



**STRATEGY
RESEARCH
PROJECT**

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**THE FEASIBILITY OF CONDUCTING CONSTRUCTIVE
COMBAT TRAINING SIMULATIONS VIA DISTRIBUTED
TRAINING TECHNOLOGY METHODS**

BY

LIEUTENANT COLONEL DEBORAH Y. HOWELL
United States Army National Guard

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USAWC STRATEGY RESEARCH PROJECT

**The Feasibility of Conducting Constructive Combat Training Simulations
via Distributed Training Technology Methods**

by

Deborah Y. Howell
Lieutenant Colonel, Army National Guard

Dr. Jerry Davis
Project Advisor

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U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

ABSTRACT

AUTHOR: Deborah Y. Howell

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The dispersion of National Guard units and limited training time has always made training readiness a challenge. In addition, sustaining reserve forces at the same level as their active component counterparts is crucial with the major reduction in active component forces. Current constructive combat training simulations available in the Army may be a viable training option to training National Guard units for combat. It is possible that training with simulations may reduce the number of days required to train a unit for mobilization.

GUARDNET XXI, the National Guard Distributive Learning Network offers a mode to make current constructive combat training simulations distributive. This research determines the feasibility of conducting constructive simulations via GUARDNET XXI. If we can conduct these simulations via GUARDNET XXI, it will enhance and supplement collective training during the limited time and other resource constraints in the National Guard.

The methodology is to determine the value of training Army National Guard units with simulations; determine requirements to operate the simulation system and capabilities of the Distributive Learning Network; and consider the National Guard's posture as it relates to simulation management. At the conclusion, Army National Guard leadership will have an alternative to train the Reserve forces at an equivalent level of the Active component forces and complete the training requirements, all at a reduced cost.

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CONDUCTING COMBAT CONSTRUCTIVE TRAINING SIMULATIONS VIA DISTRIBUTED TRAINING TECHNOLOGY METHODS

Training readiness is a major challenge facing a military commander, particularly in the Reserves. This is a challenge for several reasons; resourcing continues to be the main concern. The National Guard must seek innovative ways to train its soldiers at a comparable level with their active component counterparts, while operating within severe resource constraints, such as funding, time and equipment. The National Military Strategy (NMS) requires the Army to fight and win two nearly simultaneous major theater wars (MTW). The recent decline in size of our active force and the current mix of the force structure make it highly unlikely that US forces will engage in any MTW without the reserve forces. General Eric K. Shinseki, Army Chief of Staff, in his Statement of Intent, dated 3 June 1999; states, "We are The Army – totally integrated in oneness of purpose – no longer the Total Army, no longer the One Army. We are The Army, and we will march into the 21st Century as The Army." With this vision in mind, it is imperative that the National Guard be "trained and ready" at all times.

It is possible that Army deployments in support of the NMS may be further delayed while Army National Guard (ARNG) units train up to relieve active units with other commitments or to participate directly in the MTW.¹ There is concern throughout the Department of Defense (DOD) regarding the readiness of the Army National Guard and the time needed to get the ARNG ready for combat. The 90 days training required to mobilize the National Guard is questionable and a more realistic train up time is 102 days as supported by a Rand Corporation 1996 study.² There is a strong indication that conducting training with simulations can reduce the number of days required to train an ARNG unit for deployment. The National Guard can accomplish a great deal of training via simulation methods, combined with field training exercises to improve readiness.

In the article "Training in a Low Cost Environment", Major General Robert S. Coffey states "Good leaders are preoccupied with training, because history has taught us that the best way to care for soldiers is to train them for war. Nevertheless, we can anticipate that at no time will leaders be free from budgetary constraints on training. Developing innovative ways to train effectively with few resources is a vital tool for all leaders." He went on to conclude, "an artful combination of simulation, force-on-force training, and gunnery can overcome the budget challenge. The payoff for resource-efficient training goes beyond having a successful rotation at the National Training Center (NTC). Good training results in soldiers who believe in themselves and their ability to win in war."

Steven Komarow's, article "Readiness of National Guard in Doubt - Issue of Time, Money" USA Today, September 13, 1999 identified critical shortfalls in the ARNG's readiness and the ability to fight two MTWs. Two shortfalls identified were:

- Part-time units lack the time to practice complex maneuvers of a large-scale battle that would include tanks, helicopters, jets, artillery and a myriad of other systems.
- Opportunities to rehearse large-scale battles like those at the National Training Center (NTC) are rare and expensive. Each National Guard armored brigade visits NTC about once every eight years, compared to about once every two years for the active-duty Army.

Even though on the surface giving National Guard more time at NTC or like facilities seems to be the solution to ARNG readiness, funding to increase National Guard rotations is not available because of the current military fiscal posture. In the article "Troubling Trends: Why America Should Be Concerned About National Security - Item: Declining Budgets," it becomes obvious why it is not possible to allocate additional funds to the National Guard. "The Pentagon's budget has dropped by thirty-seven percent during the ten years since the end of the Cold War. During that period, defense expenditures as a share of the gross national

product (GDP) have dropped from six to three percent – the lowest GDP percentage spent on defense since 1950, the first year of the Korean War.”

