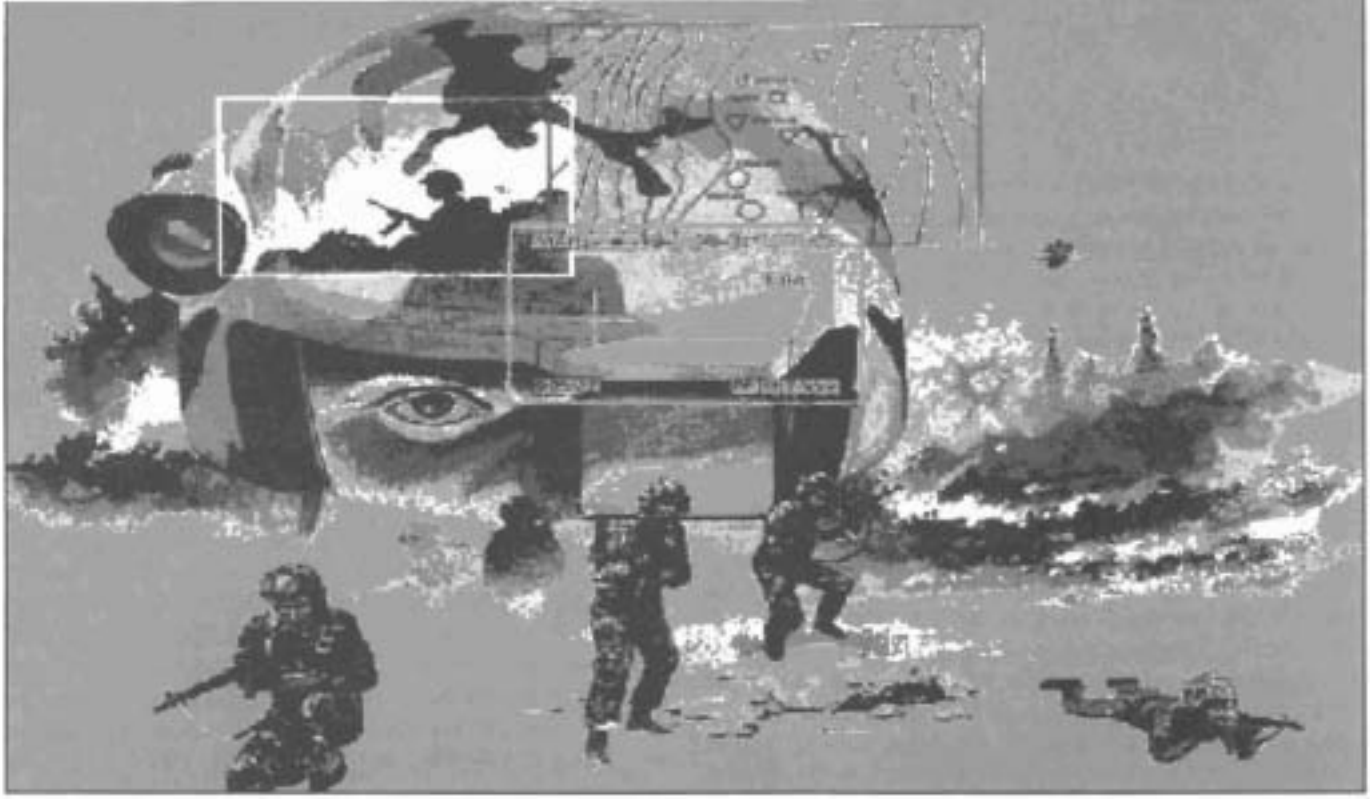


Maneuver Support Battle Lab:
Integrating Maneuver Support Into Force XXI

By Vern Lowrey and Captain Bryan Green

The year was 2005. At the National Training Center, the sun was just breaking the horizon. SFC Strader chewed his cold fast ration as the incoming variable-message-format message blazed dull green on his heads-up display.

The lieutenant was sending the morning status report. SFC Strader thought the lieutenant had 1st Platoon spread a little too thin. Each engineer squad was supposed to dominate a 10-square-kilometer area. Under normal circumstances the five engineers in their heavy wheeled engineer armored vehicle (HEAVY) could handle it.

Another message scrolled across the heads-up display; this time it blinked in crimson. SFC Strader read the message as he told the driver to start the vehicle and retract the low observable screen system and false image generator. It looked as though the opposing forces (OPFOR) were trying to force them off the airhead. The OPFOR would attack the flank where only one Mobile Strike Force company, his engineer platoon, and a squad of military police in armored security vehicles were holding an economy-of-force mission.

The lieutenant sent each squad the digitized master obstacle and chemical contamination overlay. The OPFOR were on the move, but they were still four hours out. There was still time to reinforce the autonomous combat security outpost and other dynamic obstacles they had posted the day before.

