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*Feature Article*

# Adapting Video Games For Military Applications

**by A. Duffy Baker**

The realistic qualities of video games today make them increasingly valuable tools for military training, officials said. But they also recognize that glitzy Hollywood-style animations offer only partial solutions to the challenges that have emerged in military training.

Both military and industry experts debated the virtues of gaming technology during the Interservice/Industry Simulation Training and Education Conference in Orlando, Fla. The annual event is sponsored by the National Training Systems Association.

Training-oriented video games and PC-based training tools are known as “microsimulations”, explained Marine Maj. Chris Sharp, of the College of Continuing Education at the Marine Corps University, in Quantico, Va. Some microsimulations focus on physical and mental skills needed in combat. “I work with majors and captains, so we are focusing on decision-making skills,” explained Sharp.

The benefits of microsimulations are many, according to Sharp. They are accessible, since they operate on PCs. The technology is reliable and inexpensive, having been refined in the entertainment field for more than a decade. That also makes them user friendly. “They’re intuitive. They were built for a two-year-old or a 12-year-old to understand,” said Sharp. And they allow players to interact via the Internet.

Another advantage Sharp sees in the use of microsimulations is the ability to record the missions played. “If you’ve ever done a flight simulator, you might find that you spend more time reviewing what you did than actually playing the game.”

Sharp also discussed some unique requirements for video games used by military trainees. One was a chain of command element where the various levels of commands can be played. For that reason, Sharp would like to see compatibility between games. “Not necessarily to have one game execute everything, but a console that can support an aviation model played along with a tank simulation,” said Sharp. These elements can be seen in games such as Close Combat, made by Atomic Games, in Houston. Close Combat is a series of games based on different World War II battles.

Commercial games are seeking a middle ground “between pure simulation and a fun game,” said Brian Upton, of Red Storm Entertainment, in Morrisville, N.C. One of the company’s most popular games is Rainbow Six, based on the series of books by Tom Clancy. It is a close-quarter fighting and counter-terrorism game. Red Storm was to make the game “as real as possible, while still easy to play and accessible to consumers,” Upton said. “Part of the fun for our players is the realism.

“There are things that you can do in the real world, because of the training you do or the capability of weapons, that just aren’t fun for the player. For instance, you can shoot somebody from two miles away in the real world,” explained Upton. In the game, that person would be just a tiny pixel. This takes away from the tension level and excitement for the player.

Commercial Platform

LB & B Associates Inc., in Columbia, Md., has developed the Military Element Tactical Trainer Simulation (METT Sim) based on a commercial platform. “We took the gaming elements out of it and increased the realism as much as we could,” explained Michael Bradshaw, systems division manager for LB & B. “There is ballistic data, and we modified the weapons, based on expert advice from former Marines.” METT Sim is PC-based and can stand alone or can be networked for up to 16 players.

According to Bradshaw, the players are in control of the scenario, thus enhancing team decision-making skills. Players can be friendly forces, noncombatants and opposing forces. “We can map any location true to life,” Bradshaw said. “Any uniform, any skin texture, anything you want we can make. ... An American embassy in Russia can play against an embassy in Poland,” Bradshaw said.

Sharp noted that the Marine culture has been slow to adopt the games for training. That is why he shies away from calling them games and calls them microsimulations instead. Marines are given the software, and it is never unwrapped, said Sharp. “They see it as just a game.” But as the realism grows, so does the acceptance.

And there is no end in sight to the boom in gaming technology. “Next fall, Microsoft will be releasing its desktop box, the Microsoft x-box. It will have a price of under $300, and the x-box is equivalent to a 700 Megahertz P3

a price of under $300, and the R 50 is equivalent to a 700 Megahertz PC [Pentium 3] running a G4 graphics card," Sharp said. "That means that it will go through about 3 million color rounds per second on a box that cost under $300."

Alias Wavefront, a subsidiary of SGI, headquartered in Toronto, has a three-dimensional animation program called Maya. The Maya Composer is a video-based product known as "The Swiss Army knife of Hollywood," said Edward M. Ward, a branch manager for Alias Wavefront's federal systems, in Chantilly, Va. "It is a low-end compositing tool." The Maya Composer can take one scene and change the background. If the scene was shot in the fall, but the action of the movie is supposed to be in the spring, Maya can change the background without changing the people or objects in the scene, explained Ward. For intelligence analysts, this technology allows them to locate an object or person of interest and track it.