The ARNG budget for FY 99 as depicted in figure 1 was 6.2 billion dollars, which equated to approximately 10% of the Army’s budget and less than 2.4% of Department of Defense budget.”³ Hence, the funding required for increasing NTC rotations for the National Guard is just not available.

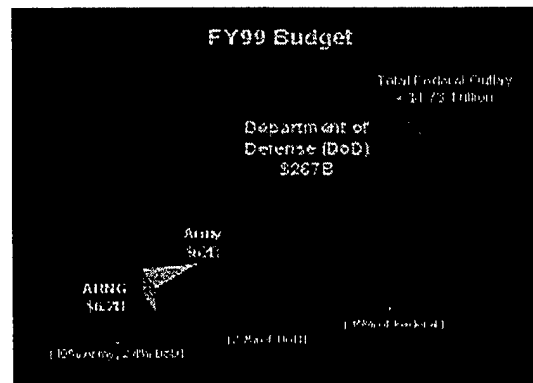


FIGURE 1. 1999 DOD BUDGET

Legislation has been proposed to mandate a four-year

NTC rotation cycle versus the current one in eight years, but there is not overwhelming support as cited in the 13 September USA Today article, which highlights two Generals’ perspective on increasing time at the National Training Center.

—“Even the ‘killed’ troops learn great lessons at the NTC,” Shinseki (General Eric Shinseki, Army Chief of Staff) says. But a program for improving Guard training may not mean more time here.”

—“Even without more trips to the NTC, soldiers would improve skills. Extra practice at local base in maneuvering as small platoons or in companies, which include about one hundred fifty soldiers, would pay big dividends when the units combine for bigger formations,” says Major General Richard Alexander, president of the National Guard Association, a private group of Guard officers.

A potential solution to improving readiness is the increased use of constructive simulations. Simulations, if used properly at appropriate levels and for the intended purpose can enhance training. We must identify current resources and explore ways to expand the capabilities versus seeking new solutions for which resources may not be available. Currently, the National Guard has two hundred distance learning classrooms connected by a network (GUARDNET XXI) that

serves all fifty-four states and territories.⁴ This is an untapped resource. This research determines the feasibility of conducting constructive combat simulations via distributed training methods utilizing the GUARDNET XXI, the National Guard's distributive learning network, in hopes of improving readiness and reducing the number of days to train for deployments. This paper is a non-technological approach to capitalizing on technology advances. For the purpose of this paper, distance learning and distributed learning are synonymous. In presenting the data, the mission, functions and capabilities of the Army National Guard will be briefly discussed, followed by a discussion of existing and future resources and their potential. This paper:

- Identifies the readiness training requirements and resources currently available to accomplish the goals.
- Identifies and briefly describes the constructive combat training simulations available to the National Guard. The scope of the alternative, however, is limited to JANUS combat constructive training simulation. The researcher will consider the National Guard simulation management initiatives and other initiatives that may benefit the National Guard.
- Based on the research, recommend an alternative for training National Guard soldiers for combat using simulations, within the resource constraints and the feasibility of accomplishing such via distributed methods.

THE ARMY NATIONAL GUARD (ARNG)

MISSION

The ARNG, component 02 of the army structure, is uniquely dual-missioned. The mission consists of federal roles such as warfighting, homeland defense and counter drug interdiction.

When mobilized for Federal service, the President is Commander-in-Chief. The state roles are predominantly emergency management and response, civil disturbance, and others at the request of the Governor. The state missions vary based on locale and needs of the community.

The National Guard manages overall readiness by prioritizing the units designated as “first to deploy.” This method of tiered resourcing ensures that high priority units receive necessary resources to meet operational readiness requirements and effectively support the National Military Strategy. The 218 units designated as Force Support Package (FSP) Readiness are the highest priority units for the National Guard. The units are predominantly combat support and combat service support and doctrinally aligned to support the nearly two simultaneous Major Theater War (MTW) strategy. These include one full and one partial corps headquarters, one theater element and one theater-opening element. The National Guard’s fifteen Enhanced Separate Brigades (ESB) are the Army’s principal reserve ground combat maneuver forces and are fully integrated into the two MTW scenarios.⁵ The eight Armored/ Infantry Divisions are lower priority and their role in the NMS is being worked. The ARNG readiness goal is to ensure all units are resourced to attain and sustain readiness levels needed to meet CINC mission requirements and deployment timelines.

COMPOSITION

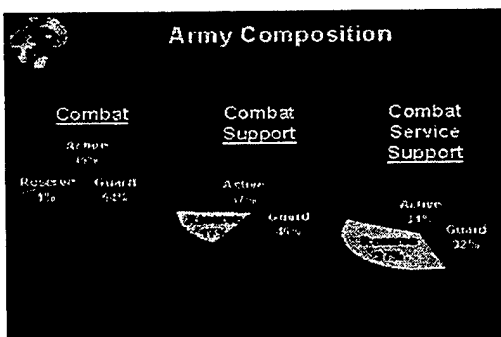


Figure 2 shows the relation of ARNG to the total Army force structure. The ARNG maintains 45% of the combat, 46% of combat support and 32% of the combat service support structure of the Army.⁶ These units are contained in the ARNG’s eight armor/infantry divisions, fifteen enhanced separate brigades, three strategic brigades and

FIGURE 2. ARMY COMPOSITION

other separate combat support/ combat service support units. The preponderance of the force is part-time soldiers or traditional drill status personnel. The fulltime support structure is a combination of Title 10 (federal) and Title 32 (state) Active/Guard Reserve (AGR), Federal military technicians, and reimbursable state civilians.

