Sgt. Theresa Fuentes, a parachutist with the 301st Psychological Operations Company, prepares to rehearse jump procedures on a virtual reality parachute simulator at Hunter Army Airfield, Ga., on April 24, 2018. (Photo by Sgt. 1st Class Sean A. Foley)

The Synthetic Training Environment Revolutionizes Sustainment Training

By Maj. Gen. Maria R. Gervais

New simulation capabilities will allow sustainers to rapidly acquire and maintain the skills necessary to win in multi-domain operations.

March 23, 2003, was a dark day for the Army. This was the day when the 507th Maintenance Company took a wrong turn onto Highway 7, putting 33 Soldiers on a path to be ambushed by Iraqi forces during the Battle of Nasiriyah.

This wrong turn resulted in the death of 11 Soldiers, the capture of Pfc. Jessica Lynch, and numerous lessons learned for our Army. Factors leading to this wrong turn included a lack of equipment, a lack of maps, poor judgment, and a lack of training.

Field Manual 7-0, Train to Win in a Complex World, highlights that planning and rehearsing lead to better execution. Simulations enable Soldiers to plan and rehearse events prior to executing operations in a live environment. The 507th Maintenance Company may have avoided this tragedy if it had virtually rehearsed this convoy route before executing the mission.

Imagine an environment in which sustainment Soldiers can put on a pair of virtual or mixed reality goggles and find themselves in any country in the world and on the same type of terrain they will operate on in the near future. In this environment, they are connected with their supported maneuver force and joint and coalition partners, and they have the ability to rehearse the sustainment plan developed for the mission numerous times before they execute it.

It seems far-fetched or like something in a movie. However, this capability is much closer than you might imagine; the virtual and gaming industry is developing leap-ahead technologies at an accelerated pace that will revolutionize the way the Army trains in the future.

This article will discuss the Army's current simulation capabilities and how the Combined Arms Center–Training (CAC–T) and the Mission Command Training Program deliver simulation capabilities to the sustainment community. It discusses how the Synthetic Training Environment (STE) will revolutionize the way the Army and sustainment community will train in the future.

Current Training Environment

CAC–T, located at Fort Leavenworth, Kansas, delivers world-class live-virtual-constructive (LVC) collective training simulation capabilities for the Army. The deputy commanding general for CAC–T serves as the director of the STE Cross-Functional Team (CFT) and focuses on modernizing the Army's LVC simulation capability.

The Army must modernize its current training environment, known as the Integrated Training Environment (ITE), because of shortfalls that limit the Army's ability to replicate the multi-domain operational environment. The current training environment has served the Army well for three decades; however, the ITE is insufficient to prepare the Army for the future operational environment. The Army must train for multi-domain operations in order to win against near-peer adversaries.

The Army's current training simulation capabilities are based on 1980s and 1990s technology. They operate on closed, restrictive networks, are facilities-based, and require high personnel overhead. They do not support the full range of current mission command information systems.

These current capabilities cannot replicate the complex operational environment that Soldiers will fight in and do not support training for electronic warfare, cyberspace, and megacities.

The ITE cannot fully replicate a combined arms training capability and critical enabling warfighting functions, such as sustainment, in virtual and constructive simulations. Limitations of the current training environment affect the overall quality of training that the LVC ITE provides for commanders and units at all echelons. For the sustainment community, these limitations are readily apparent in warfighter exercises (WFXs) executed by the Mission Command Training Program.

The Mission Command Training Program

The Mission Command Training Program, a subordinate organization of CAC–T, executes the current WFX program of LVC command post exercises for corps, division, and brigade headquarters. These headquarters include sustainment brigades and expeditionary sustainment commands from both the active and reserve components.

The WFX has evolved over three decades from a relatively simple training event using maps and acetate to a sophisticated LVC wargame driven by a computer simulation known as Warfighter Simulation (WARSIM). WFXs focus on preparing commanders and staffs to execute large-scale combat operations against near-peer adversaries in complex environments.