"They can zoom in, clean up the image and track the object the entire time it is in the camera's view," Ward said. A sample video showed a shot of a ship with a man walking along one of the decks. The camera can zoom in to focus on the man and follow him as he walks along. The software tracks the pixels that make up the man, so he will stay the same, even if things around him change.

Some modifications to the software had to be made to make it more user friendly for military analysts, stated Ward. "Their specialty is analyzing data, not the software." So SGI and Alias Wavefront simplified the keystrokes needed to run the software. According to Ward, it is now an icon-based interface. There is a panel of icons that perform what Ward called "macro-commands," as opposed to the individual keystroke commands. This makes it possible for a user to be trained to use the software in about one day.

Multi-Gen Paradigm, of San Jose, Calif., is developing a program called Site Builder 3D that will allow users to turn two-dimensional Geographic Information Systems (GIS) data into a three-dimensional map, without having to learn any complex 3D modeling tools.

"Users would first generate terrain," according to Jon Zucker, a programmer for Multi-Gen. "They would texture the terrain with either high-resolution imagery or a map, then populate the terrain with feature data, trees, buildings, roads, forests, light posts, whatever kind of information they have in their maps."

The 2D and 3D maps can be viewed in a split-screen manner, and various elements can be turned on and off. For instance, the trees can be taken out of the map and only the building positions shown, or vice versa, explained Zucker.

The program will not simulate an object, unless that object is added to the data library, Zucker said. However, the dimensions of an object, such as a building, can be used to create a model of that size in the 3D map. Textures can be added to make it more realistic.

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Beta versions of Site Builder will be tested by the National Imagery and Mapping Agency, Marine Corps and Army for mission-planning purposes. Zucker said the program also can be used for city planning and by police and fire departments. Site Builder will be available, sometime this year.

Special Effects

“Every TV commercial you can name today has some high end special effect in it. We believe that training should be brought up to that level,” said Al Lowenheim, chief executive officer for eGad Software Company, of San Diego.

The software eGad is developing is not a static animation. It is a model that can be dynamically modified by players in the created environment in real time, explained Dan Fritze, a company programmer. For instance, when modeling water, the effects of a hovering helicopter or changes in the wind can be simulated based on the actions of the players in the environment, and not a preset scenario, Lowenheim said.

“There is an expression that we use in the entertainment business: ‘suspension of disbelief.’ When you go to a movie, you lose yourself in the story and the characters,” he said. “We need to bring the visual simulation environment up to the level of the real world.”

This viewpoint prevails throughout the industry. Professionals from Hollywood, the video-game industry and retired military officers have converged at the Institute for Creative Technologies (ICT), headquartered in Marina Del Ray, Calif. They are designing digital simulations to train Army crews on the Future Combat System (FCS), the Army’s next-generation combat vehicle.

Teams of professionals from the institute visited various military outposts to develop the scenarios for testing FCS designs, said Ron Cobb, an industrial designer of futuristic vehicles for films. ICT created story boards and designed drawings for the computer models, much like the beginning of pre-production of a movie. Two vehicles that the team worked on were the Schwarzkoff, nicknamed the “hedgehog,” and the Powell.

Designers focused, in part, on the wheels. Each wheel has its own motor and hydraulics that allow it to swivel, according to Cobb. The vehicle can change directions very quickly, over almost any kind of terrain. The Powell, a medical vehicle, has the ability to reach victims and scoop them up, so medical staff are not exposed to enemy fire, Cobb said. The next step is to work with military experts on how to train users of this advanced technology.

“The games don’t have the details. The Army has the details, but not the game know-how,” said Michael Murguia, chief executive officer of New Pencil Inc., in Sausalito, Calif. New Pencil is working with the ICT and the

U.S. Army to develop new training programs for the FCS. The company plans to rely on so-called immersive simulations, which offer a high level of realism. The core of the training, according to Murguia, is the use of video games, but vehicles, for example, would have the correct weight and center of gravity, as they would in the real world.

A capable artificial intelligence system (AI) also is an important part of immersive simulation, according to William R. Swartout, director of technology at ICT. An example is a project called Mission Rehearsal Exercise.

Swartout cited a scenario where a Humvee crashes with a civilian vehicle during a peacekeeping mission. The player has to decide whether to stop to help a boy hurt in the crash or continue with the mission. AI technologies enable complex behaviors and interaction with the players. Characters such as soldiers or the mother of the hurt boy can be pre-recorded and scripted.