LOCATION

The National Guard is currently located in the fifty-four states and territories, spread across fifteen time zones with 362,000 personnel at 3,360 armories in 2,700 communities and over 16,000 maintenance, training and aviation facilities.⁷ The number of personnel and location of ARNG units indeed make training a challenge. The unique challenge is primarily because of geographic dispersion, civilian employment concerns, competing personal demands, and travel costs.

ARNG TRAINING TIME

Federal law requires that Guard troops train thirty-nine days a year. This is usually one weekend a month plus a two-week annual training exercise as depicted in figure 3.⁸ Paperwork, maintenance and other administrative requirements dominate many of the weekends. How can the ARNG accomplish the training requirements in the limited time allotted? Training with simulations may be the answer. Many soldiers put in extra time voluntarily while others find thirty-nine days or excess a strain on job and family. The ARNG is still required to uphold its commitment and stand ready in the defense of our nation.



FIGURE 3. ARNG TRAINING TIME

Today's Army must be capable of producing swift, decisive, low-casualty victories across the spectrum of conflicts anywhere in the world. Simulated environments can be tailored to provide realistic training for these missions, and these simulators must be used to maximize training effectiveness while keeping costs low.⁹

ARNG TRAINING REQUIREMENTS

The thirty-nine training days, previously mentioned, presents a challenge for National Guard commanders. Prior to deploying ARNG units, commanders need reasonable assurance that the unit is prepared for the mission. Requirements are established to ensure that units meet floors, or minimum training requirements before they are called to duty. Units will face additional training requirements after activation; however, local commanders are responsible for the premobilization training. The training objective stated in FORSCOM Regulation 350-2 is to have trained and ready units. The regulation provides premobilization training requirements, prescribes training proficiency levels of expectations, and prioritizes required training support executed within available resources.

GENERAL TRAINING REQUIREMENTS

The general minimum premobilization training proficiency level requirements as prescribed in the regulation follow:

- Level of individual soldier proficiency: Duty Military Occupational Skill Qualified (DMOSQ) and professional development at 85% of strength.
- Level of maneuver proficiency:
 - Infantry (IN)/Armor (AR)/ Cavalry (CAV): platoon.
 - Other Combat Arms (CA) and Combat Support (CS)/Combat Service Support

(CSS) unit: company/battery/detachment level.

- Crew/weapons system qualification/technical skills proficiency.
- Command and Staff proficiency at level organized.

UNIT TRAINING REQUIREMENTS

The unit training requirements are more in depth and exhaustive. A tremendous challenge is associated with accomplishing these requirements, in addition to the mandated administrative requirements all in the allotted thirty-nine training days available to a unit during a year. The minimum unit premobilization training requirements follow:

- Force Support Package (FSP) units, Division Round Out (RO)/Round Up (RU) units, Attack Helicopter (AH-64) units, units with Latest Arrival Date (LAD) \leq 30 days (company/battery-minimum), and Enhanced Separate Brigade (ESB) (platoon level is minimum for IN, AR and CAV units) will conduct Mission Essential Task List (METL) focused training:
 - Lane Training conducted annually, normally during Annual Training (AT).
 - Gunnery In accordance with (IAW) STRAC XXI.
 - Command and Staff Training. Conduct one staff-training event quarterly with one simulation supported battle staff exercise annually for each brigade and battalion level headquarters.
 - Inactive Duty Training (IDT). A commander may request any of several alternatives, such as a Mobile Training Team (MTT), branch and functional training, and lane training, to support his Yearly Training Plan (YTP). The IDT lane training should be a Training Support Division (TSD) supported requirement, within capabilities, supporting AT goals.
 - Training Assessment Model (TAM) annually within capability of the CONUSA and IAW FORSCOM Regulation 220-3.

- Requirements for all other units.
 - Lane training conducted every other year supported by the Continental United States Area (CONUSA) as resources allow and IAW training support priority.
 - Gunnery IAW STRAC XXI.
 - Command and Staff Training. Conduct one staff training event quarterly with a constructive battle staff exercise for each brigade and battalion level headquarters.
 - TAM. Conducted triennially within capability of the CONUSA and IAW FORSCOM Regulation 220-3.
 - YTP. The ARNG will execute 280 platoon/company and 21 battalion maneuver training cycles annually.
 - Divisional Opposing Forces (OPFOR). The ARNG divisions are required to provide one battalion task force for each ESB for purposes of AT OPFOR mission support.
 - Conduct a ten-day field training exercise consisting of a 24-hour operation.

METHODS TO ACCOMPLISH TRAINING REQUIREMENTS

MEETING THE CHALLENGE

It becomes obvious that the ARNG faces a difficult, if not impossible task to accomplish the prescribed training requirements within the time and resources allotted. Additionally, the options available for correcting the shortfalls are limited. Additional time to train would certainly be desirable, but in all likelihood will not occur. The obvious solution is to be able to accomplish the training within the training time available. The aggressive use of simulation appears to offer high potential for accomplishing the training challenges. In the following section of this paper, the simulation possibilities available to the Guard will be discussed.