Strader ordered SPC McKinney to launch two Night Owl unmanned aerial vehicles to recon the route to their obstacle release point. As the Night Owls' saucer-like bodies lifted off the top of the HEAVY, SPC McKinney received infrared, ground-penetrating radar and acoustic images from their sensors as he guided them along the HEAVY's intended path to the obstacle release point. PVT Roberts drove the HEAVY out of its hiding position and followed the Night Owls down the combat trail.

SPC McKinney's voice came over the intercom, "Hey, the OPFOR laid some mines at the fork." The Night Owl transmitted targeting data to the on-board laser-munitions neutralizer. Without slowing, the laser-munitions neutralizer fired five bursts powerful enough to raise the buried mines' temperatures to a point that effectively neutralized them. Everyone prepared for a blast, because the laser sometimes missed a mine. Sure enough, the ModSAF simulation caused one to detonate right under the HEAVY...

This vignette describes a conceivable future virtual and live experimentation scenario where no one gets hurt but where soldiers and combat developers gain valuable insights regarding maneuver support DTLOMS (doctrine, training, leader development, organizations, materiel, and soldiers) programs. TRADOC's newest battle lab, the Maneuver Support Battlefield Laboratory (MSBL) provides direction, oversight, and horizontal integration of experiments related to the maneuver support enduring battlefield function. Maneuver support encompasses those actions taken to protect the force from the

effects of enemy/adversary action, provide the force freedom of movement during military operations, and inhibit the enemy/adversary's ability to move.

The Maneuver Support Battlefield Laboratory was officially organized at Fort Leonard Wood on 1 October 1996. Major General Clair Gill, commander of Fort Leonard Wood and commandant of the Engineer School, serves as the director. Colonel Ed Arnold serves as the deputy director for day-to-day operations. The commandants of the Army's Chemical, Engineer, and Military Police Schools form the battle lab's board of directors.

The MSBL coordinates the efforts of other TRADOC battle labs and schools in the maneuver support experimentation arena. It also exchanges information with industry, academia, major Army commands (such as the U.S. Army Intelligence and Security Command), Army components of the combatant warfighting commands (such as the U.S. Army Europe and Seventh U.S. Army component of U.S. European Command), various governmental laboratories and Department of Defense agencies, and other nations' battle labs (such as the German Army Battle Lab).

Experiments

The primary function of the MSBL is to conduct experiments on potential systems, techniques, and concepts and then input the most promising ones across Army DTLOMS programs. Most experiments are based on direct soldier and leader interaction with emerging technologies and materiel initiatives. The experiments support future materiel acquisition and assist with the development of future operational capabilities. They may be discrete, single events or progressive, iterative simulations (constructive, virtual, or live) designed to assess the military use and potential for new or revised concepts.

MSBL-led teams plan, conduct, and provide proponent evaluations to TRADOC. These teams focus on specific capabilities or technology opportunities. The experimentation process consists of design, planning and reviews, approval, execution, and the decision to invest or discard. The MSBL is the clearing house for all experiments within the maneuver support arena, including those related experiments that are to be conducted elsewhere.

Maneuver support experimentation produces one of the following recommendations:

- ***Invest in the Warfighting Rapid Acquisition Process (WRAP).*** Performed to accelerate fielding when mature technology fulfills an urgent need and experiments demonstrate compelling success.
- ***Invest in non-WRAP.*** Performed when the technology is successful and the normal requirements-determination process is satisfactory for fielding.
- ***Experiment further.*** Initiative appears to have merit, but further experimentation is needed to refine the DTLOMS requirements or develop the technology.
- ***Discard.*** Initiative does not meet the needs of the Army and merits no further investigation.

Types of Simulations

Most maneuver support experiments are conducted through iterative simulations that evaluate new ideas and technology. Modern simulations allow the Army to evaluate current and future force capabilities, determine requirements, and compare the contributions of alternative solutions. Simulations are divided into the following three categories, each with characteristic strengths and weaknesses:

Constructive simulations replicate warfare through computer-modeled war games. In some constructive simulations, the computer presents the participants with a graphic showing the operational situation and allows them to make decisions that influence the situation. Most constructive simulations employ models that war-game against a competent and active opponent. Others run independently of human interaction once the initial parameters and data are established. Constructive simulations replicate live exercises; simulate prototype technologies not currently available; vary the mission, threat, terrain, and weather; and repeat events until participants gain confidence in the outcomes.

