

Train As We ~~Fight~~ Operate

Non-kinetic skills, non-governmental organizations, and non-human instructors are no longer alien to military learning language. Rick Adams updates elements of the continuing Training Transformation evolution.

From extremely hostile confrontations to a visit to an orphanage during operations – today's soldier must be prepared for every situation. Image credit: Trish Bunting/USAF.

When I was a kid, I faithfully watched the television series, "Combat," every Tuesday night with my dad.

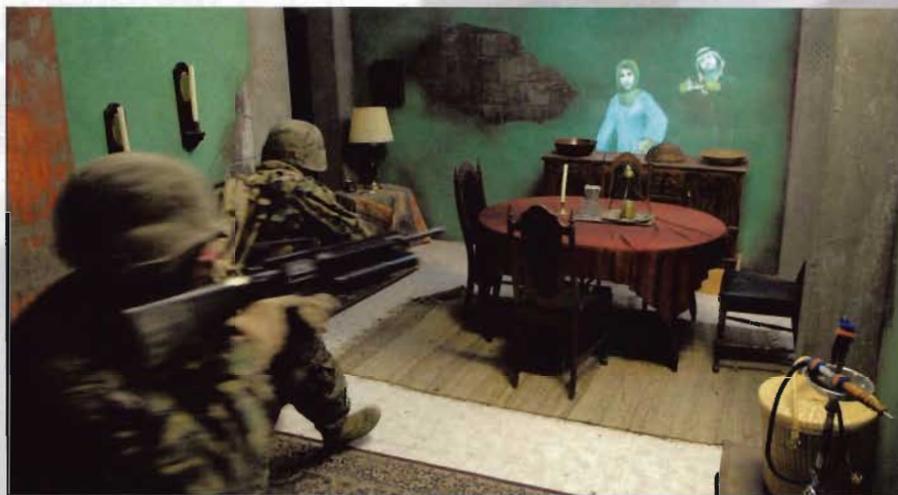
The black-and-white World War II drama featured a squad of American soldiers in France, led by Sgt. Chip Saunders (actor Vic Morrow). The mid-1960's show didn't have the type of destroy-the-world special effects of today's action movies; it had to rely on an actual plot and interesting personalities to keep the audience coming back the next week.

What stands out in my memory today, 40 years after the last show aired (not counting re-runs, which you can now find on some cable stations) is that Morrow's Sgt. Saunders was very much the composite soldier that is required today in theaters such as Iraq and Afghanistan.

Sgt. Saunders was as tough as they come – he was frequently battered by the enemy when captured and interrogated, bruised by falling debris after a shell exploded too close, and shot multiple times. He always survived, of course, and usually completed the mission.

But Sgt. Saunders also displayed what US Defense Secretary Robert Gates today refers to as "soft power." Morrow's battle-hardened character often had to deal with civilians, whether nuns or orphaned children or resistance fighters, as well as wounded enemy combatants. In such situations, the Sergeant's gun was not nearly as important as his judgment and diplomacy.

Today's soldier must also be prepared for "the whole gamut," explains Dan Gardner, Director for Readiness and Training Policy and Programs in the Office



US Marines confront avatars, or virtual humans, while clearing a room in the Infantry Immersion Trainer (IIT). Image credit: US Navy/John Williams.

of the Deputy Under Secretary of Defense for Readiness. "They must deal with one extreme to the other – from kicking the door down to having a cup of tea."

John Nicol, CEO of distributed learning specialist Acron, describes it as "handing out food in one block, seeking and destroying the enemy in a second, and rebuilding the infrastructure in the third block."

Gardner says traditional military training has focused about 95 percent on 'kinetic' skills – "training for the hardest and worst and deadliest confrontations" – but only about 5 percent for 'non-kinetic' skills such as negotiation, diplomacy, and other ways to "win hearts and minds." And yet, the US and coalition forces now typically operate in just the

opposite ratio: 5 percent kinetic, 95 percent non-kinetic.

"We've always had the non-kinetic skill set, but it has not always been exercised and trained," Gardner notes.

Sights, Sounds, Smells, and Stress

One innovative example Gardner cites of teaching troops how to make decisions under stress is the Office of Naval Research and US Marine Corps' Infantry Immersive Trainer (IIT) at Camp Pendleton, California. Much like the Navy's Battle Stations 21, the IIT replicates not just the real-world physical environment but also the sounds and smells that confront Marines on the streets of Baghdad or Basra: the melodic 'call to prayer,' the explosive blast and acrid smoke odor of a rocket-propelled grenade, the accented dialects of native-speaking role players. Much like a Hollywood set, the streets of Iraq transported to a cavernous former tomato-packing warehouse.