The Army's current sustainment simulation capabilities are insufficient to train sustainment operations during large-scale combat operations executed during a WFX. WARSIM has a limited interface with Army logistics information systems (LISs) and depends largely on manual inputs by a team of database managers using the Combined Arms Support Command's Joint Deployment Logistics Model (JDLM) and Logistics Federation (LOGFED) for sustainment information.

JDLM is a constructive computer-based simulation designed to train commanders and staffs in sustainment functions from the brigade support battalion through the theater support command. JDLM supports the visualization of both the strategic and tactical battlespace and imitates sustainment mission command and business systems.

However, simulation-supported training using JDLM is not providing the rigor required to train sustainment units. Specifically, current simulation tools fail to replicate sustainment operations in four major areas: maintenance, sustainment rigor and WARSIM anomalies, LIS interfaces, and human resources operations.

Maintenance. Maintenance and repair parts operations are not simulated in a WFX except for the bare minimum automatic actions within JDLM.

Sustainment rigor and WARSIM anomalies. WFXs create anomalies,

Gen. Gustave Perna visits the Synthetic Training Environment Cross-Functional Team at the Combined Arms Center's Training Innovation Facility at Fort Leavenworth, Kansas. (Photo by Scott Myers)

such as providing massive amounts of simulated ammunition, which creates less stress on units. These amounts far exceed theater-level allocation and expenditure rates for many Department of Defense identification codes.

LIS interfaces. There is no available LIS to stimulate sustainment training audiences. As a result, sustainment personnel on the digital battlefield fall back on analog systems for reporting.

Human resources operations. WFXs conduct mortuary affairs and replacement operations but not to the level appropriate for command post exercises, which train division and corps commanders and their staffs.

Over the past three years, the MCTP's Operations Group Sierra has observed sustainment shortfalls in units across the Army. Many of the shortfalls found during WFXs were not the units' fault. For the past 17 years, the Army has fought a stationary, forward operating base-centric conflict centered on a push supply distribution pipeline executed by contractors.

Operations Group Sierra identified three major areas that sustainers need to improve to support an expeditionary force: executing unit displacement operations, developing a logistics synchronization (LOGSYNCH) matrix, and integrating key staff sections to better synchronize meetings and boards.

