of notifying the publication author of an outdated reference belongs to everyone within the organization. Sustainers must remain engaged at all levels and continue to encourage investment into current doctrine.

Summary

Army aviation is an expensive service. It is expensive to fly and it is expensive to fix. We mandate rigid flying rules, which means it's more work to fix the fleet when it breaks. Acceptance of a certain RTL rate by the operator does not equal the same performance metrics for the sustainer. We must strive to go beyond the now and develop habits that will expand availability tomorrow. Acquisition of future aircraft types and systems will not reduce our sustainment burden. The development of a culture to stay ahead of the sustainment curve will not only increase the sustainer's proficiency but will also reduce the need for the maneuver commander to guess which aircraft is ready to perform a specific mission. OR rates are ours, and we as sustainers must own them as if the lives of our brothers and sisters in arms depend on it.

Chief Warrant Officer 4 Onwah Campbell serves as the Senior Aviation Maintenance Technician for Central Command. Campbell has completed all levels of the Warrant Officer Professional Military Education and has a master's degree in Information Management with a focus on project management from the University of Arkansas Grantham. Campbell is a certified Project Management Professional, a certified Lean Six Sigma Black Belt, and a Demonstrated Master Logistician.

*Feature Photo
Brigade aviation maintenance officer Chief Warrant Officer 5 Rolando Sanchez conducts a predeployment site survey on board a UH-60 Black Hawk in Afghanistan on April 19, 2019. (Photo by Chief Warrant Officer 4 Onwah Campbell)*



Basis of monthly readiness rates and group limitations to readiness. (U.S. Army Graphic)



Educating AGILE and ADAPTIVE Sustainment Noncommissioned Officers

An Interview with Command Sgt. Maj.
Marissa Cisneros, Logistics Noncommissioned
Officer Academy Commandant

■ By Mike Crozier

Command Sgt. Maj. Marissa Cisneros has served as Logistics Noncommissioned Officer Academy (LNCOA) commandant since August 2020, when she became the school's first female leader. The LNCOA — located at Fort Lee, Virginia, operating within the Combined Arms Support Command's Army Logistics University (ALU) — offers professional military education (PME) for all quartermaster, ordnance, and transportation NCOs in a blended learning environment that has evolved over time to continually meet the sustainment needs of the Army and joint force.

Army Sustainment sat down with Cisneros to discuss the LNCOA's key education modernization initiatives, which ensure the Army sustainment enterprise's backbone is collectively postured for future competition, crisis, and conflict.

What are the LNCOA's mission and vision for the staff sergeants and sergeants first class it is called to train and educate? Has this adapted over time, or have the LNCOA's key tasks in the PME world remained enduring?

The LNCOA trains and educates sustainment NCOs through 40 courses across each logistical branch, operating in three locations throughout Virginia: Fort Lee, Fort A.P. Hill, and Fort Eustis. We aim to empower NCOs through agile and adaptive training and education aligned with the Army's overarching NCO strategy. To ensure we're evolving at the pace necessary for our NCOs, we constantly collaborate with the varying branch proponent schools to update our curriculum as necessary. We take course feedback from students to adapt the way we deliver education. That's an ongoing, fluid process that naturally helps us modernize year in and year out.

How have the PME and leader development available to sustainment NCOs evolved and adapted throughout your career?

The Army is continuously evolving, and that certainly has

held true both institutionally and operationally throughout my career. You need to look no further than sustainment common core, which recently evolved as a result of internal research and direct feedback from the field. We now have a common core that is sequential and progressive and fully aligned with the NCO common core competencies. We've effectively leveraged technology to deliver our training and leader development, which undoubtedly would not have been possible or even considered earlier in my career. We have placed an enormous emphasis on content digitization to make it as accessible as possible to every Soldier. Collaboration tools such as Blackboard and Microsoft Teams have transformed the military learning environment in ways not possible 20 years ago. Soldiers can access educational materials from wherever they are, in both synchronous and asynchronous learning environments. Project Athena — the Army's leader development program that informs educational programs of instruction — is another example of the evolution that has taken place. Our approach now, thanks to efforts like Project Athena, effectively integrates training and leader development in a much more holistic manner. The integration of Project Athena coupled with PME modernization accounts for a Soldier's unique skills, capabilities, and behaviors and shores up areas of weakness while amplifying strengths. The support from Training and Doctrine Command has been phenomenal. There is no question certain parts of

For the first time in our history, we are developing multifunctional NCOs that can operate in ambiguity, intellectually advise their officer counterparts, and piece together a holistic mission support plan.



Command Sgt. Maj. Marissa M. Cisneros, senior enlisted advisor, 401st Army Field Support Brigade, speaks after receiving the Legion of Merit from Maj. Gen. John P. Sullivan, commanding general, 1st Theater Sustainment Command, at Camp Arifjan, Kuwait, June 24, 2020. (Photo by Claudia LaMantia)

our curriculum are still best delivered in the traditional classroom setting, specific to mentorship and coaching, so we've been able to strike a healthy balance in this regard while developing our instructors to be prepared to deliver their curriculum in a blended or hybrid environment.

The onset of the COVID-19 pandemic in March 2020 seemed to greatly limit the LNCOA's ability to train and educate students in the traditional sense. Before the pandemic and in the last year, annual throughput at the

academy topped 6,000 students, but that figure only reached about 3,200 as COVID-19 spread and in-person activities were halted. How did the LNCOA operate in such a constrained environment to continue training sustainment NCOs throughout 2020? What lessons learned have you carried forward?

The pandemic acted as a modernization forcing function for the LNCOA, and we have made the necessary adjustments over time to ensure our students receive the

training and education they deserve while also emphasizing their safety. In October 2021, we began a pilot to digitize our curriculum, validate lesson delivery, and certify our instructors to operate in a blended environment. Lasting for three quarters, the pilot demonstrated how we could continue to train and educate thousands of NCOs in both distributed and local settings. We worked in tandem with ALU's Operational Research and Systems Analysts team to survey our students and garner reliable feedback to help us shape future delivery options. Feedback from students proved our

staff and cadre were prepared for the challenge of COVID. I am extremely impressed with our team's ability to adapt lesson plans and exams during the pandemic while optimizing technology to enable learning. Through feedback, we have been able to make incremental updates as necessary while solidifying flexibility and agility in the entire education delivery process. As I mentioned, COVID has been a forcing function to ensure we're modernizing in an adaptive and flexible way that will be enduring in the future as we train and educate the next generation of sustainment NCOs in a safe and challenging environment.

Building on those lessons learned throughout the pandemic, how has the LNCOA balanced training and leader development in a blended learning environment?

I believe Secretary of the Army Christine Wormuth put it best: the Army can't simply train its Soldiers through PowerPoint. We have worked tirelessly to move away from this highly static training method. While there's a time and place for standardized delivery through PowerPoint-based lectures, this methodology cannot pervade our pedagogy for the sustainment NCO corps. We have been fortunate to find balance by nesting our learning continuum with the Army Leader Development Strategy. This enables us to ensure our blended environment accounts for learning across the institutional, operational, and self-development domains. We

have leveraged the Experiential Learning Model (ELM) to enhance collaborative discussions among students and bring to bear their varying experiences to benefit the entire group. ELM has proven to be useful in helping students share their unique knowledge, skills, and behaviors to teach other students in ways that extend beyond traditional lecture-based instruction. So much of a Soldier's learning happens out in the field, in the operational domain. We would be at a loss if we didn't apply that knowledge and integrate it into the classroom setting. We think this is at the core of training sustainment NCOs. Within LNCOA, we have modernized our education activities to address sustainment gaps and develop multifunctional NCOs. Sustainment common core allows us to develop sustainment NCOs that can break down the sustainment warfighting function into those individual parts that enable maneuver. We train logistics planning tools, the military decision-making process, and components of sustainment, to name a few lessons. The culminating event is a student-led concept of support — a value-added assessment that builds confidence and understanding. For the first time in our history, we are developing multifunctional NCOs that can operate in ambiguity, intellectually advise their officer counterparts, and piece together a holistic mission support plan.

What advice would you offer to sustainment NCOs preparing to advance throughout their careers?

First and foremost, everyone should participate in a mentor-mentee relationship. Having someone help you widen your aperture within and beyond your areas of expertise is critical for development. Second, create an individual development plan for yourself. Identify your goals and chart short-, medium-, and long-term actions you will take to achieve them. Be willing to be agile and adaptive along the way by maintaining an open mind to new challenges. Finally, ensure you understand the importance of the other logistics branches outside your own. That's step one to being truly multifunctional. Suppose a broadening opportunity arises in one of those external branches that interest you. In that case, you should feel ready to take that opportunity to learn, grow, and develop as part of the critical backbone of the U.S. Army.

Mike Crozier is a strategic analyst in the Army G-4's Logistics Initiatives Group. He holds bachelor's and master's degrees from Georgetown University.

Feature Photo
Command Sgt. Maj. Marissa Cisneros, command sergeant major, 401st Army Field Support Brigade, addresses the unit's Soldiers following their familiarization training with the new Army Combat Fitness Test at Camp Arifjan, Kuwait, Aug. 17, 2019. (Photo by Kevin Fleming)

Future of Data Education within Army Sustainment

■ By Col. Bob Spivey, Lt. Col. Doug Fletcher, Maj. Brian Johnson, and Dr. William Smith

“My second objective is to ensure the Army becomes more data-centric and can conduct operations in contested environments, which will enable our ability to prevail on the future battlefield.” — From a Feb. 8, 2022, message by the Honorable Christine Wormuth, Secretary of the Army.

The multidomain environment demands and requires sustainers to quickly organize and present data from multiple sources to describe the current sustainment situation and make data-informed decisions. Sustainers must rapidly describe what happened, diagnose why it happened, and apply analytical competencies and skills to enable them to prescribe optimal actions. These actions account for interrelated effects across the industrial base, the global distribution system, and the complex, multidomain battlefield. To effectively prescribe optimal actions in these interrelated factors, Army sustainment leaders must adopt a culture of rigorous data-driven recommendations and decision making.

Data-centric operations require sustainers to be competent with analytical and technical skills. Traditionally, academic disciplines such as mathematics and computer science provide the necessary skills used in data analysis. Unfortunately, most sustainers do not have this prerequisite education, either from civilian or military sources. A review of current degrees held by sustainment officers and warrant officers reveals at best 52% of officers have the requisite math or computer skills to exploit data. At worst, perhaps more likely, only 18% have the necessary data competencies via civilian education.

Considering these deficiencies, this article describes the data competency gaps and proposes a program to close them within the sustainment workforce. The Army

must ensure personnel training quality matches material solution quality. While the Army has invested in the Global Combat Support System-Army (GCSS-Army) and Logistics Information Warehouse to store incredible amounts of data, this data provides little value to decision makers if sustainers lack the training to effectively exploit it. Exploiting data starts by providing our workforce with the analytic competencies required to develop sound data-driven recommendations through effectively using increasingly available data.

Identifying the Gap

This article is not suggesting sustainers do not currently use data effectively. On the contrary, sustainers have always conducted analysis based on data, including data entry, working with a system of record, forecasting, and communicating results. Yet for many, these skills have not kept pace with the speed and abundance of data provided by the modernization of military systems. All sustainers must have the appropriate technical competencies to effectively manipulate and quickly analyze data at scale. In the fiscal 2022, Army Logistics University (ALU) conducted a qualitative study of sustainment officers and warrant officers to identify the key data competencies to serve as a basis for a data education program. Based on the participants’ experiences with data analysis in an operational environment, the study identified six competency themes: data entry, system of record, export/import data, data manipulation (or wrangling), modeling, and communication.

In addition to these insights, the study identified numerous gaps that currently exist in these competencies. For example, GCSS-Army is the most widely used system of record. Yet, many participants stated they could not retrieve desired data for analysis, nor could they access historical data. Additionally, the study identified Microsoft Excel as the tool of choice for data manipulation due to its widespread availability and capability to handle data imported from various systems. Unfortunately, there exists a wide disparity in skill levels for Excel across all ranks, and participants felt this disparity significantly hampered their ability to manipulate data efficiently and accurately. Finally, sustainers currently leverage their experience to conduct forecasting and trend analysis but desire additional data-driven predictive and prescriptive modeling techniques to better support their commanders and units. These examples highlight some of the data analytic training shortfalls sustainers currently encounter in the force, yet the multidomain environment expects sustainers to be proficient in these data competencies now.