But don't mistake this for a firing range in a faux building. This is a "decision house," not a "shoot house," according to Thomas Buscemi, director of the I Marine Expeditionary Force Battle Simulations Center at Pendleton. The IIT presents the chaos, confusion, and "ethical questions" of urban warfare to marine riflemen and small unit leaders, thus building the individual's "stress-immune system" before they go into actual close-quarters situations.

The IIT is a blend of live and virtual environments. The Marines wear their regular gear; Lt. Gen. James Mattis, I MEF commander who originally envisioned the system, didn't want wires and "extra gadgets." Weapons are modified to shoot paintball-type rounds. Many of the walls in the Middle East style buildings are extra-large display screens depicting life-size images of friends and foes capable of talking interactively with the Marine squad. Embedded throughout the facility are cameras that record the scenarios and enable squads to later critique their actions and words.

The 2D 'holographic' walls are adapted from the University of Southern California's FlatWorld technology. A primary developer of the IIT was Game Production Services, a New Mexico-based developer of serious games and immersive mixed-reality environments.

Game Production is also collaborating with USC's Institute for Creative Technologies on a similar project at the 'Gruntworks' human factors laboratory in Stafford, Virginia. One key difference, though, is that the trainees' gear will be prototypes being tested for increased efficiency, personal protection and survivability.

One goal of Gruntworks is to 'lighten the load.' Brig. Gen. Michael Brogan of the Marine Corps Systems Command says, "You see just how heavy we've made the equipment for the



The I2SORT project incorporates Bohemia Interactive's Virtual Battlespace 2 synthetic environment.
Image credit: Bohemia Interactive.

Marine deployed today in Iraq and Afghanistan. We just keep adding things onto his kit. [Gruntworks] is an opportunity for us to look at the squad as a combat system, integrate pieces, remove redundancies, lighten the load, and make him better."

Quantum3D's man-wearable, untethered ExpeditionDI technology is being incorporated, together with Bohemia Interactive's Virtual Battlespace 2 synthetic environment, in the Gruntworks project – known as Immersive Infantry Simulation for Organic Rehearsal and Training (I2SORT). Raytheon is the Gruntworks integrator.

Exercise Regularly

At the opposite end of the training continuum, the OSD's Training Transformation initiative is essentially going full tilt with large-scale live, virtual, and constructive exercises. Gardner says the initial target for full operating capability of 45 exercises a year will be well exceeded in fiscal 2008 with about 80 events and "probably more" in 2009. "There really isn't an equilibrium," Gardner surmises. "We'll always be working to expand and be more complex, to make pre-deployment training as realistic as possible."

The joint exercise training network now encompasses 22 nodes globally with the capability for about 250 locations "to get in the game."

What's different in recent exercises is inclusion of more and more non-military players ... not just other federal agencies such as the State Department, Justice, Homeland Security, and the FBI, but also non-governmental organizations (NGOs) and private voluntary organizations (PVOs), such as the Red Cross or Red Crescent, and academics.

"Interagency participation is a growing factor," notes Gardner. "We're bringing all of these resources who work together into an environment where they can train together." Accordingly, the T2 mantra is shifting from "train as we fight" to "train as we operate."

The three most prominent Mission Rehearsal Exercises (MRXs) are designed to prepare joint task force commanders, major subordinate commanders, and their staffs for the assignments they will soon undertake – Combined Joint Task Force 76 (CJTF-76) in Afghanistan; CJTF Horn of Africa in Djibouti, which seeks to promote regional stability in east Africa and Yemen through humanitarian assistance and civic programs; and the far more visible Multi-National Corps, Iraq (MNC-1).

The MNC-1 exercise, dubbed Unified Endeavor 09-01, was conducted in October and involved the US Army I Corps headquarters

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and 1st Cavalry division headquarters, plus the II Marine Expeditionary Force HQ.

Locations included Fort Lewis, Washington; Fort Hood, Texas; Camp LeJeune, North Carolina; the US Air Force's Hurlburt Field, Florida; and the Joint Warfighting Center in Suffolk, Virginia. Coalition partners from the United Kingdom, South Korea, and Iraq joined as well.