The high operating tempo in large-scale combat operations requires sustainers to be on the move in order to keep pace with the warfighter. The lack of a LOGSYNCH matrix affects all warfighting functions. A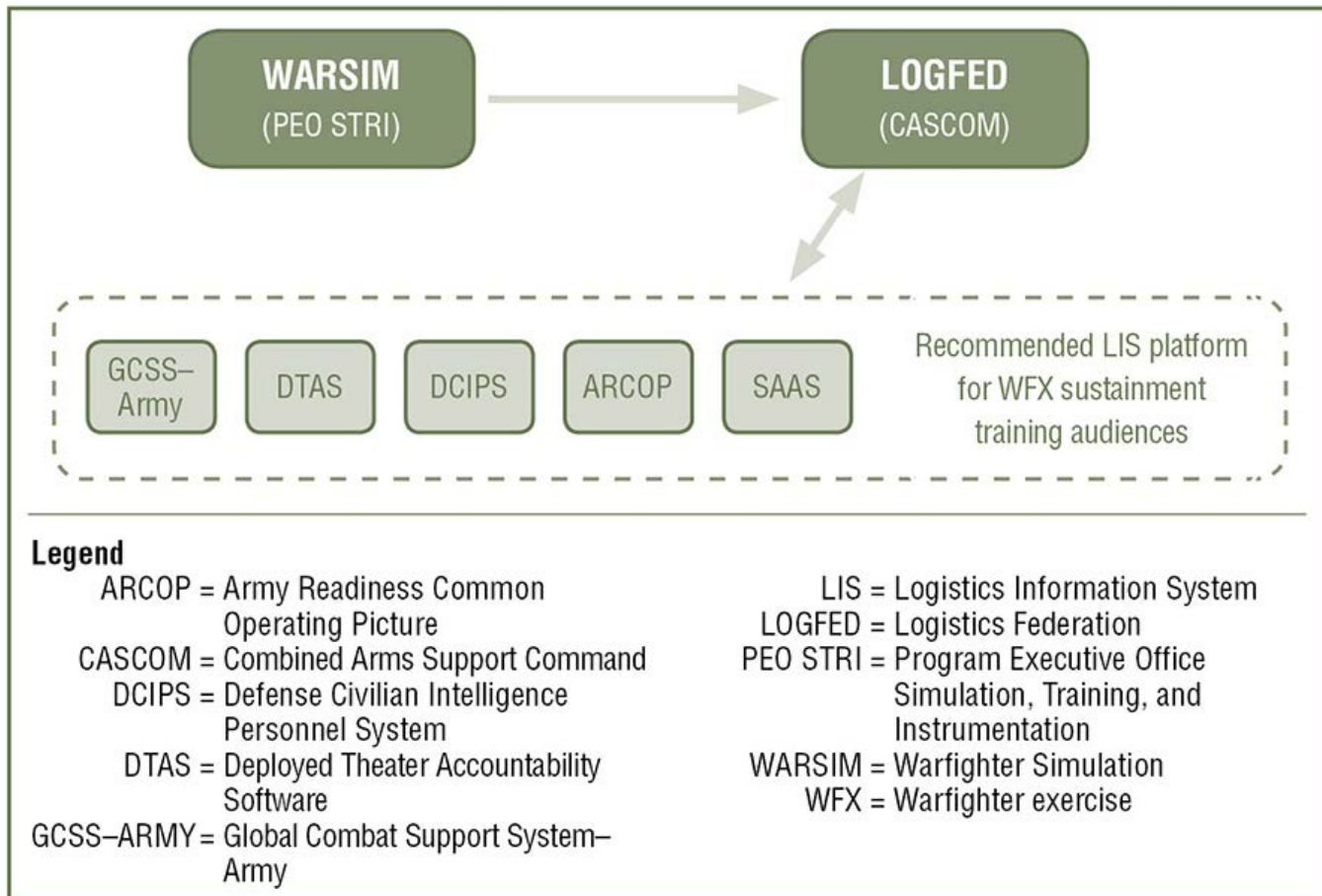 LOGSYNCH matrix is the science behind sustainment operations and serves as the playbook for when and where to support the warfighter.

The Army's future training environment, STE, must provide the sustainment community with simulation tools that drive the staff processes needed to train all aspects of the sustainment warfighting function.

Improving the Army's simulation architecture for the WFX and bridging capability gaps in simulation across the Army is the mission of the CAC–T's Logistics Exercise and Simulation Directorate (LESD), which is located with the Combined Arms Support Command at Fort Lee, Virginia. LESD is the Army's organization for planning, distributing, and executing large-scale logistics during constructive simulations.

The MCTP is working with LESD and the STE CFT to incorporate an

Figure 1. This proposed logistics information system simulations architecture includes the Army's many sustainment systems that could be added to simulations.

Legend

ARCOP = Army Readiness Common Operating Picture
CASCOM = Combined Arms Support Command
DCIPS = Defense Civilian Intelligence Personnel System
DTAS = Deployed Theater Accountability Software
GCSS–ARMY = Global Combat Support System–Army

LIS = Logistics Information System
LOGFED = Logistics Federation
PEO STRI = Program Executive Office Simulation, Training, and Instrumentation
WARSIM = Warfighter Simulation
WFX = Warfighter exercise

LIS platform into simulations to better stimulate units. An LIS provides the appropriate data to simulate sustainment mission command processes. Figure 1 proposes the LISs and architecture that could be included in future WFXs.