We must evolve the Army’s military and civilian education system to be more responsive and relevant to the needs of the current and future operational environment. The current appetite for data-driven analysis requires sustainers to quickly organize and present information from multiple sources to describe the current sustainment situation to decision makers. Furthermore, sustainers must diagnose what happened and why it happened (using tools such as readiness trends and causal and correlational analysis), drawing on common data sets and organizing information for different purposes depending on their role in the supply chain. For our sustainers to meet these expectations, they need the analytical competencies and skills to enable them to prescribe optimal actions that account for the interaction within the industrial base, the global distribution system, and the multidomain battlefield. With respect to data education, the Army’s military and civilian education system must remain responsive to remain relevant.

Closing the Data Education Gap

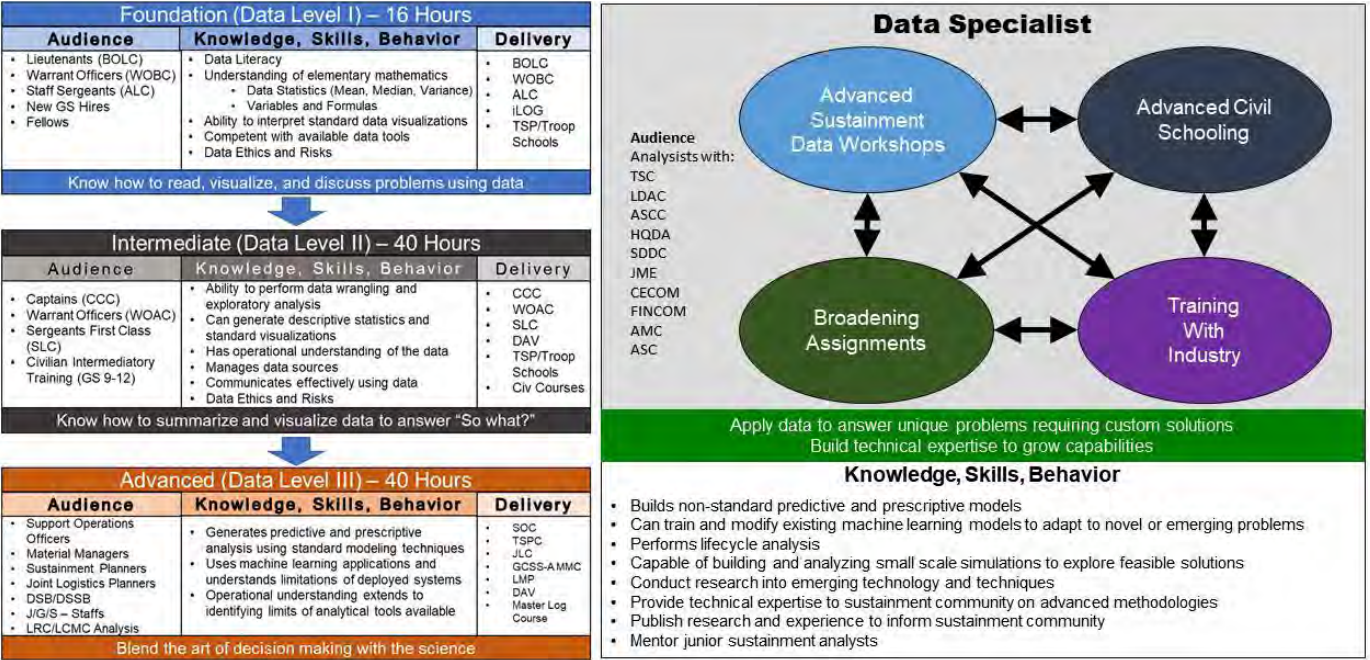
To change the culture and develop data analytic skills and proficiency across the Army, ALU educators are

using a multitier approach to establishing, delivering, and sustaining data education. ALU will embed sequential and progressive data education into current ALU courses. The proposed education will focus on practical applications rather than theoretical foundations, blending math and computer skills with sustainment warfighting function (WfF) requirements. Talent management will identify exceptional sustainers for advanced data education external to ALU in the form of either graduate school or training with industry.

The proposed approach integrates data education through an iterative and progressive framework. To facilitate this, existing officer, warrant officer, noncommissioned officer, and Department of the Army (DA) civilian professional education will be amended to provide the requisite data knowledge, skills, and behaviors throughout a career. While these courses provide initial exposure to data analysis, they will allow personnel to seek other academic and professional certification opportunities. In addition to developing more of the requisite skills, this approach drives organizational change toward a culture of data-centric decision making.

Level I (Foundational). Foundational level instruction will be provided through a 16-hour synchronous block of instruction to familiarize students with basic data literacy and math concepts, standard data visualization fundamentals, and the tools used to input and pull required data. ALU proposes integrating foundational instruction into the Basic Officer Leadership Course, Warrant Officer Basic Course, and NCO Advanced Leaders Course professional military education (PME) to blend data literacy with foundational sustainment WfF and combined arms concepts. ALU also proposes integrating data literacy concepts in the civilian Intern Logistics Course. As an alternative delivery method, ALU proposes the development of an interactive media instruction (IMI) training support package (TSP) for installation troop schools to use to educate the operational Army and new civilian hires on basic data literacy concepts.

Level II (Intermediate). This 40-hour synchronous instruction builds upon foundational data literacy concepts by providing students with the ability to perform data



Graphic of proposed approach that integrates data education through an iterative and progressive framework. (U.S. Army Graphic)

wrangling and exploratory analysis, descriptive statistics and standard visualizations, and an understanding of data source management and communication. ALU proposes integrating intermediate instruction into the Captains Career Course, Warrant Officer Advance Course, Senior Leaders Course PME, and the civilian Logistics Career Field Intermediate Logistics Course currently under development. As with Level I, ALU proposes developing an IMI TSP for installation troop schools to use to educate the operational Army and DA civilians on higher level data analysis concepts. Soldiers and civilians will complete Level I (Foundational) or equivalency certification and/or statistics courses, along with two-to-three years of documented experience for Level II credit.

Both foundational and intermediate level instruction will evolve over time as feedback from the field refines required data-centric skillsets, but these two levels of instruction should remain in PME. Both initiatives will play a central role in future leader success and enable the effective synchronization of sustainment WfF concepts into large-scale, multidomain operations, whether in peace or combat.

Level III (Advanced). The advanced level will provide students the skills to perform predictive and prescriptive data analytics, forecast requirements, and execute life-cycle

management skills for duty in tactical/operational levels and warfighting, enabling assignments requiring a higher-level understanding of data-centric competencies. ALU will develop Level III data education as a 40-hour data prerequisite for several functional courses.

ALU will modernize existing courses to take advantage of Level III proficiency. These courses will include the Support Operations Course, GCSS-Army Materiel Managers Course, the Logistics Modernization Program Enterprise Resource Planning suite of courses, the Joint Logistics Course, and the Master Logistician Course. With the integration of Level I and II competencies into PME and civilian courses, ALU proposes revising the current Data Analysis and Visualization Course to provide functional analysts with a higher level of understanding of data-centric concepts. Additionally, ALU proposes the submission of a Joint Sustainment Planners Course growth initiative to address operational level data analysis and sustainment planning proficiency shortfalls.

The Way Forward

Data Education Center. ALU proposes the establishment of a Data Education Center by fiscal year 2026 to assist in facilitating and maintaining a culture of decision making based on science and art. The center

will conduct continual curriculum assessments and modernization based on feedback and collaboration from the sustainment community, academia, and private industry. This will assist the center in updating PME curriculum and provide exportable TSPs for the installation troop schools and other centers of excellence. The Data Education Center will oversee credentialing and identifying civilian equivalency courses across multiple levels. Finally, deliberate personnel selection and utilization through talent management will enable the sustainment community to keep pace with advancements in academia and drive data innovation across the sustainment WfF.

Senior Leader Data Analytics Course Implementation. ALU will develop a Senior Leader Data Analytics Course to familiarize military and civilian senior leaders with current and emerging concepts and the proposed data education implementation strategy. ALU anticipates conducting this course during fiscal years 2025-2028 to gain senior leader championship, bridge the knowledge gap, and enable a data-centric culture.

Identify and Code Data Analyst Positions on Modified Tables of Organization and Equipment/Tables of Distribution and Allowances. ALU research validates the need to identify select positions requiring more comprehensive data analyst knowledge and skills across multiple ranks, cohorts, and levels of expertise. Such positions include support operations officers, sustainment planners, and Army Material Command Logistics Readiness Center and Life Cycle Management Center positions. Military and DA civilian job title changes and description revisions based on position codes and data proficiency requirements may be required to funnel the right personnel into more advanced education. ALU will collaborate with the Logistics Proponency Office and Army Civilian Career Management Activity on requisite updates in DA Pamphlet (PAM) 600-3, Officer Professional Development and Career Management, DA PAM 600-25, U.S. Army Noncommissioned Officer Professional Development Guide, and Army Regulation 690-200, General Personnel Provisions, to reflect data analytics

training, education, and professional development opportunities.

Conclusion

The Army’s technical capabilities in collecting, storing, and disseminating data have increased dramatically over the last two decades. Unfortunately, the capabilities of sustainment Soldiers and civilians to effectively use that data have not developed at the same rate, giving rise to a gap between analytic competencies and technical capabilities, which will only widen if not addressed. “We need to hasten the Army’s transition from the Industrial Age to the Digital Age,” said Maj. Gen. Karl Gingrich, Director, Program Analysis and Evaluation, Office of the Deputy Chief of Staff, G-8.

The sustainment community maintains a reputation of always providing the warfighter with the necessary supplies and services for mission success. This will become increasingly challenging as modern warfare requires greater resources during an era when the Army is being asked to reduce its logistic footprint and do more with less. To accomplish this, sustainers must be capable of exploiting and understanding relationships of data from the tactical to strategic levels. The Army’s investment in materiel modernization must be matched by an investment in its people.

Col. Bob Spivey currently serves as an operations research and systems analysis instructor and associate dean in the College of Applied Logistics and Operational Sciences at Army Logistics University.

Lt. Col. Doug Fletcher, Ph.D., is an Army operations research and systems analysis officer with over 25 years of service. He currently teaches operations research and systems analysis at Fort Lee, Virginia.

Maj. Brian Johnson is an operations research and systems analysis instructor at Army Logistics University and a recent graduate from the Air Force Institute of Technology’s Operations Research program.

Dr. William Smith has over 20 years of experience with operations research and logistics. He holds graduate degrees in both mathematics and industrial engineering. He currently teaches future operations research analysts at the Army Logistics University.



Educating the Next Generation of Support Operations Professionals

■ By Maj. Jonathan Kalczynski and Maj. Etta Wheeler

As the Army transforms and modernizes, Army Logistics University (ALU) has kept pace through the development of rigorous, relevant, and valued-added training and education opportunities. These efforts include a revised Support Operations Course that captures key components of the sustainment warfighting function (WfF) in support of large-scale combat operations in multidomain operations.

Field Manual (FM) 3-0, Operations, and FM 4-0, Sustainment Operations, necessitated Support Operations Course revisions to align with current doctrine. Although still delivered in a phased approach, an 80-hour Phase I asynchronous online prerequisite and an 80-hour Phase II synchronous instruction (either resident or mobile training team), the previous course was a direct learning model comprised predominantly of lecture style instruction, multiple

choice, checks on learning, and initial and final multiple-choice exams.

In May 2021, in response to operational Army knowledge gaps and combat training center lessons learned, ALU updated the Support Operations Course to the current 120-hour phased hybrid model focused on the sustainment WfF through increased rigor. The new course curriculum emphasizes the adult learning model, leveraging the experiences students bring into the classroom. A completely redesigned asynchronous Phase I prerequisite interactive multimedia instruction (IMI) provides students a general understanding of the sustainment WfF fundamentals needed for successful Phase II synchronous instructional participation. Upon enrollment in a resident or mobile training team support operations course, students receive an assessment of their understanding of the fundamentals presented in the IMIs that require a passing grade for Phase II participation. Additionally, ALU incorporates sustainment planning and estimation tools to enhance student knowledge in developing realistic and relevant running estimates based on capabilities and requirements. Students undergo practical exercises and receive examinations on estimation tool use and running estimate calculations.

