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Feature Article

Emergency Response Teams Rehearse in Digital Simulators

by Stephen Willingham

A simulation-training suite called the virtual emergency response training simulation (VERTS), is being designed for use by National Guard and Reserve weapons of mass destruction-civil support teams (WMD-CSTs). These specially trained units have been assigned responsibility to intervene in cases of domestic terrorist attacks involving nuclear, biological or chemical (NBC) weapons.



The first trial training system is scheduled for delivery to the New York City area WMD-CST during the first quarter of 2001, according to a spokesman for the Army Simulation Training and Instrumentation Command (STRICOM) in Orlando, Fla. The trainer will be assigned to the 2nd WMD-CST Military Support Detachment, at Scotia Air National Guard Base, N.Y.

A second VERTS station will be located at Fort Leonard Wood, Mo., home to the U.S. Army Chemical School. A third VERTS suite will be situated at STRICOM. In addition, a partial VERTS suite will be installed at the Advanced Distributed Learning Collaborative Laboratory (ADL Co-Lab), at the Institute for Defense Analyses (IDA), in Alexandria, Va.

Once in place, these four VERTS stations can then be linked to form a distributed learning tool, thus enabling dispersed units to train together in a virtual environment.

Virtual urban models of New York City, Philadelphia, Los Angeles and Washington, D.C.—including streets, trees, vehicles, and buildings—are being developed at IDA, officials reported. One model has already been put to use. A copy of virtual Los Angeles was made available to the local sheriff's office to aid in security preparations for this year's Democratic National

Convention.

VERTS allows CST units to do much of their training in private, said Matt Kraus, program manager for human simulation and VERTS project director for Science Applications International Corp. (SAIC), in Orlando. This, he said, “does not alarm the public or educate our enemies about how we will respond and what our capabilities are.”

VERTS trainers will be located inside National Guard Armories or on Air Guard bases, he said. The plan is for 32 CST units to have individual VERTS systems by 2006.

Creating Teams

Congress established the CSTs in 1998, when it appropriated funds for 10 teams. Those teams now are certified and in operation. Another 17 CSTs are in training. Five more CST teams are planned, but have not yet been funded by Congress, said Col. Jay S. Steinmetz, VERTS program director.

Steinmetz directs the Consequence Management Program, in the Pentagon’s Office of Military Support. During the planning for the 1996 Summer Olympics, Steinmetz advised local authorities in Atlanta on the possibility of WMD attacks.

Each VERTS team has 22 members, drawn from local National Guard and Army, Air Force, Navy and Marine Corps Reserve units. The teams’ primary job is to assist civilian first-responders, fire and rescue and law enforcement units after a terrorist strike against a civilian target. In addition, the teams can be called in to help local hazardous-material crews deal with industrial or transportation accidents involving toxic substances such as chlorine, phosgene or hydrochloric acid.

The decision to give this responsibility to the Guard and Reserve, rather than active-duty armed forces, was due partly to the posse comitatus federal law restricting the use of military personnel within the borders of the United States.

Another important factor, Steinmetz explained: “Guard and Reserve units were already scattered across the country and well established within their communities.”

A VERTS suite consists of two virtual-reality “immersion” training stations. The entire suite occupies about 1,500 to 2,000 square feet of space, according to STRICOM. Inside the stations, troops wear Level-A chemical suits that encapsulate them completely, isolating them from the external environment.

The Level-A suits guard against toxic inhalants and protect skin from chemical blistering agents. Troops wearing the suits carry a limited internal oxygen supply. They also are outfitted with NBC detection sensors, radios and sampling kits which include scissors, dirt scoops and plastic bags

and sampling kits, which include sensors, air scoops and plastic bags.

Outside the immersion station, students in separate cubicles can view this synthetic learning environment and interact with their immersed compatriots through desktop computers. The students participate directly in the exercise through what Kraus calls “avatars”—virtual characters that they control, using joysticks to manage every required move.

The non-immersed students, dressed in battle-dress uniforms (BDUs), can act either in consort with their immersed teammates or as an adversary. Avatars also can be created to simulate real-life crowds, other biological/chemical teams or casualties that require treatment and evacuation, or perhaps enemy forces. Included in the scenes are animals, vehicles, trees, fire hydrants, streets, doors, stairs and the interiors of buildings, which can be entered for reconnaissance.

A “battlemaster” station, where the chief trainer controls the exercise, rounds out the suite. Constant radio contact is maintained among team members at all times and recorded for later review.

Upon completion of the exercise, an “after-action review” is conducted, using playback capabilities similar to watching a movie on a videocassette recorder. This provides students with the opportunity to review and critique their performances and learn from mistakes.

“The nice thing about VERTS is that the teams can play it again and again, until they get it right,” said Kraus.

‘Buddy’ System

Trainers stress the “buddy” system. “It’s like scuba diving,” Kraus explained. Even while in simulators, the teams are taught to keep one another in sight.