CAC–T continues to improve its current simulation capabilities and integrated training environment in order to better train commanders and units. These incremental improvements are insufficient to prepare the Army (and sustainers) to conduct multi-domain operations in order to win against a near-peer adversary.

Future Training Environment

The STE CFT directive is to rapidly expand the Army's STE, achieve deeper distribution of simulations capabilities down to battalion and companies, and provide a simulation capability to model combat operations in megacities.

STE CFT is one of the eight CFT pilots designated by the Secretary of the Army and Chief of Staff of the Army and is aligned with Soldier lethality, the Army's sixth modernization priority.

The STE will provide the complex training environment and training management tools that will allow sustainers to rapidly acquire and maintain the skills and collective tasks necessary to win in multi-domain operations.

The STE, through the Training Simulation Software, will provide the Global One World Terrain, a digital map that allows sustainers to train on the terrain they will operate on, including terrain such as complex urban areas and megacities.

For sustainers, Global One World Terrain will allow for theater-level logistics planning, to include validation of potential aerial and sea ports of debarkation and theater opening, reception, staging, onward movement, and integration processes. The Training Simulation Software will also replicate a complex operational environment by accurately portraying the culture, patterns of life,

weather, and threat.

Finally, the STE will provide the Training Management Tool, which will allow leaders and commanders to deliver tailored training scenarios quickly. It is a user-friendly database that allows units to design an exercise or operation.

The program prompts the user to consider all aspects of an operation from start to finish. The Training Management Tool archives each exercise or operation, allowing units to download previous exercises and make adjustments as required.

Sustainers will conduct training in a complex environment in virtual immersive simulations that replicate combined arms maneuver with joint and coalition partners. Simulation using artificial intelligence will enable units to improve training through repetition at a much faster pace. This capability increases the repetitions and allow sustainment units and Soldiers to enter live or simulated combined arms maneuver training exercises at a high level of proficiency.

The institutional Army will leverage the STE to train and educate leaders on the application of doctrine. Leaders will have access to the complex operational environment in which they train and operate from the onset and throughout the professional military education process. STE, through its ability to accurately replicate force structure and rapidly introduce new capabilities, will allow sustainment leaders to fight the future fight.

Leaders will introduce emerging sustainment concepts and capabilities into the STE in order to test applications well in advance of fielding them to the Army. The STE will provide sustainment leaders with the ability to shape the future and allow us to outpace our adversaries and ensure sustainment overmatch.

The Army's recently released vision statement signed by both the Secretary of the Army and the Chief of staff of the Army states, "Focus

training on high-intensity conflict, with emphasis on operating in dense urban terrain, electronically degraded environments, and under constant surveillance. Training must be tough, realistic, iterative, and dynamic. Continuous movement, battlefield innovation, and leverage of combined arms maneuver with the Joint Force, allies, and partners must be the hallmarks. This training will require rapid expansion of our synthetic training environments and deeper distribution of simulations capabilities down to the company level to significantly enhance Soldier and team lethality."

Our current simulation capability and the ITE are good, but they are not good enough to train our Army for the threat we see today and expect in the future. Our simulation capability must accurately replicate the operational environment and enable combined arms maneuver with all warfighting functions. Replicating the sustainment warfighting function is hard; however, it is critical we improve this simulation capability in the future.

By leveraging the STE, future sustainment Soldiers will enter into battle better trained and better prepared than ever before. They will have confidence in themselves, their leaders, and their equipment.

As the Army moves forward to the STE, sustainment requirements, both individual and collective, must be included to ensure the Army trains this warfighting function fully during combined arms operations.

Maj. Gen. Maria R. Gervais is the director of the STE CFT and the deputy commanding general of CAC–T. She has a bachelor's degree in biology from Lander College, a master's degree in human resources from Webster University, and a master's degree in military strategic studies from the Army War College. Her military training includes the Chemical Officer Basic and Advanced Courses and the Command and General Staff College.