The first week of Phase II focuses on a brigade support battalion's capability to support an armored brigade combat team, with week two elevating to the division sustainment

brigade's support of the divisional requirements and priorities. The revised course has also incorporated the military decision-making process with two iterations of mission analysis culminating in the execution of a sustainment rehearsal of concept drill. To ensure students develop a feasible and realistic concept of sustainment, students participate in course of action development, comparison, and decision briefs focusing on sustainment.

The course is open to more than just the logistics, ordnance, quartermaster, and transportation branches. It has seen a rise in enrollment of adjutant general and medical service corps student attendance. Although the largest element of the sustainment WfF, logistics comprises only part of the support and services that ensure freedom of action, extended operational reach, and prolonged warfighting endurance. Accordingly, the Support Operations Course incorporates human resource, financial management, and health service support elements to plan for casualties, evacuations, and replacements to draft holistic sustainment plans based on independent and interrelated sustainment principles.

Recent updates to FM 3-0, Army Techniques Publication 4-91, Division Sustainment Operations, and the impending updates of FM 4-0 require additional Support Operations Course revision to ensure its relevance. The course will emphasize division-level sustainment support during completion, crisis, and conflict, primarily focusing on

the division sustainment brigade support operations section instead of the brigade support battalion. The course will also incorporate a robust portion of data analytics and predictive logistics, as Maj. Gen. Mark Simerly, commanding general of Combined Arms Support Command, stated, "The shift to division-centric operations is not revolutionary and does not change sustainment principles and concepts. But division-centric operations within a multidomain environment does create new problem sets for sustainers." Thus, as these new and emerging problem sets arise, ALU will strive to prepare graduates of the Support Operations Course for the challenges of sustaining the warfighter in 2030 and beyond.

Maj. Jonathan J. Kalczynski currently serves as the Support Operations Course manager at Army Logistics University, Fort Lee, Virginia. Previously, he served as a support operations officer, brigade S4, and battalion executive officer in the 4th Infantry Division, Fort Carson, Colorado. He holds a bachelor's degree in criminal justice from Niagara University and a Master of Business Administration from the College of William and Mary in Virginia.

Maj. Etta Wheeler is an instructor of the Support Operations Course within Army Logistics University, Fort Lee, Virginia. Wheeler's previous assignment was with the 21st Theater Sustainment Command as a G-3/5 Future Operations Planner in Kaiserslautern, Germany. She holds a bachelor in general studies (humanities) from Louisiana Tech University and a Master of Science in administration from Central Michigan University.

Feature Photo
Capt. Paul Petersen (left) and Capt. Kelvin Riddle, Lead Materiel Integrator Directorate, Army Sustainment Command, work on team briefing Oct. 30, 2019, during the Support Operations course held at Rock Island Arsenal Oct. 21-Nov. 1. (Photo by Sgt. 1st Class Maillettis Gardner)

SUS TAIN ING

Soldiers

By 2nd Lt. Rayna Catino

People are the most valuable resource within any organization. This is especially true within the U.S. Army. Regardless of the component, it is people that propel progress and innovation. Within the area of sustainment, it is vital the Army

employ competent Soldiers to adapt and solve logistical challenges and meet the future needs of the branch. To further the sector of sustainment, Soldiers must proactively manage their career paths, and academic institutions must rise and adapt to the needs of their service members.

To best prepare for future Army operations, sustainment Soldiers should take a dedicated interest in pursuing their careers through their outlook and actions and focus on a holistic educational mindset. Instead of brain-dumping information directly after a test, a true leader



Soldiers assigned to 8th Ordnance Company, 264th Combat Sustainment Support Battalion, 3rd Expeditionary Sustainment Command arrive at Fort Bragg, North Carolina, on Nov. 1, 2022, after completing a nine-month deployment in support of the NATO Alliance. (Photo by Sgt. Daniel Ramos)

finds ways to catalog information for future use. Students are not expected to memorize and retain every piece of information, but a general understanding of the regulations gives Soldiers a better grasp of the fundamentals. This general knowledge feeds into sustainment Soldiers' responsibility to be accountable for their academic success.

With the continual shift in the operational environment, logisticians need to be well-rounded experts in

their craft. It is no longer enough to expect the educational opportunities afforded by the Army to be sufficient to meet these needs. Sustainment Soldiers must continually seek external education opportunities to further their personal development. With each Soldier focusing on an area of their own interests, the knowledge employed within the Army exponentially increases. This, coupled with the internal instruction offered by Army academic institutions, creates more capable Soldiers.

The area of sustainment needs to continue to adapt to meet the needs of the modern battlefield. To do this, academic institutions must adopt 360 degrees of feedback, soliciting advice and criticism from all fronts. Including all internal and external stakeholders in this evaluation would give institutions the best possible outlook for its strengths and shortcomings. From there, key leaders can ascertain the shifting needs and priorities of educational programs for sustainment. It is imperative that

leaders continually reevaluate the relevancy of instruction.

While after action reviews help capture the individual classroom environment, they lack long-term scope. Currently, the Army relies on email surveys to gain anonymous feedback on its programs. Between that and informal word-of-mouth feedback between peers, there needs to be more consistency in retrieving valuable criticism. It is important to receive direct feedback from sustainment Soldiers and their chain of command to fully ascertain the long-term effects the training was able to provide.

Another area of focus for academic institutions should be within the civilian sector. Not simply to monitor the actions of civilian academia or government contractors but to solicit insight from both sources. Civilian academia shines a light on the newest methods of instruction and groundbreaking research. Partnerships in this area would speed up innovation. Government contractors are the unseen sustainers, providing parts, expertise, and labor to fuel the warfighting missions. Incorporating their knowledge would bring a greater level of depth to the level of instruction.

The final area of interest is the end customer. The sustainers support the warfighters, and the needs of the warfighters drive the battle rhythm and echelons of support. Incorporating them into not only the feedback cycle but also the cycle of instruction would be invaluable to those in sustainment.

While Army academic institutions offer a wide variety of instruction, there are areas where civilian institutions offer more up-to-date information on the study of logistics management. The military institution carries a stigma of being slow to change. For the Army to remain tactically competitive, its academic institutions must enact policies and procedures that improve organizational retention and rival that of the civilian sector. As stated earlier, Army institutions must take direct feedback from all sides to monitor effectiveness. The needs and desires of current service members are changing. With the economic pressure, shifting political environments, and higher competition in the civilian sector, the Army must yield to these needs.

Another opportunity is for the Army to consider allowing Soldiers to take civilian equivalencies for some courses. If there are programs that meet the standards and qualifications set forth by the Army, allowing service members to take external courses gives them more direct control over their careers. It could cut down on instances where Soldiers need more schooling to be eligible for promotion. Promotions, pay raises, and benefits are fundamentally key to retaining meaningful talent.

Beyond fiscal priorities, retention is also affected by culture. It would not be the start of an Army school without the countless briefs on risk management, sexual harassment, resiliency, and equal opportunity. The academic environment is one of the best ways to evaluate how service members will affect the culture of

the Army. It is vitally important for leadership at these levels to identify Soldiers who create a negative stigma within their classes. Addressing these issues early and within the academic environment gives the Army more time to find the root of the problem and assist the Soldier.

The expectation to remain competitive is within the academic institutions of the Army and the individual service members. The Army should continue seeking external feedback and expanding its connections with stakeholders. Being open to this feedback offers the opportunity to increase the knowledge provided within the schoolhouse. Freeing the path to educational opportunities creates a more appealing path for sustainers to consider the Army as a long-term career opportunity. Fostering individual sustainment Soldiers to explore areas of interest inside and outside of the Army will benefit the overall knowledge base of the force. It is a combined effort that will continue to innovate the areas of sustainment, academic institutions, and the Army.

2nd Lt. Rayna Catino is a student at Army Logistics University's Basic Officer Leadership Course. She attended Officer Candidate School at Fort Benning, Georgia, branching as a transportation officer and commissioning in 2021 for the Army Reserve. She holds a Bachelor of Science in aviation business administration specializing in air transportation and a Master of Business Administration focusing on aviation from Embry-Riddle Aeronautical University.

Editor's Note: This article was a selection from the Army Logistics University President's Writing Competition.

Army Logistics Survivability Against Multidomain Threats

By Lt. Col. Ross M. Hertlein

The Nagorno-Karabakh conflict in September 2020 passed into history without comment, greatly overshadowed by the Russian invasion of Ukraine in February 2022. Most Americans would have been challenged to find Azerbaijan or Ukraine on a map before recent events. Fresh professional articles have started examining the Nagorno-Karabakh conflict and its possible implications in greater detail. However, the explosion of war in Ukraine has

transformed an academic discussion into an urgent need to update the tactics, techniques, and procedures (TTP) for Army logistics in the field. An article in the April 2021 edition of *Small Wars Journal* states that in Nagorno-Karabakh, “for the first time in recorded history, nearly all battle damage was inflicted by unmanned platforms. The attrition of forces and equipment by UAS (unmanned aircraft systems) led to a decisive Azeri victory.” Azerbaijan was able, in 44 days, to seize an advantage, capture a large portion

of the Karabakh region, and redraw a regional map that had been in place since the early 90s. In Ukraine, defensive and offensive operations have hinged on the availability and capability of drones to shape tactical and operational activities. The idea of secure support areas, insulated from threats and hidden from enemy reconnaissance by distance from the forward line of troops, is over. As Russian President Vladimir Putin’s army has demonstrated, the U.S. Army must update its tactical way of operating or risk failing strategically.

Nagorno-Karabakh: September-November 2020

The opening and subsequent shaping of military operations in 2020 by the Azerbaijan military drew primarily upon the proliferation of low-cost loiter munitions (“kamikaze” or “suicide” drones), low-cost UASs both as direct fire and reconnaissance platforms, and the use of direct/indirect fires aided by UAS precision targeting. This sensor-to-shooter enhanced flexibility enabled a low-cost multidomain threat environment that the Armenian forces were not prepared, equipped, or trained to deal with. Six days into the conflict, Azerbaijan destroyed 250 armored vehicles, a similar number of artillery pieces, and 39 air defense systems, including a Russian S-300 surface-to-air missile system. Without a modern air force, the Azeri forces penetrated the entire air domain and engaged high-value targets through various means without overcoming the Armenian main defense line. The destruction of key bridges, logistics nodes, and resupply convoys isolated forward elements early in the conflict. Assembly areas and reinforcements were easy targets due to the lack of tactical dispersion and camouflage because the Armenians lacked an appreciation of the depth of the threat environment. These shaping operations critically weakened the main defense for the final coup de grace. In less than two months, previously accepted military tenets about the importance of the reverse slope (vulnerable to armed UAS and loiter munitions) and the defensive advantage of mountainous terrain (continuous UAS observation

coupled with direct/indirect precision fires eliminates strong points and break up counterattacks) crumbled, along with the Armenian defenses.

Ukraine: February-September 2022

In November 2021, three months before Putin’s failed attempt to seize Kyiv, retired Lt. Col. Alex Vershinin wrote an article in *War on the Rocks* that, in hindsight, appears prophetic. He defines the Achilles’ heel of the Russian army and the limit of its threat to NATO as the lack of logistics flexibility and capability. He postulated that victory after the initial assault would require an operational pause by the Russian army to extend operational reach. The accuracy of his article was borne out by the 40-mile resupply convoy to Kyiv that attained ubiquitous status with the early logistics failures of the Russian invasion of Ukraine. Ukrainian use of drones early in the war strained Russian resupply efforts. Later, the combination of drones, loiter munitions, special operations, and partisan forces with precision munitions and artillery all but immobilized the entire Russian army offensive. With U.S. M142 High Mobility Artillery Rocket Systems (HIMARSs), the Ukrainian armed forces destroyed more than 50 Russian ammunition stores in just a few weeks. It now appears that Russian forces have attempted to disperse their logistics nodes to avoid catastrophic losses but are unable to maintain the flow of supplies to forward troops. In September 2022, a Ukrainian counteroffensive shattered an under supplied and overly

stretched Russian army in the eastern Kharkiv Oblast. Ukrainian soldiers captured hundreds of armored combat vehicles and full ammunition stockpiles while troops fled without weapons, vehicles, or combat gear back to the rear.

U.S. Army Logistics

Army logistics officers with brigade combat team experience know the sprawling footprint of our brigade support area (BSA). This necessary concentration consists of ammunition holding areas, motor pools, various company headquarters, assorted support company echelons, communications arrays, antennas, supply support activity containers, maintenance collection points, and, of course, the battalion headquarters for operations. Poorly camouflaged, if at all, and tightly spaced to provide some semblance of an integrated perimeter defense, usually in an open space, the BSA is not mobile or survivable in the conflicts we are now seeing. Yet without this logistics support element, the brigade’s capability is measurable in a few days. So, what is the answer?