TRAINING AIDS, DEVICES, SIMULATORS AND SIMULATIONS

The National Guard's Integrated Training Strategy (ITS) supports a high reliance on Training Aids, Devices, Simulators and Simulations (TADSS). MG William Navas, then Director of the ARNG, indicated in the ITS, the ARNG will accomplish training in all three simulation environments; live, constructive and virtual using TADSS. Further the ITS highlights the challenges of training ARNG units and how NGB plans to resolve the issue:

Our main effort is to embed TADSS in all training strategies, plans and events. TADSS is the key factor in current information age technology that will allow for significant improvement of National Guard individual and unit readiness. TADSS can reduce travel time and administrative cost which is now required for achieving current readiness levels. TADSS must be the platform for rapidly acquiring additional individual and collective skills.¹⁰

The capability, potential and the infrastructure exist to accomplish the training requirements through simulations.

DISTRIBUTED SIMULATIONS

The availability and use of simulations can assist the National Guard in accomplishing the training requirements. The objective is to train a large number of soldiers at home station. The Training with Simulations Handbook defines remoting simulations as using multiple computers at various geographic locations with one or more simulations joined to conduct training. By remoting simulations, trainers and trainees in two or more locations can interact. Distributed simulations will remote the training to soldiers, possibly eliminating the need to move a large number of soldiers to training sites.

Simulations are remoted from different geographical locations for several reasons.¹¹

- It helps reduce training costs
- Reduce troop deployments

- Reduce exercise costs (property damage, fuel consumption, repair parts, and field losses of equipment)
- Reduces scripting of scenarios for CPX play.
- Maximizes use of widely distributed computing assets that may not be available in one central location.
- Due to the short training time available to RC units, remoting has greatly increased the effectiveness of this resource while reducing training costs since units can train at and from home station.

In addition, training with simulations is often realistic and stressful which adds to the overall training value.

CONSTRUCTIVE COMBAT TRAINING SIMULATIONS

What do simulations, particularly JANUS, offer the National Guard? Why is it essential that these simulations be available via distributed methods? These are critical questions that will be addressed in this section.

The use of constructive simulation holds potential for the National Guard. Constructive simulation - as defined by DODI 5000.59-P, DOD Modeling and Simulation Master Plan - is simulations that involve simulated people operating simulated systems. Real people stimulate (make inputs) the simulations, but are not involved in determining the outcomes. The National Guard's Integrated Training Strategy identifies constructive training as involving the use of icons and

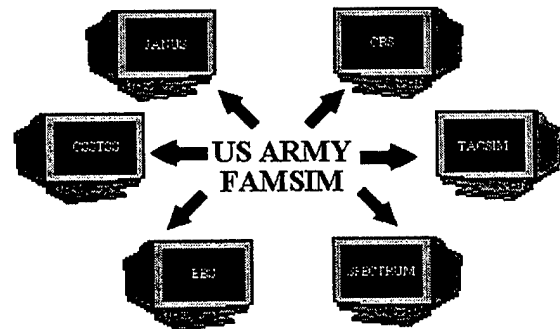


FIGURE 4. CONSTRUCTIVE COMBAT TRAINING SIMULATIONS

symbols to represent soldiers, whose time may be used elsewhere.

The Family of Simulations (FAMSIM) Directorate at the National Simulation Center is the proponent responsible for managing constructive combat training simulations. The constructive simulations available to the National Guard include Corps Battle Simulations (CBS), Brigade/Battalion Simulation (BBS), JANUS (Battle Focused Trainer), Combat Service Support Tactical Simulation System (CSSTSS), SPECTRUM, and Tactical Simulation (TACSIM). These simulations train commander/staff skills up through brigade level and leader skills from platoon to battalion level. This list includes the systems listed in FORSCOM Regulation 350-2 and identified as the US Army fielded constructive combat training simulations by the Family of Simulations Directorate.

WHY CONDUCT TRAINING USING SIMULATIONS

The National Simulation Center views the available constructive simulations as command and control (C2) training simulations. *The January 1999 Training with Simulations: A Handbook for Commanders and Trainers*, provides guidance to those who plan and conduct C2 exercises, employing simulations and applying the Army's training principle to the area of C2 simulations. It states that the Army needs to be deliberate in the use of simulations to maintain unit readiness. The handbook further specifies there are several reasons why the Army has concentrated significant effort and resources into the area of simulations. Money was the primary drive to using simulations. It is less expensive to train the entire force using simulations than training it in the field. Other factors influencing the use of simulations include:

- Safety of the force
- Elimination of lethality in weapons systems
- No environmental damage created
- Reduced public land use
- Great time reduction on the force

- Range distances on actual ground not a concern as they are in live-fire training
- Maneuver space for unit training is at premium
- Integration of unit training is complemented in the ease of simulations over staff exercises
- Treaties
- Deployment training can be exercised easily
- C4I systems can be realistically employed in simulations, joint operations are possible with sister service models being linked to Army models during exercise, and doctrinal requirements to train as one would fight are achieved in simulations.