Virtual simulations are conducted with electronic mock-ups of real weapons systems. The mock-ups use computers to replicate onboard systems and the external combat environment. Flight and tank-gunnery simulators are representative of this type of simulation. Virtual simulations allow man-in-the-loop assessments of new DTLOMS programs. Simulators at various locations can be linked to offer a common warfighting picture for multiple elements of the force. Insights are derived at both operational and systems levels. The advantage of virtual simulations is the ability to have soldiers make warfighting decisions while computers analyze the effects.

Live simulations are exercises conducted by units in the field, preferably against a tactically competitive OPFOR. Live simulations are useful to experiment with new DTLOMS programs. They offer the advantage of using soldiers and equipment in an actual training environment. The advantage of realism in live simulations must be balanced against their expense and the inability to repeat training events.

The optimal solution in experimental analysis probably is to use a combination of the three simulation types. Live simulations offer the most realistic environment for analysis, but the cost may be prohibitive. Ideally, experiments should maximize the use of live and virtual simulations and augment them with constructive simulations. The ability to link live, virtual, and constructive simulations through the use of distributed interactive simulation (DIS) links facilitates the best use of all three types.

Fort Leonard Wood is working to establish a *Core Distributed Interactive Simulations Facility* by the year 2000. This facility will provide state-of-the-art simulation for experiments and exercises in a synthetic environment using distributed interactive technologies. The facility will be physically and electronically secure and have fully integrated, validated, and accredited simulators, models, and tools. State-of-the-art reconfigurable, virtual simulators will represent the full functionality and capability of a battalion task force. The facility will provide realistic command, control, communications, computers, and intelligence (C4I), including battlefield effects. Users will have

access to repositories of standard databases, representations, algorithms, symbols, scenarios, and other data. They can access realistic resolution terrain databases with a variety of terrain types, conditions, and climates. The facility will support concept evaluation; requirements determination; crew, unit, command, and battle staff training; technology development and evaluation; system development; test and evaluation; tactics and doctrine development; and force modernization.

Current Experiments

The MSBL currently is involved with Force XXI and Army After Next tests and experiments. (Force XXI is concerned with operations between the years 2000 and 2010. Army After Next is concerned with operations after 2020.) The battle lab focuses experiments and analysis efforts to—

- Analyze operational impacts of various Force XXI and Army After Next designs of maneuver support forces.
- Leverage emerging technology to improve digital terrain data acquisition, storage, updates, dissemination, and exploitation on the battlefield.
- Provide an integrated joint force-protection strategy against nuclear, biological, and chemical (NBC) weapons and associated threats. This effort spans the spectrum of conflict from chemical and biological counterterrorism and industrial hazards during military operations to NBC defense during full-scale combat operations.
- Enhance counterproliferation initiatives for weapons of mass destruction.
- Enhance NBC defense capabilities in operations other than war.
- Integrate NBC defense into the passive sensors of the theater missile defense system.
- Provide an NBC defense battle management system that is integrated into Army command and control systems to leverage information technology in Force XXI and Army After Next operations.
- Identify military technologies that can be applied in military and civilian counterdrug operations.
- Provide capabilities needed to conduct land countermine operations.
- Analyze physical security requirements and capabilities for Force XXI operations, including nonlethal technologies and land mines, robotics, and antiterrorist activities.

The battle lab began limited experiments during 2nd quarter FY97, including several Concept Evaluation Program experiments. It is now the sponsor of the Autonomous Remote Chemical and Biological Agent Sensor—Advanced Concepts and Technology (ACT) II program and will receive sponsorship of the Biological Detection—Advanced Technology Demonstration (ATD) on 1 October 1997. The Dismounted Battlespace Battle Lab continues current proponent efforts involved with the Task Force XXI and Division XXI Advanced Warfighting Experiments (AWE) and Prairie Warrior 97. Insights gleaned from FY97 experimentation include:

- The Hornet (wide-area munition) is a clear "winner."
- The proposed Division XXI engineer group design is inadequate to support full-spectrum division operations.
- Collecting, storing, updating, and disseminating high-resolution digital terrain data are critical elements of the commander's battlefield visualization program.
- Maneuver brigades require dedicated terrain analysis capability.
- An automated NBC early warning system is required for force protection.

Experimentation in FY97 resulted in the following recommendations:

- Possible WRAP investment systems include: Assault Breach Marking System (ABMS), Downsized Digitized Topographic Support System (DTSS), Digital Reconnaissance System (DRS), and Miniflail Mine-Clearing System.
- Requirements to be documented include: Antipersonnel Obstacle-Breaching System (APOBS), intelligent minefield (IMF), and vehicle teleoperation capability (VTC).
- Systems requiring further experimentation include: Ground and Hand-Held Standoff Mine-Detection Systems (G-STAMIDS and H-STAMIDS), biological detection systems, digital terrain data dissemination through long-range communications systems.
- No experiments currently are scheduled to be discarded.

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