Dispersion

Tactical doctrine for Army logistics must change, and the type of threat we face needs to be reframed and emphasized across the force. The Center for Strategic and International Studies (CSIS) study of the Nagorno-Karabakh war came to a similar conclusion of “ground force tactics on dispersal and deception ought to be reinvigorated.”

“Ought to be” should be replaced with “must be,” or the risk to the



Graphic from the Center for Strategic and International Studies study of the Nagorno-Karabakh war. (U.S. Army Graphic)

force is an unmitigated disaster. However, physically dispersing the BSA to limit the effect of fires is not enough, and dispersion also can affect the efficiency and security of the BSA. CSIS's study also recognized the necessity of deception. Typically, the Army does not train much on deception, likely because of the Army's domain dominance. Since the Vietnam War, the Army has been used to friendly skies and fires dominance. The low cost and availability of new technologies almost guarantee this will not be the

case in future conflicts. It should be assumed in any conflict the air domain will be contested, and therefore rear areas will not be safe and secure for combat support activities. We must reallocate protection assets across the battlefield to protect vital capabilities, disperse the signature, and deceive enemy targeting.

Deception

Deception can be accomplished with simple, low-cost methods. Gen. George Patton's Ghost Army in England during World War II was

provided with inflatable tanks to fool German aerial reconnaissance. An August 2022 article in the Washington Post reported Ukraine was using wooden mock-ups of HIMARS to fool Russian UAVs, wasting expensive precision-guided cruise missiles on mistaken high-value targets. Similarly, applying wood or sheet metal to current Army logistics platforms like the tank rack module and the Hippo water tank could make readily identifiable logistics targets look like simple shipping containers. Dispersing the BSA

geographically and reintroducing camouflage netting would lower signatures and conceal activities. Replacing tactical operations center tents, which are anything but tactical, with all-terrain expandable command trucks with integrated power and communications systems would increase survivability and mobility. Yet dispersion and deception can only accomplish so much. As an executive officer and support operations officer in a brigade support battalion (BSB), I argued for the positioning of the brigade reserve, when not being actively employed, with the BSA to provide effective protection to counter threats. I also argued for mortars and air defense to be positioned to support the BSA. When combat power is limited, it cannot be everywhere, and hard decisions must be made on what to protect and where to accept risk. The support area's nature demands additional combat power beyond the BSB's organic capability to protect its critical functions. New air defense and counter-UAS systems are critical to BSA survival. As we have witnessed in Karabakh and Ukraine, combat formations stripped of their logistics rapidly derail operational and strategic plans.

Organization

Lastly, as the Army reviews its TTP for large-scale combat operations (LSCO), we must consider our current alignment of logistics elements. The decentralized BSB organization that worked so well in supporting the counter-insurgency fight does not bode well for LSCO. The BSB and its parent organization, the division-aligned sustainment

brigade, have limited ability to mass logistics to support the main effort. The forward support company (FSC) construct creates a situation where the BSB commander asks to take back resources from maneuver battalions to conduct the logistics fight rather than having the organic flexibility to weigh the effort according to the brigade plan. The current spread of command and control of the logistics peanut butter is inefficient and leaves the BSB without the capability to surge transportation, maintenance, or recovery to the brigade's main effort, limiting the combat brigade's operational reach. We should remove the habitual relationships of the FSCs and bring them back to the BSB commander to enable the massing of logistics effects and weight the effort in line with the brigade and division plans.

At echelon, active duty sustainment brigades do not have the organic units necessary to support a division's combat requirements. The division combat sustainment support battalion (CSSB) in the sustainment brigade should have transportation, maintenance, fuel, and recovery capability to support the division support area (DSA). Without a division CSSB retrograde capability for maintenance and combat losses, battle-damaged equipment accumulates in the BSA. Accumulation in the BSA further complicates concealing this critical logistics node, delaying the reconstitution of combat power and restricting mobility. Currently, too much Army logistics has transitioned to National Guard and

Reserve components for sustainment brigades to train BSBs how to fight in LSCO. While the modular system enables Reserve and National Guard battalions and companies to complement formations in wartime, it limits a sustainment brigade and a division's ability to train as it fights. A sustainment brigade commander with full command and control over three BSBs, all their FSCs, and a Division Sustainment Support Battalion capable of executing DSA operations would vastly increase flexibility and extend operational reach to support the division fight.

This commentary is based on my experiences supporting various forces in varying contexts. Ultimately, we cannot wait for combat to ensure our logistics forces are efficiently aligned, trained in dispersed operations under constant threat, and properly equipped to conceal, deceive, and avoid threats in this current multidomain threat environment.

Lt. Col. Ross M. Hertlein is currently serving as the Deployment and Distribution Operations Center chief for U.S. Southern Command. He has company and field grade operational experience in the 524th Combat Sustainment Support Battalion, 173rd Airborne Brigade, and the 82nd Airborne Division. He has 36 months of combat tours in Central Command in addition to deploying to Liberia in support of the Ebola response mission. He is a graduate of the Transportation Officer Basic Course, the Combined Logistics Captains Career Course, and Command and General Staff College at the Navy War College in Rhode Island.



Native Fury 2022

Distributed Sustainment, Mission Command Across the CENTCOM Theater

■ *By Maj. Gen. Michel M. Russell Sr., Lt. Col. M. Shawn Abbott, and Capt. Taylor J. Goodwin*

Native Fury is a biennial, joint, and multinational exercise led by Marine Corps Forces Central Command (MARCENT) that takes place within the Central Command (CENTCOM) area of responsibility (AOR). This year, Native Fury 2022 (NF22) was conducted in the Kingdom of Saudi Arabia (KSA). Participants for the exercise included Army Central Command (ARCENT), MARCENT, Naval Forces Central Command (NAVCENT), Air Forces

Central Command (AFCENT), and the KSA Ministry of Defense (MOD) forces. For ARCENT, the purpose of the exercise was twofold. First, it allowed the command to demonstrate its ability to conduct joint reception, staging, onward movement, and integration (JRSOI) from port to fort for units entering the AOR. Second, and equally as important, it was an opportunity to strengthen the partnerships between U.S. service components and our international

partners. Decisively, NF22 met both objectives. The planning, preparation, and execution of this exercise were seamlessly organized between participants and validated our ability to deploy, fight, and win in complex environments.

Planning

ARCENT's planning for the exercise originated at the 1st Theater Sustainment Command (1st TSC) main command post (MCP) at Fort

Knox, Kentucky, in Fall 2021. After assembling the final details of the exercise and starting the military decision-making process, the MCP transferred responsibility for NF22 final planning and execution to the 135th Expeditionary Sustainment Command (135th ESC). The 135th ESC's role within CENTCOM is significant as it is the unit responsible for managing theater sustainment operations from the 1st TSC's operational command post (OCP) located at Camp Arifjan, Kuwait. After their assumption of planning responsibility, members of the ESC G35 attended two planning conferences and initiated parallel planning with the 36th Sustainment Brigade (36th SB).

The first of these planning conferences was conducted with the I Marine Expeditionary Force (I MEF) at Camp Pendleton, California. The second planning conference was conducted with I MEF and KSA MOD forces in Riyadh, KSA. Primary outputs of the conferences included 1st TSC convoy requirements, the Joint Movement Control Center (JMCC) construct, the plan for theater gateway establishment, and the exercise's overall medical concept of support plan. These planning efforts continued through mid July, culminating with a comprehensive and detailed rehearsal of concept (ROC) drill. Everyone had a clear understanding of the mission and their role in its accomplishment. The team did a phenomenal job of accounting for and mitigating risk to mission and risk to force.

Preparation

Following the ROC drill execution in July, the 1st TSC OCP resumed its preparation for NF22. The OCP's key exercise task for NF22 was to validate strategic operational plan objectives with the displacement and dispersion of a tactical command post (TAC) to enable distributed mission command. To ensure the staff was ready to execute, the 1st TSC deputy commanding general, Brig. Gen. Thomas Vickers, directed three OCP TAC exercises. Two of these TAC exercises were conducted at Camp Arifjan, Kuwait. The final exercise was conducted at the Kuwait Naval Base, which is shared with our Kuwaiti partners. The three TAC exercises validated the TAC's mission command capability and ability to forward deploy, which was essential to the ESC's success during NF22. The exercises enabled the establishment of the TAC at Yanbu, KSA, in less than 24 hours, and the Soldiers that participated gained valuable experience in TAC operations to assist JRSOI.

At the conclusion of these three exercises, the TAC was ready to start NF22 and displaced to Logistics Support Area (LSA) Jenkins located in Yanbu, KSA. Concurrently, the 36th SB staged troops and equipment at Prince Sultan Air Base (PSAB), KSA, in preparation for supporting the exercise. From this combined base with the Saudi MOD, the 36th SB then established convoy support centers (CSCs) along the Trans Arabian Network (TAN) to enable the JRSOI of MARCENT's equipment and personnel. Once the equipment, troops, and mission command infrastructure

were in place, conditions were set for the execution of NF22.

Execution

ARCENT formally began the execution phase of NF22 on July 28, 2022, with the arrival of the 1st TSC OCP's liaison to MARCENT's Combined Exercise Coordination Cell located at the commercial seaport of debarkation (SPOD) in Yanbu, KSA. Throughout the next two weeks, forces from the 1st TSC continued to flow into the exercise AOR via the aerial port of debarkation (APOD) and from ground lines of communication across the TAN. On Aug. 6, the 1st TSC OCP TAC was fully operations capable and ready to provide mission command to all 1st TSC forces supporting NF22.

The 1st TSC OCP TAC provided mission command through the JMCC and communication infrastructure created over five geographical command and control nodes between the 36th SB and 336th Combat Sustainment Support Battalion (CSSB) TACs. The JMCC was a robust cell comprised of personnel from the I MEF, 135th ESC, 36th SB, 336th CSSB, 257th Movement Control Battalion, 14th Human Resources Support Center, and 595th Transportation Brigade. The JMCC was essential to the OCP TAC's ability to provide oversight of all 1st TSC and MARCENT personnel and equipment moving to and from the Yanbu SPOD, the LSA, and across the TAN as part of MARCENT's JRSOI requirements.

The 36th SB served as the tactical execution element for the 1st TSC and ARCENT. Over the course of the

exercise, the 36th SB's Theater Gateway Personnel Accountability Teams immigrated 1,352 service members into KSA. Additionally, their customs teams cleared 354 pieces of rolling stock while also providing sustainment support to MARCENT for surface port operations at the commercial port of the Yanbu SPOD. This support included the inland transportation of 367 pieces of equipment spanning over 2,200 cumulative miles between the SPOD and LSA as well as across the TAN into PSAB. To exercise mission command of their operation, the 36th SB established a brigade-level TAC at PSAB, supported by a battalion-level TAC at the Yanbu APOD. This structure provided simplicity of mission command to the 36th SB commander, Col. Carrie Perez, and extended the operational reach of the brigade during the exercise.

Using organic and contracted services, the 36th SB employed two CSCs to provide tactical sustainment support for combined/joint convoy operations transiting the TAN. The CSCs provided more than 44,000 gallons of bulk fuel, 3,255 contracted meals, 746 bags of ice, and stored 192 cases of meals ready-to-eat along with 2,304 bottles of water. The CSCs also provided air-conditioned sleep tents, laundry services, and shower facilities. KSA partners provided Ministry of Health Services, conducting combined medical training and key leader engagements with MARCENT and 1st TSC health service support personnel. The KSA MOD also provided force protection at each CSC, the SPOD, the APOD, and for convoy movements.

Upon completion of the combined/joint convoy operations from Yanbu to PSAB, NF22 culminated with a 36th SB planned and executed bilateral machine gun range with participants from both the Marines and KSA partners. This bilateral machine gun range met both the ARCENT and 1st TSC commanding generals' intent to increase partner capacity with regard to lethality and enhanced cooperation for the mutual defense of KSA. It was also the capstone of a yearlong planning process that required extensive collaboration and validation leading up to the execution of NF22.