ADVANTAGES OF TRAINING WITH SIMULATIONS

Some advantages of C2 training simulations, as identified by the Training with Simulations Handbook are:

- Simulations can assist units in preparing for Mission Training Evaluation Plans (MTEPs), exercise and evaluate internal staff training and unit standard operating procedure (SOPs)
- Develop an awareness of the lethality and complexity of the modern battlefield
- Evaluate written material and verbal communication processes between: commanders and staff members; commanders and subordinate commanders; commanders and adjacent commanders (US or international); and commanders and higher levels of command; and provides feedback to measure situational responses and staff ability to develop alternative courses of action.

Further, simulations support training in unique ways:

- Provides commanders large areas for conducting operations
- Simulations can portray large, capable and doctrinally correct opposing forces

- Simulations can stress command posts and provide realistic conditions under which commanders must make decisions
- Simulations allow different units to train under the same conditions and the same standards.

The Handbook cautions that continued resource reduction will strongly influence how training is conducted. Trainers must ensure that simulations are selected for the benefits derived. If a simulation can be used to assist in training no longer feasible due to reduced resources, then it should certainly be considered and incorporated into the overall training strategy. However, simulations are not substitutes for training. Ideal training occurs in conducting live, virtual and constructive training depending on the training needs.¹²

DISADVANTAGES OF TRAINING WITH SIMULATIONS

Admittedly, there are some disadvantages to training with simulations. Some disadvantages are:¹³

- Misunderstanding the purpose and place
- Misuse
- Under using the training potential
- Staying in the “warrior trap” (where winning is the focus, while C2 simulations concentrate on the process)
- Maintaining training fidelity

ARMY CONSTRUCTIVE COMBAT TRAINING SIMULATIONS

A brief description of the constructive combat training simulations and the benefits derived by training with them follow. This information identifies what is available and how simulations can be integrated in the training plan.

Corps Battle Simulation (CBS)

Corps Battle Simulation (CBS) is a geographically and functionally distributed air/land wartime simulation that drives the US Army Battle Command Training Program (BCTP) War Fighter Exercises as well as Corps and Division command training exercises for the active Army and National Guard. This simulation also serves as the Land Warfare component of various Joint Training Exercises as a member of the Joint Training Confederation (JTC). CBS provides training stimuli for all ground forces staff elements from Brigade to Corps including combat, combat support, combat service support and fixed and rotary wing air operations. All Battlefield Operating Systems (BOS) are represented: Maneuver, Command and Control, Fire Support, Air Defense, Combat Service Support, Mobility/Counter mobility/Survivability, Intelligence as well as fixed and rotary air operations, Nuclear, Biological and Chemical (NBC) operations including Smoke and Chemical Reconnaissance and Decontamination, Special Operations, Civil Affairs and Psychological Operations.¹⁴

Brigade/Battalion Battle Simulation (BBS)

Brigade/Battalion Battle Simulation (BBS) is a real-time, man-in-the-loop, free play system that responds to the decisions of commanders in the field. BBS models down to platoon level for a battalion CPX, down to company level for brigade CPX and, it is possible to model squads, single vehicles/soldiers and aircraft. A commander and his staff in a field command post interact with the model through workstation operators who control subordinate units. The maximum number of units (Red, Blue and Unknown) is 1,000. Personnel are modeled by MOS and rank. Movement, conflict and battle damage affect supply, ammunition and fuel levels of all units. Enemy Prisoners of War/Civilian Refugees (EPW/CIV) in the simulation represent factions for which both blue and red forces must accommodate. In addition, BBS presents

multi-factional forces referred to as Unknown Forces that model multi-action/multi-interaction scenarios, coalition warfare, multi-force operations, or United Nations charter operations. The BBS after action review (AAR) capability collects, displays, and presents near real time data from the exercise allowing evaluation of performance.¹⁵

JANUS

JANUS is an interactive, six-sided, closed, stochastic, ground combat simulation featuring precise color graphics. Interactive refers to the interplay between the military personnel who decide what to do in crucial situations during simulated combat and the systems that model that combat. Up to six sides can be simulated. Closed means that the disposition of opposing sides is largely unknown to the players in control of a force. Stochastic refers to the way the system determines the results of actions like direct fire engagements, according to laws of probability and chance. Ground combat means that the principal focus is on ground maneuver and artillery units, although JANUS also models weather and its effects, day and night visibility, engineer support, minefield employment and breaching, rotary and fixed wing aircraft, resupply, and a chemical environment.¹⁶ JANUS provides Brigade/ Battalion commanders a staff-training tool. It is designed to train synchronization of maneuvers, fire support, mobility/counter-mobility/ survivability. The training audience interfaces directly with simulations via workstations, and communication between members of training audience is via tactical communications. JANUS models both friendly and opposing forces and incorporates enhanced combat service support functionality while portraying virtually any tactical situation. Forces are directed by players but disposition is unknown to the players in control of the other forces. The actions are accomplished in real-time with an after action review capability that can be displayed on a workstation or projector.¹⁷

Tactical Simulation (TACSIM)

TACSIM provides interactive computer-based simulation to support intelligence training from the Military Intelligence (MI) Battalion (BN) level through Echelons Above Corps (EAC).