“You don’t go into a real situation alone,” Kraus said. “The terrorists might still be in the area, for all you know. Also, teams will have to deal with crowds of people who are disoriented, injured and emotional because of the attack.”

During training sessions, one section of the team is held in reserve, “just as it would be in a real-life situation,” added Kraus.

A realistic simulation trainer like VERTS makes it easier to practice handling simulated NBC attacks around a city block or in a convention center, explained Steinmetz. “It’s hard to go out and rope off a four-block area in New York City,” he said.

Pentagon planners wanted VERTS “to be tied to the common-operations-force concept,” Steinmetz said. This allows everyone to train and practice the same way, so when there is a real incident, everyone is on the same page and understands what to do, he explained.

According to Steinmetz, VERTS technologies include interactive courseware and performance tools, which allow CST members to train in the same way that they are going to respond. These tools will also include “reach-back” capability, enabling teams to access on-the-spot information from faraway government experts and databases.

This is where the Defense Threat Reduction Agency (DTRA) comes in, said Steinmetz. Although VERTS development itself is not part of DTRA’s mission, the agency recently provided training for the next 17 CST teams currently seeking certification by the Office of the Secretary of Defense. VERTS is primarily designed to teach onsite casualty assessment, treatment and removal. Medical assessment and treatment, however, are not part of the DTRA mission, agency officials stressed.

Even without terrorists, the danger of a chemical or biological incident exists, noted Walt Zimmers, chief of DTRA’s WMD Assessment and Analysis Center, in Alexandria. On any given day, there are approximately 50,000 tanker trucks carrying dangerous chemicals on U.S. highways, he pointed out. “You never know what is going to happen.”

When something does happen, the assessment and analysis center sometimes is called upon to help. During an insecticide factory explosion and fire incident in Helena, Ark., last year, for example, the center supported local first responders.

Using weather modeling and plume analysis, meteorologists on the DTRA staff were able to predict a wind shift, caused by an advancing storm front, that eventually carried the fire’s toxic plume directly into an area previously chosen to receive evacuees from the surrounding countryside.

VERTS also will save the government money, Stienmetz said, because it is much cheaper and easier to have troops achieve a high level of proficiency before they train in real-life urban exercises.

VERTS is based, in part, on simulation-based trainers for aircraft and tanks, Steinmetz explained. “What we have created is a dismantled version.”

By converting some pieces of existing technology from one use to another and leveraging some more recent developments, Steinmetz said, they have been able to hold down costs. The budget for VERTS was \$1 million in 1999, he reported. It was doubled in 2000, to \$2 million. “We are buying stuff for hardware costs,” Steinmetz said.

They also plan to use the most recent innovations in the video game industry, he indicated. “The gaming industry is driving us constantly and at the same time providing us with more and more realistic simulations,” Steinmetz observed.

Task Analysis

By analyzing tasks that teams must perform, VERTS planners have been able to determine which procedures are best taught in the classroom, in live exercises or in a simulator.

“Cleaning a detection sensor is probably better accomplished through live training, than in a simulator,” Kraus added.

“Virtual training used to be a separate field,” Steinmetz said. “Now, it is combined routinely with other types of training.”

To further enhance training, VERTS offers what Steinmetz called “constructive simulation,” which allows players to cooperate with one another while conducting their own training. This means that feedback from team members can be incorporated to improve future versions of VERTS.

When it come to live simulation training, Steinmetz explained, by adding a combat trauma patient simulator, team members actually can transfer medical cases from the screen to a dummy that can be programmed to exhibit real-life WMD symptoms. These dummies can sweat, convulse, cry and die. They also can be revived.

“One of Steinmetz’s jobs is to wedge VERTS into Advanced Distributed Learning,” said Eddie Nagel, director of the Maneuver Support Center (MANSCEN), at Fort Leonard Wood, who also handles fielding and integration of VERTS with CST units. “This endeavor still needs maturation. Hence, we will be conducting experiments and exercises at both the individual and collective training areas.”

“VERTS is a distributed learning network,” Steinmetz confirmed. “Avatar movement is actually what will be shared.”

By using the National Guard Internet, or GuardNet, VERTS stations in different cities can be linked so that CST teams in New York can train with their counterparts in Los Angeles, he said.

“The GuardNet has already been used for courseware development,” Steinmetz reported.

This particular system is known as Advanced Distributed Simulation Technology (ADST). The increased bandwidth that resulted from running advanced versions of ADST made it possible to go online with VERTS, Steinmetz said.

The most recent, and extensive test of this distributive learning network, occurred on August 30, and engaged 13 different satellite systems. Several government departments and agencies connected during this exercise were the Federal Emergency Management Agency, Environmental Protection Agency, Federal Bureau of Investigation and the Defense Department. “By

broadcasting to several different locations at once, we were able to show that we could, in fact, connect points A and B,” Steinmetz said.

Improvements in distributed learning programs, Steinmetz said, made it possible for the first 10 CST teams to be fielded in two years. This time frame is “unprecedented,” he said, it usually takes as long as seven or eight years to field a brand new unit.