Conclusion

NF22 presented a welcome opportunity for ARCENT to demonstrate that, in conjunction with partners, the Army can effectively execute its wartime mission in support of any contingency operation. This year's iteration came at an opportune time when, post COVID-19, all intermediate preparation steps required for execution could be performed at full scale, which greatly enhanced execution. The exercise required in-depth doctrinal understanding, precise planning, innovative ideas, and an optimized mission command infrastructure to effectively meet its objectives. The units from ARCENT, MARCENT, NAVCENT, AFCENT, and our KSA partners admirably responded to the challenge and convincingly validated their ability to thrive in complex environments and support victory on behalf of the combatant commander.

While the sustainment enterprise was unquestionably successful during

NF22, the exercise opened the door for future applications of Army innovation within the CENTCOM theater. New technologies, processes, and capabilities currently under development provide opportunities to gain efficiencies, enhance effectiveness, and reduce risk to mission and risk to force. Recognizing these opportunities, ARCENT and the 1st TSC are working diligently to get these capabilities into the CENTCOM theater where they can be put to the ultimate test.

Maj. Gen. Michel M. Russell Sr. is currently serving as the commanding general of the 1st Theater Sustainment Command operating at Fort Knox, Kentucky, and Camp Arifjan, Kuwait. He previously served as the 28th Chief of Transportation and Commandant of the Army Transportation School and as the commanding general of the 19th Expeditionary Sustainment Command in South Korea. He holds master's degrees from the Combined Arms Services Staff School, the Marine Corps Staff College, and the Industrial College of the Armed Forces.

Lt. Col. M. Shawn Abbott is currently serving as the director of the Commanding General's Initiatives Group at the 1st Theater Sustainment Command. He is a graduate of the Quartermaster Basic Officer Leaders Course, the Combined Logistics Captains Career Course, and the College of Naval Command and Staff. He has a master's degree in defense and strategic studies from the College of Naval Command and Staff.

Capt. Taylor J. Goodwin is currently serving as the G-35 chief of Future Operations for the 135th Expeditionary Sustainment Command in Birmingham, Alabama. He is a graduate of the Ordnance Basic Officer Leaders Course, the Naval School of Explosive Ordnance Disposal, and the Reserve Component Logistics Captains Career Course. He holds a bachelor's degree from the University of Alabama and is currently completing a master's degree from Asbury Theological Seminary.

Feature Photo

U.S. Marines with Combat Logistics Regiment 1, 1st Marine Logistics Group drive a tactical vehicle onto the USNS Seay (T-AKR-302) during exercise Native Fury 22 at Yanbu Commercial Port, Kingdom of Saudi Arabia, Aug. 26, 2022. (Photo by Marine Corps Sgt. Alize Sotelo)

Evolution of Army Civilian Logistics Education in a Multidomain Operating Environment

By Dr. Robert J. Neeley

The Army of 2030 is undertaking a generational transformation to develop the capability to fight and win across multiple domains in a contested environment. This transformation includes an investment in the people who make up the Army force, both military and civilian. The time, resources, training, and education devoted by the Army to the development of its military and civilian force provide the Army with a distinct and competitive leadership advantage over its adversaries. Looking to a future strategic environment centered on large-scale combat and multidomain operations, it is critically important for the Army to maintain this advantage. To do so requires a deliberate and continuous methodology to ensure Army leaders receive essential education, training, and broadening experiences focused on building professional leaders who are capable

and ready to lead this nation's Army now and into the future. Army Civilian professionals play an integral and essential role in support of a multidomain-capable Army. The Honorable Christopher Lowman, Assistant Secretary of Defense for Sustainment, stated the overarching goal for the civilian portion of the Army People Strategy is to leverage modern talent management practices to ensure Army Civilians can “respond with the skill sets that we own — and that only our civilians can bring to the table — to support the warfighter.”

Civilian Education: An Investment in the Future

The importance of investing in Army Civilian education to provide the essential foundation on which operational experience is applied cannot be overstated. Successful civilian education is a collaborative responsibility of the individual leader, the institutional Army, and the operational force. The Army invests in the development of its civilians through the Civilian Education System, which begins upon entry into the Army Civilian workforce with appropriate functional training and professional education throughout a civilian's career. This investment of time and resources is a long-term investment in our civilian workforce as individuals and an investment by current Army leaders to develop the Army's next generation of civilian professionals.

Civilian Education Important to Ensuring Army's Success in Complex World

Army Civilians are critical thinkers, able to visualize creative solutions to

complex problems. To be effective problem solvers supporting the Army's goals and mission, Army Civilians must understand the strategic environment and be proficient in fundamental traits such as adaptability, agility, responsiveness, and resiliency. Through effective civilian education and development, Army Civilians become expert, responsible professionals who have learned the requisite knowledge, skills, and behaviors to build and lead world-class teams to meet the challenges of the 21st century operating environment.

Army Civilians as Stewards of the Profession

The Army deliberately develops its civilians through training, experience, and a formalized, structured program of professional education augmented by relevant functional training and self-development opportunities. This deliberate approach acknowledges the importance of developing a trained and educated civilian workforce for the Army and supports the Army stewardship principle to care for the people and resources in the Army family. The development of Army Civilians is an important and fundamental component of Army readiness and equips the Army with a ready and capable civilian workforce. Accordingly, Army Civilian logistics education must evolve at pace with doctrinal changes and emergent initiatives.

Evolution of Army Civilian Logistics Education through Full-Spectrum Learning

Per Volume I of DOD Instruction

1322.35, Military Education: Program Management and Administration, a main tenet of DOD policy, achieved through its educational programs, is the leveraging of a wide range of educational opportunities to develop a canon of professional knowledge for DOD personnel. Focusing specifically on the civilian workforce supporting the Army logistics enterprise, this education should produce experienced logistics civilian professionals who can provide expert logistics support, understand the tactical and strategic levels, and integrate logistics across all levels in support of national objectives. The Army Training and Doctrine Command Commander's Vision 2023 accentuates this point regarding the modernization of functional training: the training and education of Army Civilian logisticsians must adapt and evolve with new and emerging operating concepts such as multidomain operations with updated, relevant training, and new educational content centered on closing the gaps.

Lines of Effort

Functional logistics education provides Army Civilian logisticsians with knowledge and skills from foundational training in basic logistics concepts to a higher-level curriculum focused on mastering Army logistics. Army Logistics University's (ALU's) College of Applied Logistics and Operational Sciences is leveraging four main lines of effort to facilitate the modernization of functional civilian training and education. The lines focus primarily on functional concepts, capabilities, and subjects

central to the development of Army Civilian professionals, spanning enterprise logistics, capabilities development, data education, and operations research.

ALU regularly collaborates with course sponsors, supported commands and organizations, and other key stakeholders to review and revise existing course content to ensure it is academically rigorous and doctrinally relevant. ALU also fosters relationships with partners across DOD, industry, and academia to capture and incorporate best practices and innovations as part of its continuous approach to evolve and modernize the functional logistics education provided by the university. These efforts help ensure Army Civilian logisticsians are provided with ample opportunity to develop the knowledge, skills, and behaviors required to support the Army fighting multidomain operations in a large-scale combat operational environment.

Educational Initiatives

To this end, ALU is undertaking new educational initiatives to modernize civilian education. ALU is working closely with key stakeholders such as the Army Materiel Command, the Army Civilian Career Management Activity, and other functional course sponsors within the four lines of effort toward an end state where students are provided relevant, value-added, and cost-effective training and education opportunities that meet warfighting and enabling force competency requirements in support of large-scale combat operations and multidomain operations at all levels of war. Current

ALU courses are assessed, revised, and updated as necessary to maintain relevant educational content. ALU is redesigning existing and outdated courses to reflect changing doctrine to address new and emergent requirements. In 2023, ALU will begin the development of new courses, in subjects ranging from supply chain optimization to intermediate level logistics, and an integrated, progressive, and sequential data education strategy centered on sustainment data competencies.

Since the outset of the COVID pandemic in 2020, ALU has delivered world-class functional education to its students through a combination of in-person and virtual distributive learning. These educational delivery methods have been successful and enabled thousands of students to continue learning throughout the pandemic and beyond. ALU is adding blended learning, hybrid mixes of synchronous and asynchronous delivery methods, and interactive media instruction to the suite of available instructional delivery methods, which will allow students greater access to training through increased educational delivery options.

ALU is also working with its partners to establish a process for civilian logistics training and education governance to provide guidance and direction for functional logistics training programs. Finally, ALU is committed to its faculty's continuing education and professional broadening. Civilian instructors are encouraged to seek out self-development in the form of additional training and

education. They do and are afforded opportunities to attend educational development courses and programs, all with the goal of providing the Army's civilian logisticsians with qualified and exceptionally well-trained educators.

Conclusion

The educational development of Army Civilian logisticsians is a critically important component of overall Army readiness and directly impacts the Army's warfighting capability. ALU is focused on developing leaders and Army Civilians who are warfighting focused and globally aware, confident and competent in their craft, innovative and adaptive, and stewards of their profession. Through partnerships with key stakeholders throughout the Army logistics community and others such as the Army University and the Army Civilian Career Management Activity, ALU is working to modernize civilian logistics education to develop the knowledge, skills, and behaviors required from Army Civilian logisticsians to support the Army in a multidomain, large-scale combat operating environment.

Dr. Robert Neeley currently serves as chairman of the Enterprise Management Committee in the College of Applied Logistics and Operational Sciences at Army Logistics University, Fort Lee, Virginia. He holds a Bachelor of Arts in history from the University of North Carolina at Charlotte, a Master of Arts in organizational management from the University of Phoenix, a Master of Arts in national security and strategic studies from the Naval War College, and a Doctorate of Business Administration from Walden University. Neeley retired from the Army as a lieutenant colonel.

*Feature Photo
Graduates of the Army's Civilian Education System at Redstone Arsenal, Alabama, on June 28, 2019. (Photo by Kari Hawkins)*



LIQUID LOGISTICS

Fuelers Build Unit Readiness for Large-Scale Combat Operations

■ *By Maj. Derek J. Castelluccio and Chief Warrant Officer 2 Omar J. Stoddard*

Since the 1980s, the Quartermaster Liquid Logistics Exercise (QLLEX) has served as an annual Army multicomponent liquid logistics training exercise to build readiness across the Total Force. Today's QLLEX is revolutionizing its mission and focusing on preparing units from brigade level and below to support large-scale combat operations (LSCO) in a multidomain environment. QLLEX integrates active duty, National Guard, and Army Reserve units conducting petroleum distribution and water purification operations at the tactical and operational levels. Units are organized under one of the Army Reserve's three petroleum groups and conduct operations receiving, storing, and issuing petroleum product, operating field services, and producing potable water for participants and customer units. The 135th Quartermaster (QM) Company (Co.) played a significant role in QLLEX 22 as the only active duty, tactical petroleum support organization to participate, with more than 2,540 Soldiers across seven states moving more than 968,000 gallons of fuel in a short nine-day window.

The 135th QM Co. is an essential element within the 87th Division Sustainment Support Battalion (DSSB). The company is designed to provide petroleum support to sustain an LSCO fight. During QLLEX, the 135th QM Co. was responsible for receiving, storing, and distributing more than 80,000 gallons of Jet-5 aviation-grade fuel to Navy and Marine Corps strategic partners at

the Naval Air Station’s Defense Fuel Supply Point in Jacksonville, Florida. This accounted for 8.2% of the total fuel distributed during QLLEX. The Soldiers masterfully executed setting up the 120,000-gallon fuel system supply point (FSSP) using the all-terrain berm system. They simultaneously conducted daily quality assurance and quality surveillance checks per American Society for Testing and Materials D1655, Standard Specification for Aviation Turbine Fuels, and MIL-STD-3004-1A, Quality Assurance for Bulk Fuels, Lubricants, and Related Products. Sustaining readiness is a priority and a challenge for petroleum support companies like the 135th QM Co. The unit must maintain garrison support operations to multiple battalion-sized customer units in the field and at the garrison while simultaneously training its Soldiers in a diverse set of skills in multiple operational environments. Building and planning a crawl-walk-run approach to training is crucial to maintaining and building readiness while supporting the unit’s traditional daily customers.

Building readiness does not happen overnight. It requires a methodical approach to establishing systems. Units must balance day-to-day requirements, approach maintenance aggressively, incorporate effective training methods, and share lessons learned to achieve the desired effects. The 135th QM Co. was able to achieve positive training effects by ensuring readiness of their M969 5K tankers, maintaining flexibility in their missioning approach, and

coordinating critical elements of information up and down the chain of command. At the company level, effective training while executing the daily mission set is critical to ensuring customer support and mutual training benefits coincide.