TACSIM is designed to provide training to intelligence staffs, collection managers and analysts.

TACSIM accomplishes this mission by simulating and or stimulating the spectrum of intelligence operations. TACSIM can support training from large-scale joint exercises to training on specific intelligence section tasks. The TACSIM system is composed of a main simulator and several peripheral devices. These peripherals support computer-generated analyses, after action reports, national collection systems, and the Communications Support Processor (CSP).

TACSIM is designed to operate at the Secret Compartmented Information (SCI) security level.

TACSIM has the capability to stimulate the taskings, collection, and reporting functions of intelligence sensors from the national level down to individual tactical collectors.¹⁸

SPECTRUM, Operations Other Than War (OOTW) Simulation

SPECTRUM models the political, economic, and socio-cultural environment into which military forces deploy and conduct operations. This simulation is not only applicable to military training but also to civilian agencies in OOTW scenarios such as Weapons of Mass Destruction (WMD) incidents, logistics catastrophes, and acts of nature (Hurricane Andrew). SPECTRUM combines conflict attrition based modeling with a sociological model that stimulates political, economic, social and cultural groups and activities. Combined with movement over digital terrain, logistics, and combat operations; SPECTRUM is a robust and flexible simulation driver. SPECTRUM can model the environment based on the training objectives and the intended training audience and provide exercise stimulus at the tactical, operational and strategic levels.¹⁹

Combat Service Support Training Simulation System (CSSTSS)

CSSTSS is a simulation for training commanders and staffs on CSS Battle Command and Staff Training (BCST) tasks. It can train personnel from Theater Army Area Commands (TAACOM), Personnel Commands (PERSCOM), Transportation Commands (TRANSCOM), Medical Commands (MEDCOM), POL Groups, Ordnance Groups, Corps Support Command (COSCOM), and subordinate commands down to battalion level. The CSS functions designed into the system are: Supply, Maintenance, Transportation, Mortuary Affairs, Personnel, Liquid Logistics, Ammunition, Medical and Reception, Staging, Onward Movement and Integration (RSOI). The CSS Commander selects the BCST METL tasks for training. CSS units, equipment, supplies, location, transport networks, customers and other significant data are uniquely built into the system. CSSTSS produces Standard Army Management Information Systems (STAMIS) and other information reports that portray the CSS resources to support a description of the battlefield. Operating from a tactical location, the commander and staff communicate with higher headquarters, subordinates and adjacent units who are at CSSTS workstations or other tactical locations. The simulation runs and produces battlefield attrition and consumption through free play, pre-planned events or linkage to a warfighter exercise. Staffs do mission analysis, estimates, courses of action, Operation Orders (OPORDS), logistics plans, and concepts of support. They direct their subordinates to execute missions and observe the results.²⁰

FUTURE ARMY COMBAT CONSTRUCTIVE SIMULATIONS

One emerging future simulation is WARSIM 2000. The system and the legacy systems it will replace are described below.

WARSIM 2000

WARSIM 2000 is a computer-based simulation with associated hardware and is the Army's next generation command and control training environment. It will support the training of unit headquarters and command posts from battalion through theater-level in joint and combined scenarios. Additionally, it will provide command post training events in educational institutions. It will be designed to allow units worldwide to train in their command posts using organic organizational C4I equipment, with minimum overhead. This simulation system will meet emerging distributed interactive simulation standards and protocols, thus providing a comprehensive joint environment capable of linking its simulation-based, constructive entities with virtual (simulator-based) and instrumented vehicles.

WARSIM 2000 will replace, in priority order, a number of existing legacy training simulations including Corps Battle Simulation (CBS), Tactical Simulation (TACSIM), Combat Service Support Training Simulation System (CSSTSS), and Brigade/Battalion Battle Simulation. WARSIM 2000 is in Acquisition Phase I.²¹ Fielding of this system to the National Guard will be in accordance with the Modernization Plan for replacing the legacy systems.

DISTRIBUTIVE TRAINING TECHNOLOGY PROJECT (DTTP)

The National Guard has the technological resources to ensure that a trained and ready force is available when needed. Future National Guard training will involve increased use of distributed simulations. In determining the feasibility of conducting simulations over GARDNET XXI, reallocation of assets/resources may be necessary to maximize the benefits.

The National Guard, with significant assistance from Congress, has improved the technological posture and readiness through the Distributive Training Technology Project

(DTTP). H.R. 104-863, FY 96 Authorization Act and P.L. 104-208 directed the Distributive Training Technology Project (DTTP). The DTTP includes classrooms established with federal funds and will connect many others established with state and private sector funds. A DTTP objective includes fielding an interactive classroom within 60 minutes driving time to every armory.²² Through the DTTP, National Guard has the capability to remote simulations.

As evidenced in the National Guard, "necessity is the mother of invention" or in our case, innovation. The National Guard has accomplished much in providing training via distributed methods. DTTP provides the technological component to ensure that states have the capability to provide advanced communication services for operations and training and provides consistency throughout the National Guard. The National Guard has developed a network connecting the fifty-four states and territories. In addition, there are currently 200 sites/classrooms and a goal to establish a total of 639, all which makes up GUARDNET XXI.