"Essentially, this is to immerse us for two weeks in the operational environment as much as we can to make it look like Iraq in terms of the problems we are solving," explains I Corps chief of staff, Brig. Gen. Peter Bayer. He calls it developing a "shadow battle rhythm."

"No matter how good you are ... or think you are ... it will expose you in areas for improvement."

One of the US Navy's new showcases is the Distributed Training Center Atlantic (DTCL) at Naval Air Station Oceana, Dam Neck, Virginia. The center consolidates some of the elements of the Navy Continuous Training Environment into a single East Coast node for live, virtual, and constructive synthetic war games.

The DTCL anticipates hooking into Air Force systems at places such as Davis-Monthan AFB, Army installations

like Fort Hood, and coalition partners in Europe and Asia.

The Dam Neck center will help support Joint Fleet Synthetic Training Exercises (FST-Js), which link ship-based and land-based personnel in simulated battle conditions.

Some sailors still adhere to the belief that training cannot be effective unless their ship is churning through deep water. The FST-J 08-02 expeditionary strike group exercise earlier this year was the first conducted with the ships in port.

A Rand National Defense Research Institute analysis of training for the DDG-51 Arleigh Burke-class destroyer concluded, "although most exercises are done underway, many could be done in port." The study's author commented, "We do not know if ships complete exercises underway because the ships already are underway, or if the ships get underway to complete the exercises. The fact that most of the training for [unit-level training] is done underway may be due to culture, policy, or practice."

Even the United Nations is getting into the collective training arena. Canadian-based Acron is unveiling OpSimX, which John Nicol says was built for the UN World

Food Program to support preparation for humanitarian response in the wake of a disaster. OPSimX represents the "fusion" of operations and simulation, enabling decision-makers to take a simulated peek at future scenarios, then use the same tool to manage operations in real-time. Players can include defense, public safety, first responders, and even diplomats.

The UN Disaster Planning and Response Simulator layers Microsoft's ESP visual simulation and VirtualEarth platforms onto the UN's existing IT infrastructure and applications.

The underlying technology is Acron's InfoX architecture, which Nicol describes as a policy-based information exchange. "Information exchange in the military is pretty much hard-wired or based on the data model," he explains, "and the data model is pretty dumb. Within an austere environment, you can't guarantee bandwidth." InfoX, says the former New Zealand Army major, "just does its thing in the background."

Smart Talking Avatars

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Learning network includes the Workforce ADL Co-Lab at the FedEx Institute of Technology, University of Memphis, Tennessee. Memphis is intended to be a catalyst to enhance training for the workforce of the future.

Gardner is keen on the "intelligent tutoring" developments emerging from the Institute such as the AutoTutor, which appears on a student's computer screen as a three-dimensional animated avatar who acts as a dialog partner. The agent communicates with the learner via synthesized speech, facial expressions, and simple hand gestures.

But AutoTutor is not a mere talking cartoon head. The program is designed to elicit answers that exhibit deep reasoning, not the recitation, by rote, of factoids of basic knowledge.

The AutoTutor avatar presents a series of challenging problems or questions that require lengthy verbal explanations. The program dynamically selects words and statements in each conversational 'turn' in a manner that is sensitive to what the learner knows (by analyzing the content of the dialog history). The process typically takes approximately 100 conversational turns. One version of AutoTutor even adapts to the learner's emotional states.

"These are hardly the fill-in-the-blank questions or multiple-choice questions that many associate with learning technologies on computers. It takes a conversation to answer each one of these challenging questions," explains Memphis researcher Dr. Art Graesser.

Experiments have been conducted to help students learn scientific reasoning, Newtonian physics, and computer literacy.

"The conversations managed by AutoTutor are hardly perfect, but are smooth enough for students to get through the sessions with minimal difficulties," claims Graesser. "In fact, the dialog is



AutoTutor appears on a student's computer screen as a three-dimensional animated avatar who acts as a dialog partner.

Image credit: University of Memphis.

sufficiently tuned so that a bystander who observes tutorial dialog in print cannot tell whether a particular turn was generated by AutoTutor or by an expert human tutor."

He adds, "It is easy to imagine the various ways AutoTutor can be used in eCommerce, surveys, medical applications, entertainment, and nearly any enterprise that benefits from advanced technologies with conversational facilities." Agents could also be embedded in game environments that captivate many learners "and thereby automatize skills, strategies, and knowledge applications." **ms&t**

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