Preparation for QLLEX 22

The 135th QM Co.’s success at QLLEX 22 was a great collaboration with the U.S. Army Tank-automotive and Armaments Command (TACOM). First, the unit identified critical class II, class IX, and major end item shortages starting with fabric collapsible tanks that had reached their shelf life. The unit worked with TACOM and Product Manager Petroleum and Water Systems to turn in old systems and receive new ones. According to the Technical Bulletin for Collapsible Fabric Fuel Tanks, and Fuel Technical Letter 17-04, elastomeric fuel fabric collapsible tanks and berm liners have a shelf life of 12 years from the date of manufacture (DOM) if stored in depot conditions (dry indoor environment) and five years from the DOM if stored in nondepot conditions (outside). Fabric tanks stored in depot conditions can extend their shelf life to 15 years if properly inspected by a trained petroleum and water systems technician or senior petroleum supply specialist. The 135th QM Co. identified fabric collapsible tanks needing to be replaced and submitted extensions for fabric collapsible tanks meeting that requirement. With operational fabric collapsible tanks on hand, the unit focused on maintaining the

FSSP’s other elements. FSSPs must be serviced annually to ensure the systems are working properly. This includes pumps, filter separators, and calibration of the flow meters. Once the unit confirmed it had operational systems, the leadership planned its training events.

Training Methods: Crawl-Walk-Run

During the fall of 2021, the company coordinated with the U.S. Army Forces Command Petroleum Training Module (FPTM) team from Fort Pickett, Virginia, for a mobile training team (MTT) to come to Fort Stewart, Georgia, and conduct FSSP training to prepare the unit for its upcoming QLLEX mission. Any unit can request an FPTM MTT to support their training, which truly pays off in support of the crawl phase. The MTT’s training plan allowed Soldiers to focus on mission-relevant tasks and high-value battle drills. Leaders took these battle drills, prepared a plan, and inserted the battle drills into the unit’s home station training to build team readiness. Additionally, the unit integrated training aids and resources in building the crawl phase plan. Resources such as the Petroleum Planning and Operations Smart Book and the FSSP/Assault Hoseline Checklist from the Petroleum and Water Knowledge Center portal of the Combined Arms Support Command’s Petroleum and Water Department website (https://army.deps.mil/army/cmds/CASCOM_KAPPS/SKN/QMKC/PWD/SitePages/Liquid%20Logistics.aspx) were critical as part of the

training. These tools enabled Soldiers to understand specific requirements and step-by-step methods for establishing an FSSP. Soldiers and NCOs conducted skill level 10, 20, 30, and 40 training to enhance their tactical sustainment capabilities according to U.S. Army Command and General Staff College Theater Sustainment Battle Book Student Text. They conducted 100% inventory layouts to ensure the completeness of systems. To understand planning factors and task-to-time ratios, Soldiers and NCOs received precise hands-on training before conducting a complete setup of the 120,000 (120k) gallon FSSP. Following the training with FPTM, the unit participated in multiple iterations of battalion field training exercises (FTXs) to hone their battle drills and special skills on how to set up and operate a 120k FSSP. This was part of the walk phase. The daily mission integrated with field training built the skill sets needed to execute QLLEX. Additionally, the company acquired three 50,000-gallon all-terrain berms to meet environmental safety requirements for an operational 120k FSSP. The all-terrain berm eliminates engineer support requirements while improving flexibility and reducing the time necessary to set up a 120k FSSP by 50%.

During the 87th DSSB April FTX, the 135th QM Co. conducted sustainment warfighting functions to validate its proof of concept by providing support and services at all key levels of liquid logistics sustainment from company to division levels. The run phase of

training consisted of setting up the 120k FSSP system and all-terrain berms and identifying essential assets to deploy all system parts. The Soldiers trained on their site, set up battle drills, and continued to improve their planning and execution. The unit utilized internal support from the 87th DSSB Composite Truck Company to eliminate contracted transportation costs while preparing for its training at Camp Blanding, Florida, during QLLEX 22. Through innovation and preparation, the 135th QM Co.’s FSSP site was the first to store, receive, and distribute class III (B) during QLLEX 22 less than 18 hours after notification and movement. The unit’s supply accountability, maintenance plan, MTT employment, training resource usage, and continuous small unit battle drills paid off in a highly skilled and combat-ready team. The crawl-walk-run method of training works if units are dedicated to it.

Conclusion

More than 89% of the Army’s petroleum support capabilities reside in the National Guard and Army Reserve. There are only four active duty petroleum support companies in the Army. The 135th QM Co. was the only active duty, tactical support unit to participate in QLLEX 22 and received, stored, and issued more than 80,000 gallons of product at the Camp Blanding Joint Training Center in Florida. QLLEX 22 enabled the company’s command, staff, and Soldiers to integrate support operations at the tactical and operational levels and synchronize logistical systems across all three

components. QLLEX proved it is a primary tool for training petroleum support companies, like the 135th QM Co., to test systems, knowledge, and the proficiency of their Soldiers and leaders. QLLEX helps build readiness for the LSCO future fight. QLLEX challenged the company’s readiness and enabled the leadership to develop a comprehensive training plan using the crawl-walk-run methodology. It allowed team leaders and squads to focus on their battle drills and sharpen their knowledge and skills.

Future LSCO conflict has known challenges and unknown obstacles, but training for QLLEX and building unit readiness ensures great teams like the 135th QM Co. are trained, ready, and up to the challenge.

Maj. Derek J. Castelluccio is currently serving as the support operations officer for the 87th Division Sustainment Support Battalion, 3rd Division Sustainment Brigade, 3rd Infantry Division. Castelluccio holds a master’s degree in logistics management from the Florida Institute of Technology and a bachelor’s degree in psychology from Syracuse University. He is a graduate of the Command and General Staff Officer College at Fort Leavenworth, Kansas.

Chief Warrant Officer 2 Omar J. Stoddard currently serves as a 923A Petroleum & Water Systems Technician for the 135th Quartermaster Company, 87th Division Sustainment Support Battalion, 3rd Division Sustainment Brigade. Stoddard holds a Bachelor of Science in sports management and is a Demonstrated Logistician.

Feature Photo: Soldiers with the 135th Quartermaster Company, Division Sustainment Support Battalion, 3rd Division Sustainment Brigade and 125th Transportation Company, 343rd Quartermaster Battalion disassemble a fuel bag at Camp Blanding, Florida, June 20, 2022. (Photo by Staff Sgt. Joel Salgado)

Managing Career Development to Meet Future Operations

■ By William T. Smith, Ph.D.

So, you want to manage your career to be better prepared to meet future Army operations? I assume you do, or you wouldn't be reading this article. I can also deduce you view your current occupation as a potential profession, worthy of investment. Other than these astute observations, I am sorry

to say I do not have a crystal ball and cannot foresee the exact skills you should master for some future need. I can say you are on the right path, seeking out information that will serve you well when you meet the future. So having established I cannot divine the future, let us explore what you can accomplish to be better prepared.

Addressing the elephant in the room, you will not be there to meet future operations if you do not have a career. You must manage your career. That is your 25-meter target. How you execute the current demands of your job can set you up for success while ensuring your future in your career. Become the person others seek out when they

need something done right the first time. Be that Soldier or civilian who others trust to immediately pick up a shovel and dig if that's what's required to accomplish the mission. Along the way, seek out difficult jobs others shy away from. Leaders, peers, and subordinates alike respect someone who is not above doing the gritty work, and favor goes to the person who humbles themselves for the needs of others. As you build your reputation and career, you will learn to overcome challenging tasks, serving you well as you advance to more senior positions and complex problems.

While going about day-to-day challenges, you also must learn how your career evolves to adapt to that change. Research how advances in technologies and methodologies are transforming your chosen profession. Find out how other militaries, both friends and foes, are planning to employ them. Learn the future challenges your civilian counterparts are facing and how they overcome them. Think about exploiting these future advancements while denying them to the enemy. Don't forget to look outward at how changes in related disciplines will affect your profession. If you are a logistician, you need to be aware of how advances in indirect fire will affect supply routing. Lawyers and doctors practice their craft because they must continuously learn as their professions change. Warfare is no different. You must remain vigilant to change while constantly gaining knowledge.

Speaking of gaining knowledge, don't shy away from going back to school or learning a new skill, especially if it's difficult and in demand. Currently, all things data are in vogue, but tomorrow, it may be something else. Your ability to influence future operations is directly proportional to what you will be able to accumulate between your ears. What should you learn? That's up for you to decide, but being a lifelong learner, I am confident you will pick up on clues as to what will be in demand tomorrow. Just be wary of following the path everyone else is taking. If you do, make sure you learn more, dig deeper into the details, and don't just regurgitate buzzwords like so many do to obfuscate their inability, or lack of motivation, to become knowledgeable. You need to know what you know and, more importantly, what you do not know. For those times, look to the people around you.

The final and most important advice is to surround yourself with people you want to emulate while learning to work well with others. The future will undoubtedly present you with challenges you will not anticipate. If you have like-minded peers, the odds are in your favor some will be prepared and can help. Or maybe you were prepared, but now you need to convince others your way forward is warranted. Everything you do will inevitably include others. The time you spend cultivating relationships built on trust and respect will pay dividends beyond measure throughout your

career, regardless of your challenges. Introverted or extroverted, you must nurture relationships built on mutual respect and admiration. This advice applies to superiors, peers, and subordinates alike. People will always be part of the solution.

Well, here we are a few paragraphs later, having no more foresight into the specific skill sets you need to procure than when we started. You must work hard, think about the future, continue learning, and play well with others. I wager they don't sound much different than what you might have learned in elementary school. That's the thing about providing instruction on how to prepare for the future. The guidance needs to be simple yet applicable in various potentially unknown circumstances. Every day you will wake up and make course corrections as conditions change. Those focused on a definitive goal will often find the goal's value has changed during the journey. I'm sure that's not you, though. You are here, trying to prepare for the future. You will remain diligent, looking to the future and gaining insight to help those around you. Our Army will be better because you will be there, prepared for whatever the future holds.

William T. Smith, Ph.D., currently serves on the Operations Research Committee for the College of Applied Logistics and Operational Sciences. He has a Ph.D. in industrial engineering from Pennsylvania State University, an M.S. in applied mathematics from Naval Postgraduate School, and a B.A. in mathematics from Cameron University.

Editor's Note: This article was a selection from the Army Logistics University President's Writing Competition.

LEVERAGING

Data Analytics Technology

IN JOINT

LOGISTICS EDUCATION

■ By Lt. Col. Heath A. Mullins, Lt. Col. Matthew Strickland, Lt. Col. Nathaniel J. Groves, and Air Force Maj. Michael D. Rajchel

In a global environment that grows ever more complex, the modern logistician is increasingly challenged by the substantial volume of data and legacy data systems providing support to combatant commanders. Logisticians currently spend countless hours sifting through vast service-specific data lakes trying to determine good versus bad data to enable the visualization of information to inform their commanders' decision-making processes. To remedy this situation, the DOD is fielding new data platforms to facilitate better data-driven decision making. Advana is one such platform. Advana seeks to resolve these legacy issues by aggregating and integrating disparate and stove piped data sets into a consolidated digital dashboard.

Army Logistics University (ALU) is at the forefront of logistics data education within the military academic environment through its data education and joint logistics academic initiatives. During a recent course offering, students attending ALU's Joint Logistics Course (JLC) leveraged the capabilities and tools of Advana (instead of traditional static PowerPoint slides) to present a detailed capstone briefing of a theater-level operational problem to the Defense Logistics Agency's (DLA's) J-3, Navy Rear Adm. Doug Noble, at Fort Lee, Virginia. This first ever use of Advana in the JLC provided students with an opportunity to gain a valuable glimpse into the future with real-time data.

Current Logistics Data Environment

The DOD is developing and evolving technologies and processes in accordance with the DOD Data Strategy. However, most current DOD logistics support systems operate within individual service silos of excellence. These systems are encumbered by service-specific proprietary operating systems and processes, with the majority providing no data analysis capability, and often hinder rather than facilitate the formulation of critical decisions. Logisticians lose valuable hours devoted to sifting through data lakes, trying to transform data into usable and relevant information to arm decision makers with actionable knowledge and analytics. Without access to an analytics platform tailored to organizational needs and requirements, staff officers can spend inordinate time creating PowerPoint presentations, copying and pasting screenshots of individual sustainment systems to compile and present information for senior leader updates. Little to no time is spent analyzing the data, and critical thinking is applied at the most elementary level for the most complex problem sets. Compounding this is the potential for information to be siloed between services within a joint operating environment. An analytics platform such as Advana can mitigate many of the current shortfalls and inefficiencies in joint data analytics.