GUARDNET XXI

GUARDNET XXI is a critical component to the success of the Distributive Learning Initiative (DLI) and can support remoting simulations. Distributed Learning is defined as the delivery of standardized individual, collective, and self-development training to soldiers and units anytime, anywhere through the application of multiple means and technologies. The Distributed Learning Initiative represents the future of training and education in the Army National Guard.

GUARDNET XXI provides a robust and dynamic telecommunication infrastructure consolidating existing educational programs into an efficient and economical integrated network. The network architecture is based on international standards and the principles of open systems. One of the foremost requirements is supporting simultaneous transmissions of voice, data, high quality video, and in the future, imagery at high resolution and simulation technology

for collective training. GUARDNET XXI significantly expands the potential to improve readiness by making training more readily-available to soldiers. National Guard Bureau's goal is to shift from traditional resident training methodology to greater reliance on Distributed Learning technology, methods and materials. The National Guard's strategic plan is to maintain readiness through high-quality, locally accessible training and education in support of the total force. The Guard plans to aggressively pursue the leveraging of simulation technologies to enhance training in the future.

PARADIGM SHIFT

The Guard's training methodology must shift to accommodate resource constraints while improving readiness. Studies are ongoing to improve reserve component readiness and reduce deployment time. The National Academies National Research Council is conducting research in its technology-based pilot programs to assess technologies potentially available over the next 10 to 20 years and determine how to affect readiness of the reserve component, its mission effectiveness and integration with active components. The Reserve-Component Battle-Staff Performance Pilot Program is designed to explore using modern simulations as part of distance training of the leadership of the Army National Guard.²³ Future National Guard training will shift from the current methodology of going to training centers to simulated environments at home station. The Reserve-Component Battle-Staff Performance Pilot Program provides the mechanism to accommodate the essential shift.

The focus, to accomplish the training shift, is JANUS because of the number of JANUS systems already fielded to the National Guard and the ability to train the types of units, levels of organization, and the dispersion of units. This approach will also narrow the scope. Based on the review of requirements and capabilities, three possible alternatives will be addressed

whereby the ARNG can employ simulations to accomplish the multitude of training requirements. Only existing resources will be considered.

The training alternatives considered are Distributed JANUS (DJ); Armory Based Battle Staff Training (ABBST); and reconfigure the armory/classroom as a simulation center, similar to Jones Artic Battle Simulation Center (JABSC).

TRAINING OPTION #1: DISTRIBUTED JANUS (DJ)

The National Guard has implemented technological advancements that make JANUS distributed. Distributed JANUS (DJ) will operate over GUARDNET XXI. Simulation in Training for Advanced Readiness (SIMITAR) focused on, and modified, the JANUS simulation in three areas.

- Development of additional and enhanced play of CS and CSS functions within the JANUS model
- Development of a distributed version of JANUS model
- Porting of JANUS to allow it to run on commercial off-the-shelf (COTS) personal computers running the LINUX operating system (allow the hardware to be utilized for DL when not required for JANUS).²⁴

Distributed JANUS, version 6.3.3 and 6.3.4, have an added combat service support capability, currently available only in the Guard. This feature allows increased accountability and control for ammunition and fuel. The ability exists to cross-level ammunition between units and vehicles, to track artillery rounds by type of caliber, and to upload and download ammunition in the Ammunition Transfer Point (ATP)/Ammunition Supply Point (ASP) and configure bulk ammunition loads. These versions permit refuel on the move (ROM), tracking bulk fuel status

and bulk fuel transfer from vehicle to vehicle. JANUS workstations (WS) are being configured for dual use as DL WS.

DJ systems are fielded to separate brigades, combat divisions, simulation center/regional training institutes and other large organizations. As of 1 October 1999, 60 suites/sites have been fielded to the ARNG.²⁵ During January and February 2000 tests were conducted, remoting JANUS.²⁶ The tests were highly successful. One test site even included a firewall, which is a security measure to prevent unwanted intrusion. The period to transmit the data was slightly slower than a Local Area Network (LAN), but once loaded, no noticeable time difference occurred.

TRAINING OPTION #2: AMORY BASED BATTLE STAFF TRAINING (ABBST)

Armory Based Battle Staff Training (ABBST) is a program concept currently being proposed by National Guard Bureau (NGB) Army Training (ART).²⁷ The program is JANUS based and focused at battalion level operations. The concept requires integration and control of the JANUS support team for ARNG under the Leader Development Center (LDC) with a regionalized support concept. LDC has the mission to provide simulation-driven, collective Battle Staff training to all Army National Guard Divisions and Division and Separate Combat Ground Maneuver Brigades in coordination with the Combat Training Centers of the Army. The LDC mission supports the ARNG Divisions participating in the BCTP, and ARNG separate and divisional brigades participating in the BCBST program.