What is Advana?

Advana — a mash-up of the words advancing analytics — is the DOD’s technology platform, which, in addition to housing a collection of enterprise data, is much more than simply a data warehouse. Advana arms military decision makers across the DOD with decision support analytics, data management and data science tools, and associated support services. In her May 5, 2021, memorandum, Creating Data Advantage, Deputy Secretary of Defense, Dr. Kathleen Hicks, named the Advana platform as the single enterprise authoritative data management and analytics platform for the DOD. The purpose of Advana is to make data widely accessible, understandable, and actionable across the DOD enterprise by translating common enterprise data into profound yet actionable insights and outcomes for the decision maker.

Utilizing Data Analytics to Enhance Joint Logistics Education

In June 2022, Greg Little, Deputy Comptroller for Enterprise Data and Business Performance in the Chief Digital and Artificial Intelligence Office (CDAO), and Brad Bunn, Vice Director, DLA, facilitated a forum centered on the future of data utilization during a data summit at Fort Belvoir, Virginia. ALU leveraged the insights gained from this data summit to modernize the JLC curriculum to incorporate emergent data analytics technologies and platforms.

The target audience for the JLC is field grade officers, senior noncommissioned officers, warrant officers, and DOD civilians who are currently part of a strategic or operational level staff. These logistics leaders enter the JLC with significant experience at the tactical level of their respective service.

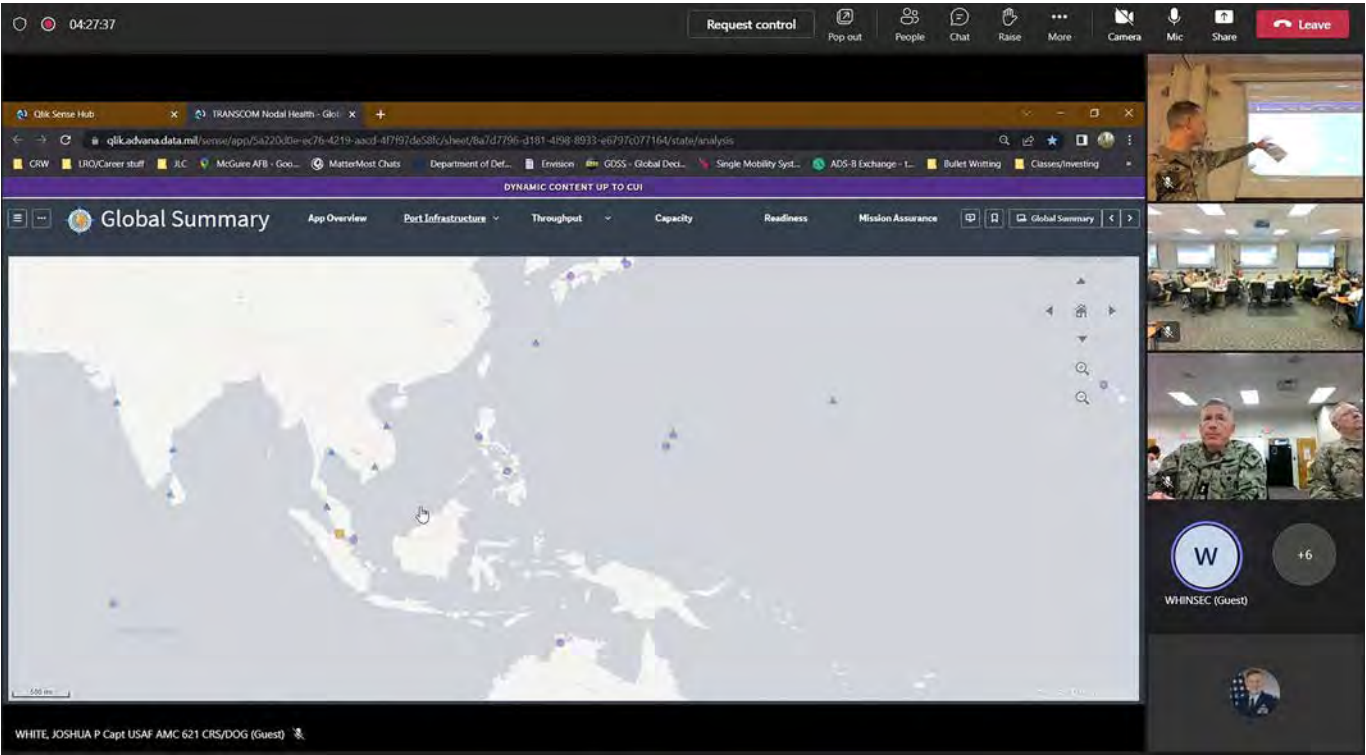
This modernization in turn resulted in a cooperative whole-of-community approach by JLC cadre and leaders to develop course content within the JLC to serve as a

proof of principle exercise to incorporate the utilization of the Advana platform within a recent course offering of the JLC. The JLC class used for the proof of principle exercise consisted of 48 students representing each service, including National Guard, the reserve component, and multiple operational and strategic level organizations. The strategic problem for the proof of principle exercise was set within the South China Sea region. Stakeholders from Transportation Command (TRANSCOM), Central Command (CENTCOM), DLA, and the Office of the Secretary of Defense CDAO contributed to the process through participating in weekly working groups, reviewing lessons learned, and developing academic applications for students’ utilization.

Bringing it All Together

Due to the agile nature of the proof of principle exercise, an aggressive execution timeline within the constraints of a 10-day course, and the fact that, for most of the class, this exercise was their first exposure to the Advana platform, course instructors guided the class through overview lessons from Joint Staff J46, Logistics Plans and Exercises, on the basic layout and program architecture for Advana. This orientation was followed by deep dives into TRANSCOM’s nodal health application, CENTCOM’s joint operational contracting support application, and DLA’s event visualization assessment and supply chain app logistics enhancement applications. The Advana team led an in-person training session over a period of three days on the framework and programming process, followed by the hands-on execution of data to information used to expound on the capstone scenario. Students quickly developed a functional understanding of the system to execute all required functions and actions to generate and visually portray information for their capstone out brief. Armed with the capabilities provided by Advana, in the time it would have usually taken a staff officer to build a PowerPoint slide deck, and with a little help from the

Yesterday’s information
does not yield
effective decision
making in tomorrow’s
multidomain battle.



Joint Logistics Course 2023-002 students present a detailed capstone briefing of a theater-level operational problem utilizing Advana for the first time in the course to the Defense Logistics Agency’s J-3, Navy Rear Adm. Doug Noble, at Fort Lee, Virginia, on Dec. 15, 2022. (Photo by Air Force Maj. Michael D. Rajchel)

Advana support team, the students also developed a base operating support-integrator application and a boards, bureaus, centers, cells, and working groups application to use as part of their capstone out brief. After receiving the capstone out brief, Noble encouraged the students to become more familiar with Advana and to be emissaries and advocates for Advana within their organizations.

Conclusion

In today’s quickly changing and rapidly evolving threat environment, commanders must have the tools and information to allow them to make timely and appropriate data-driven decisions at the speed of war. Yesterday’s information does not yield effective decision making in tomorrow’s multidomain battle. Advana seeks to bring the best available data to a consolidated point for the DOD and offers the toolset for staffs to present actionable data sets to the decision maker. ALU will continue to develop and evolve the role of Advana and other analytics technologies within the functional logistics and professional military education courses provided to the logistics enterprise community.

Lt. Col. Heath A. Mullins currently serves as the Course Director of the Joint Logistics Course, Army Logistics University at Fort Lee, Virginia. He is a graduate of the Joint and Combined Warfighting School, Army Command and General Staff Officer Course and has a Master of Arts in acquisition and procurement management.

Lt. Col. Matthew Strickland currently serves as the Operational Logistics Data Lead Sled Dog for the Joint Staff J46. He is a graduate of the Army Command and General Staff Officer Course and has a Master of Arts in educational leadership from Saint Louis University.

Lt. Col. Nathaniel J. Groves currently serves as an associate professor with the Joint Logistics Course, Army Logistics University at Fort Lee, Virginia. He is a graduate of the Army Command and General Staff Officer Course and has a bachelor’s degree in civil engineering and a Master of Business Administration.

Air Force Maj. Michael D. Rajchel currently serves as an associate professor with the Joint Logistics Course, Army Logistics University at Fort Lee, Virginia. He is an Air Command and Staff College graduate and has a Doctor of Business Administration with a focus in operations.

Feature Photo
Manveer Singh Khanijoun, a business data analyst with Business Practices at the U.S. Army Engineering and Support Center, Huntsville, Alabama, navigates a Qlik Sense dashboard on Aug. 28, 2019, as part of Huntsville Center’s push to incorporate data analytics, visualization, and automation into its everyday processes. (Photo by Stephen Baack)



Beyond the Horizon

■ By Chief Warrant Officer 4 Timothy K. Sprague

Warrant officers in the field of sustainment are regarded for technical expertise within the broad areas of quartermaster, ordnance, and transportation. This expertise is in high demand as command and staff leaders hold great expectations for a warrant officer's ability to analyze data and provide trustworthy counsel. This sentiment

resonates among the Army's technical logisticians with decades of competence and valuable advice. Still, it is fair to be concerned about what it takes to maintain this legacy and not take success for granted.

Technological advancement and modernization impact the ways the Army trains and fights. Further, rapid developments may require warrant officers to develop beyond the horizon of technical specialties

and become more familiar with all sustainment warfighting functions. This development is imperative for all sustainers because expanding awareness enables logisticians to communicate more effectively

and operate more freely outside their comfort zones. Without effective communication and a broad awareness of all sustainment functions, one's vision remains limited and self-serving.



Chief Warrant Officer 2 Jason Tabor, an automotive maintenance warrant officer assigned to Alpha Company, 541st Division Sustainment Support Battalion, 1st Infantry Division Sustainment Brigade, 1st Infantry Division, leads maintenance training with Soldiers at the Rotational Unit Field Maintenance Area on Fort Irwin, California, Aug. 14, 2022. (Photo by Pfc. Joshua Holladay)

Quartermaster, ordnance, and transportation warrant officers spend years developing their skills and knowledge through operational and institutional initiatives and experiences. All this culminates in solidifying technical expertise and mastery. The proficiencies required to function as a technical expert formulate the identity of a warrant officer.

Sustainment can be a very fragmented and complex puzzle that leaders are required to piece together. Preferably, many specialties work with each other rather than alone. The working

dynamic that develops between a warrant officer and a support operations officer, an S-4 officer in charge, or even a brigade support battalion commander becomes a question of whether the broad logistician can narrow their vision to understand the technicalities of a warrant officer's craft or whether the technical expert can broaden their vision of sustainment and translate it to broad terms. Both directions are beneficial and serve an overarching goal of communicating more effectively, yet some leaders tend to project the responsibility to bridge this communication gap onto others. Ideally, all logisticians in the

sustainment field can benefit from understanding a little more about what other people do.

This is the juncture in the communication process when one might see why it is important to have some conceptual awareness of what's going on outside of our specialty. For example, there are moments when command and staff leaders must decide which class of supply is the priority during operations. One might notice Class VIII in the 5th order of priority and misinterpret the context to assume Class III and Class V are more important to a commander if these are top

priorities. This is contextually false. The order of supply is less important and more about the strategic positioning of assets and resources.

Misinterpretations are more likely to happen when a technical expert cannot recognize what is taking place outside their area of responsibility. While this can result in apathetic mindsets among leaders, some might feel the logistical picture must change or adjust to accommodate one's requirements. This vantage point is most likely to result in an ineffective sustainment approach. When a technical expert has enough fundamental knowledge to recognize broad sustainment concepts and applies a fair level of knowledge about support operations, there is more clarity regarding the reasoning behind what is taking place. The logistical picture is recognized well enough to see how their specialty area must adapt to everything else to meet the commander's intent. From here, there's a sense of a greater, overarching purpose to enable the support effort. With all of this in mind, it is then fair to assert how competition and self-serving decisions can negatively affect support and teamwork.