ABBST provides regional support with remote OPFOR from LDC utilizing GUARDNET XXI. The program is designed to accomplish seventy exercises per year, which consist of 4-hour battles, coordinated with LDC using 30 different JANUS orders provided by OPSGRP-C. The program offers a formal After Action Review (AAR) with input by LDC, as well as on the ground

trainers. The concept is heavily dependent on reallocating resources to accomplish this task. The concept assumes that ABBST will meet the FORSCOM 350-2 requirement to conduct one staff training event quarterly with one simulation-supported battle staff exercise annually for each brigade and battalion level headquarters. Establishing ABBST teams can be accomplished by integrating current assets with no cost increase to the ARNG.

The requirement for Infantry and Armor can be satisfied using ABBST. The concept would expand the coverage offered by the JANUS support units through LDC versus specific units as they are currently organized. The movement of personnel would focus the team on ARNG issues only.

TRAINING OPTION #3: JONES ARTIC BATTLE SIMULATION CENTER (JABSC)

Jones Artic Battle Simulation Center (JABSC) is located at Fort Wainwright, Alaska. It provides all type (military/civilian) units and agencies (combat, combat support and combat service support, state and federal agencies) throughout Alaska the availability and use of computer-driven battle simulation models. The system provides individual and collective training and simulates weapons range operations. It provides both virtual and constructive simulation support and helps to enhance, hone and sustain a unit's fighting edge through the use of constructive simulations (SPECTRUM/JANUS/ BBS/ BS/CSSTSS).

The Alaskan facility has a fully capable War Room with wall maps, a 4X8 foot sand table, and multiple telephone lines to assist units. The War Room may be used as a standalone or integrated facility to conduct a unit's exercise. It includes an After Action Review (AAR) Room which is a completely automated briefing room with both frontal and rear projection screens, a direct link viewing AARs to all simulation models, tables and chairs with seating capacity for 50 personnel.²⁸

CONCLUSION

After researching this issue and the advancements made by SIMITAR, the researcher determines that it is feasible to conduct constructive combat training simulations via distributed training technology, specifically using GUARDNET XXI. Additional research is needed to determine the technical requirements and impacts of this determination, but from a non-technological perspective it is viable and has been successfully tested.

The researcher recommends that the National Guard consider configuring the classrooms/armories as simulation centers, similar to the Jones Artic Battle Simulation Center (JABSC) in Alaska to maximize the capabilities of GUARDNET XXI multi-functionality in terms of remoting different simulations. Conducting simulations via the network can be accomplished using existing resources. This configuration would allow the National Guard units to train at home station, utilizing existing resources. The National Guard can possibly implement a "Fort State" concept for simulations whereby the services can be afforded to all military services in the vicinity as well as nearby federal and civilian organizations. A cooperative agreement for classrooms will allow the sector to use the facility.

The time has come for the National Guard to change the training methodology to overcome resource constraints. The classrooms, which are part of GUARDNET XXI, have computers that can be used as DL, as well as JANUS WS, depending on the needs of the organization. The difference in the classrooms may not be noticeable since the objective is to remote the simulations to the sites. The difference is in the leveraging of technology improvements and

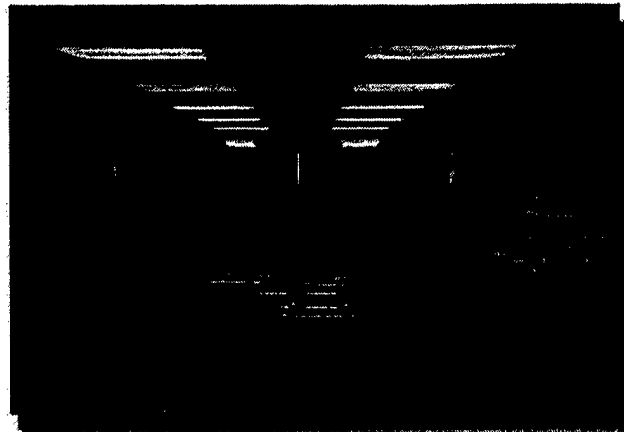


FIGURE 5. JANUS INSTALLED IN A CLASSROOM

may be seen in the hardware configuration, operating systems and software applications.

Figure 5 shows a classroom used for Distributed JANUS.

The major decision in implementing this recommendation is from where to remote the simulations. The two obvious sites would be the National Simulation Center (NSC) or the National Guard Bureau (NGB). Without adding more overhead, NGB's Net Control Center (NCC) should be given the mission to coordinate and schedule usage without overwhelming the system. This decision would be made during the additional research phase in determining technical requirements and capabilities.

In today's Army, where innovation is key to survival, the Army National Guard should capitalize on training with simulations via distributed methods to improve readiness. Remoting simulations offers training to a wider audience, ultimately the number of soldiers and units trained increases and readiness posture improves. Subsequently, the entire military benefits when the reality and perception of the state of ARNG readiness is a "trained and ready force". Conducting constructive combat training simulations via distributed methods appears to be an ideal solution for training today's soldiers as a part of the live, virtual and constructive environment at a reduced cost.

WORD COUNT = 6,555

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¹² *Ibid.*, 53.

¹³ *Ibid.*, 52.

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¹⁵ "Brigade Battalion Battle Simulation Information Paper dated 11 February 1998," linked from National Simulation Center at FAMSIM, available from <http://www-leav.army.mil/nsc/famsim/bbs/infopapr.htm>; Internet accessed 18 February 2000.

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