The Support Operations Course is arguably one of the best educational opportunities for any warrant officer to take advantage of because it enhances one's understanding of a wide range of sustainment functions without jeopardizing any current developments in one's primary specialty. For example, a property accountability technician

might get the opportunity to learn from scenarios involving fuel resupply, which would increase their awareness of another warrant officer's specialty and might help one learn more about a commander's priorities and why certain decisions are made. This instance of shared understanding does not require a technical level of expertise, nor does it require a lengthy time of study or repetition. Much can be gained in just a few rigorous days of concerted effort and research on different sustainment topics.

Without attending the Support Operations Course, another viable approach to learning more about other sustainment areas might begin with some research on the Force Management System Website (FMSWeb). The ability to identify sustainment assets and review how authorizations are distributed among each battalion in a brigade combat team or a sustainment brigade provides insight into various areas of consideration that would benefit any logistician. FMSWeb might be a common system for some warrant officers. Still, those who do not use the system to perform daily operations could easily uncover a wealth of information about unit capabilities and equipment. The research option is not just limited to FMSWeb, either. The Combined Arms Support Command website has excellent resources that anyone can navigate, including the Sustainment Virtual Playbook or the Sustainment Resource Portal, which contain many resources and tools that could enhance anyone's knowledge.

Technical developments among the warrant officers of today and the future will require a disciplined initiative to develop, not just in one's primary specialty but also beyond the comfort zone of one's area of expertise. This is the answer to gaining mastery in the craft. As frustrating as it may seem to commit efforts toward areas that might not directly apply to one's daily tasks, the awareness of how a specialty relates to other areas of emphasis is where all the magic is. Through this vision, everyone learns to have more respect and appreciation for what others do, as sustainers have much more in common than not. The means to support the mission might be different, but in the end, warrant officers support the mission by supporting each other.

Chief Warrant Officer 4 Timothy K. Sprague serves as a Warrant Officer Advanced Course (922A) instructor and course manager for the Technical Logistics College at Fort Lee, Virginia. He previously served as Senior Command Food Service Technician for the National Training Center at Fort Irwin, California, and graduated from Warrant Officer Candidate School at Fort Rucker, Alabama, in 2009. He holds a Master of Business Administration from the University of Phoenix.

Feature Photo
Chief Warrant Officer 4 Brian Beard, Sustainment Training Center senior warrant officer shows Brig. Gen. Thomas Mancino, adjutant general for Oklahoma, a motor that Soldiers train with during their time at the Sustainment Training Center located at Camp Dodge Joint Maneuver Training Center, Iowa, July 16, 2022. (Photo by Sgt. Reece Heck)

MULTI FUNCTIONAL LEADERS

New Blueprint for Logistics Officers

■ *By Capt. Lakesa Cobb, Capt. Erica Gaughan, and Capt. Eric Schnell*

Army logisticians face challenges that require agile and adaptive leaders that are trained to execute multifunctional logistics operations. In 2018, the Basic Officer Leadership Department (BOLD) implemented cross-functional training into the course design. In 2022, Army Logistics University (ALU) introduced a new training strategy and redesign of the multifunctional Logistics Basic Officer Leadership Course (LOG

BOLC). The realistic demand for multifunctional lieutenants outweighs traditional training approaches to single-function quartermaster, ordnance, and transportation officers.

Army Doctrine Publication 6-22, Army Leadership and the Profession, states a leader's development happens in three domains: self-development, institutional, and operational. Army Centers of Excellence provide junior leaders with branch-specific or specialized skills training. Army

Strategy reinforces institutional and operational domains by providing guidance, intent, and objectives for training Soldiers to sustain mission readiness. Successful training programs empower Soldiers with the tools and resources needed to improve in all three domains.

Leaders across the Army emphasize the importance of being able to multitask. Logistics leaders are not only required to complete multiple tasks simultaneously, but the Army

also relies on logistics platoon leaders to be multifunctional. Throughout the years, there has been a constant requirement for logistics units to perform logistics operations in small teams dispersed across austere operational environments. These teams operate under the leadership and guidance of a logistics platoon leader. By training multifunctional logistics, the LOG BOLC redesign better prepares logistics platoon leaders for the uncertainties of their first duty assignments and provides flexibility in talent management to unit commanders.

Multifunctional logistics platoon leaders allow commanders the talent management flexibility to respond effectively to logistical requirements needed within the operational environment. Previously, commanders struggled with branch-specific platoon leaders having insufficient knowledge and understanding of cross-functional responsibilities. As many as 27 percent of lieutenants have been initially assigned to duty positions other than their basic branches. Further, 53 percent of lieutenants served in positions outside of their basic branches before attending the Logistics Captains Career Course (LOG C3).

In May 2021, a Critical Task Site Selection Board (CTSSB) was conducted with leaders from within Forces Command, Combined Arms Support Command, Training and Doctrine Command, and ALU. The purpose of the CTSSB was to identify critical tasks for establishing logistics platoon leaders across all components

who can make competent decisions in highly complex environments. As a result, logistics platoon leaders are trained to possess technical and tactical knowledge, characteristics, and abilities to achieve the commander's desired end states.

Encompassing the results of the CTSSB, the holistic redesign shifted the legacy 16-week course format of functional areas separated by weeklong modules into six multifunctional integrated modules: Army Profession, Building Readiness, Mission Preparation, Large-Scale Combat Operations (LSCO) Foundation, Mission Execution, and Logistics Profession. LOG BOLC program of instruction (POI) still encompasses 48 percent of the previous quartermaster POI, 40 percent of the previous ordnance POI, and 41 percent of the previous transportation POI while adding 89 percent of multifunctional logistics tasks excluding initial military training (IMT) tasks. This holistic approach allowed revisions to the POI, training scenario, and Holistic Health and Fitness (H2F) initiative, increasing training rigor for students.

Along with the course redesign, BOLD realigned personnel into three teams: training, advising, and counseling; instructor; and tactics. The realignment enables talent management by assigning the right instructor for the right subject, which promotes subject matter expertise in each module. The training, advising, and counseling team facilitates the H2F initiative and adopts a crawl-walk-run methodology to train

students to complete an Army Combat Fitness Test, a 4-mile by 36-minute run, a 12-mile ruck march, and a total of 8.5 hours of resilience training before graduation. The tactics team is then enabled to focus on assessments of the troop-leading procedures, orders process, combat trains command post establishment and operations, and convoy leadership.

With looming near-peer threats, training objectives have shifted from counterinsurgency threats to LSCO and multidomain operations (MDO). The new scenario used throughout LOG BOLC is set in the Indo-Pacific Command operational environment with the 1st Brigade Combat Team, 3rd Infantry Division supporting South Torbian operations against North Torbian aggression. Students receive road to war briefs throughout the course, coinciding with the module covered, reflecting the crawl-walk-run concept for a distribution platoon leader assigned to a forward support company supporting a combined arms battalion. The progressive training strategy begins with training in a garrison environment, deploying to the operational environment, and conducting mission support to maneuver battalion operations. The scenario incorporates a combined arms maneuver framework to build an understanding of armored brigade combat team organizations, weapon systems, operations, and roles while focusing on platoon leader duties at the tactical level. In addition to preparing lieutenants for any logistics lieutenant duty assignment, LOG BOLC also prepares logistics platoon leaders for LOG C3.

LOG C3 supports Army modernization efforts by implementing a modernized POI. The updates include the addition of distance learning prerequisites comprised of: Army Profession, Mission Command, Operations, Operations Process, and Training. The resident course consists of: Adversary Tactics and Capabilities; Supply Chain Studies; Data Visualization; Company Grade Systems and Processes; Mission Command Fundamentals; Mission Command Systems and Platforms; Leader Development in Tactical Formations; Logistics Support in Army Special Operations Forces; Logistics Operations in Chemical, Biological, Radiological, and Nuclear Environments; Logistics in LSCO/MDO; Unit Training Management; and Military Decision Making Process/Operations Process. The LOG BOLC redesign introduces concepts embedded into the LOG C3 POI.

Former President John F. Kennedy said, “Change is the law of life and those who look only to the past or present are certain to miss the future.” The continuous change in how the Army fights in war — full spectrum operations to unified land operations to multidomain operations — requires constant review of force structure and modified tables of operational equipment. This may bring opposing opinions on what change leaders want to see in the Army. Specific to logistics, many believe a multifunctional LOG BOLC will lead to the degradation of heritage, traditions, and branch associations.

Quartermaster is the second oldest branch in the Army with 247 years of lineage, heraldries, and traditions that could be perceived to be lost with the removal of the branch specific office. However, the transition of basic branch officers to logistics officers does not result in the overall consolidation of the branches. The requirement for enlisted Soldier military occupational specialties and the warrant officer corps will still necessitate individual branches. The LOG BOLC course redesign also implements other long-standing Army traditions, such as socials and diningins, while maintaining regimental induction ceremonies.

Currently, classes are limited to a fixed number of courses in the Army Training Requirements and Resources System by branch to train a specific number of lieutenants per fiscal year: quartermaster — 14 courses, 673 lieutenants; ordnance — 18 courses, 597 lieutenants; and transportation — 12 courses, 543 lieutenants. Shifting to logistics courses would allow for more balanced class sizes and potentially more course dates throughout the fiscal year, enabling units and commissioning sources flexibility for assigning BOLC dates. Additionally, combined logistics BOLC courses would increase opportunities to specialty training and additional skill identifiers, such as explosive ordnance disposal and aerial delivery and materials, providing a larger talent pool to select from regardless of the students’ basic branches.

The LOG BOLC redesign encompasses POI, H2F, and instructor

management in a holistic, data-driven strategy to produce multifunctional logistics lieutenants who are prepared for any assignment regardless of branch. Progressively training for LSCO and MDO environments utilizing the crawl-walk-run strategy comprised of each branch’s functional tasks, IMT tasks, and multifunctional tasks produces the holistic logistics lieutenant. Albert Einstein said, “The measure of intelligence is the ability to change.” The modern reality of LSCO and MDO environments demands multifunctional training over traditions.

Capt. Lakesa Cobb serves as an instructor/writer of the Basic Officer Leadership Department, Army Logistics University, Fort Lee, Virginia. She previously served as the F, Forward Support Company in the 1-82nd Field Artillery Regiment. She commissioned through Officer Candidate School as an ordnance lieutenant. She holds a bachelor’s degree in business management from University of Phoenix and a master’s in business administration from Liberty University.

Capt. Erica Gaughan serves as an instructor/writer of the Basic Officer Leadership Department, Army Logistics University, Fort Lee, Virginia. She previously served as the commander of the Forward Support Company, 2nd Battalion, 3rd Special Forces Group (Airborne). She commissioned through ROTC as a Transportation Corps second lieutenant. She has a bachelor’s degree in psychology from Mary Baldwin College.

Capt. Eric Schnell serves as an instructor/writer of the Basic Officer Leadership Department, Army Logistics University, Fort Lee, Virginia. He previously served as the company commander of E Company, 1-43rd Air Defense Artillery Battalion. He was commissioned through Creighton University ROTC into the Transportation Corps. He has a Bachelor of Science degree in natural science education from Wayne State College and a Master of Arts degree in leadership from Bellevue University.

ARMY SUSTAINMENT

The Army’s Official Professional Bulletin on Sustainment
www.alu.army.mil/alog



www.facebook.com/ArmySustainment



www.linkedin.com/company/armysustainment



@ArmySustainment

Get published. Get connected. Join the conversation.

ISSN 2153-5973
DEPARTMENT OF THE ARMY
ARMY SUSTAINMENT
US ARMY LOGISTICS UNIVERSITY
2401 QUARTERS ROAD
FORT LEE VIRGINIA 23801-1705

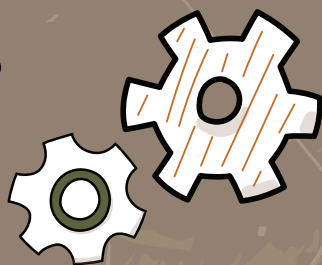
Official Business

PERIODICALS POSTAGE
AND FEES PAID
AT PETERSBURG VIRGINIA
AND ADDITIONAL CITIES



KSBs

+



technology

=



PME

+



○ —
○ —
○ —

CES

=

+

○ —

○ —
○ —
○ —

permeable
workforce

○

functional
expertise

○ —
○ —
○ —

=

○ —

○ —
○ —

+



data
analytics

academic
agility

+

○ —
○ —



○ —

PIN: 214581-000