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Feature Article

Video Games Gaining Clout As Military Training Tools

by Sandra I. Erwin

Commercial computer games have "great training value," for the Marine Corps, said the service's commandant, Gen. James L. Jones.

Many simulations used by the Marine Corps at its facilities in Quantico, Va., rely on commercial video games, Jones said in an interview earlier this year.



"There is a squad leaders' course where a squad leader can stand in front of a giant screen and actually run a squad through a particular scenario," Jones explained. Those scenarios range from combat patrol through the jungle to urban warfare and operations in the desert. "The computer picks up [the squad leader's] command, as if he were talking to a real squad, and the computer can cause the squad to do different things," he added. "When he is engaged by an enemy force, he can maneuver his squad, and they react on the screen. But you really get into the game, and it's all done in real time and is very realistic."

Ideally, said Jones, there should be a balance between simulation-based and live training. "I believe in simulation and live training both. I think simulation can do an awful lot for learning the basics. But there is nothing like getting out there and doing it in real life," he said. "Sometimes that is more expensive, if you are shooting a very expensive shell." Tank gunnery, for example, is "extremely dependent on good simulation.

"We also can improve our individual marksmanship via simulation, with the M-16 rifle, that will actually result in higher scores when they go out and do live fire," Jones said.

In addition to combat training, Jones wants to take advantage of Web-based

technology to allow more Marines to earn professional degrees online. "We are doing the same thing as the Army," said Jones. "I have told the Marine Corps that I expect resident courses and correspondence courses are to be considered by selection boards to be co-equal.

"We want Marines to get the education. How they do it is of secondary importance to me. And we are going to aggressively link all our off-campus to our on-campus courses," Jones asserted. "They'll be seamless."

The Army also has incorporated off-the-shelf video games into vehicle crew training systems.

A case in point is the use of the commercial tank simulation "Spearhead II" to train crews on artillery fire control, explained Jerry Speer, program manager at the Army's Simulation, Training and Instrumentation Command (STRICOM), in Orlando, Fla.

Spearhead, which can be purchased for about \$30, was co-developed by Zombie Virtual Reality Studios and Mäk Technologies Inc., based in Cambridge, Mass. It is a tank game featuring multi-player capabilities via the Internet and simulation of mobility and combat interactions.

The game is being used to "drive the operational software of the Army's FBCB2," said Speer. The FBCB2 is the Force XXI battle command prototype software that Army units at brigade and below levels use for command and control in a tactical network. The FBCB2 trainer incorporates the scenarios used in the Spearhead game, Speer explained. "You can use this system in a classroom, to train the digital skills that are perishable.

"The game is used to stimulate FBCB2," he said. Stimulate means, for example, sending messages that are used in the game on friendly and enemy position, to the operational FBCB2 software. "Then we display those forces that are in the game, within FBCB2. So you can see the enemy and friendly forces and communicate on their activities in the operational software. So the messages are stimulating FBCB2."

Even though Spearhead is a commercial tank game, he said, it's "a game that you can play and derive training benefits from, which is more attractive to Army soldiers than picking up a manual about what button to push to send which message. You can actually do it in a game environment."

The Spearhead-based system is being fielded as a prototype training device at Fort Hood, Texas, for the 4th Infantry Division, which is being equipped with the Army's more advanced digital networks.

"The feedback is positive," said Speer. "To be able to play a game and derive training from it is having the best of both worlds."

The Army's next-generation combat vehicle, called the FCS, will have some type of FBCB2 software, probably a more advanced version than the current

type of FBCB2 software, probably a more advanced version than the current one, noted Speer. Nevertheless, he said, "There will be a need to train when you are not inside the vehicle. So instead of starting the vehicle or bringing a vehicle out of the motor pool to train, you can do this in a classroom, day room, at home."

The "classroom of the future," he said, is tied to the Army's work in distance learning technologies for Web-based courses. The benefits for combat training would be significant. "How can I use the Internet to improve team performance before we are physically located together?" Speer asked rhetorically.

A partnership between STRICOM and the University of Southern California's Institute for Creative Technology is working to bring commercial video game and Hollywood-style special effects into the military training environment.

In addition to improvements in the visual systems, the Army wants more robust networks, more capable than the commercial Internet. A so-called "second-generation Internet" would be needed to make distance learning more effective, said Speer. "We are working on a series of initiatives to make the Internet more accessible, more powerful, deliver more readily accessible content," he said. "Search engines today are not specific enough. If, for example, you ask for information about 'chile,' you may get information about food and about the South American nation." A second-generation Internet, he said, "will allow you to make more powerful searches, towards more specific information."

Advances in this technology, said Speer, will be driven by the commercial market. "There are several technologies such as XML, (extensible mark up language), which will be an enabler of the second-generation Internet."

The use of video games in military trainers is a trend that began two or three years ago, and "it's come about because of the improvements in 3-D image generation power on the PC and the speed of the Internet," said Warren Katz, chief executive officer of Mäk Technologies Inc.

"PC-based video games have come so far in the quality of the imagery, that they rival multi-million dollar Defense Department simulators," Katz said in an interview.

Under a \$750,000 contract awarded by STRICOM, the company adapted the sequel to Spearhead, the Spearhead II, to stimulate the FBCB2 simulation that the Army developed, he explained. "We are going to see more and more of this during the next several years. This is going to become a big trend."

Spearhead originally was developed and sold commercially in 1998. The Army evaluated the game as a potential training tool and decided to make it HLA compliant, said Katz. HLA is the high-level architecture mandated by the Defense Department for all simulations. HLA is designed to make all

defense simulations interoperable. By making Spearhead HLA compliant, the video game could be linked to the Pentagon's terrain databases.

Katz cautioned that nobody should be fooled into thinking that adapting a video game—to fit in a military simulation—is a simple or inexpensive task. "Modifications are significant," he said. "Many people think you can take a video game out of a box and just use it for training or think the modifications are small. The modifications are fairly sophisticated. Making a video game HLA-compliant is no easy task."

Most games have splashy graphics and are fun to play, he noted, but "they don't [necessarily] exercise the training skills that you need." It still is financially a good deal for the Pentagon because it can benefit from the development work that commercial firms already have funded. The original investment by the Spearhead publisher, for example, was \$2 million. "If half of that winds up being useful to the Defense Department, that's a million dollars that the government doesn't have to pay for," Katz said. "It is worthwhile to take games off the shelf and adapt them. But it is a lot more difficult than people think."

Spearhead II will be used by the U.S. Army Armor School to train tank crews and commanders in tactical decision-making, said Katz. A commercial version will be available for sale as well. The game also will be used by the Army Mounted Maneuver Battle Lab for weapon experiments and tactical analysis.

Katz recently conducted a crude cost analysis of military simulators. "On one end of the spectrum, there are expensive dome-based simulators, with a motion-base and full wrap-around imagery," he said. Those simulators cost \$5,000 to \$10,000 an hour to operate—for each hour of "useful training time."

A PC-based game, using the Internet, costs 25 cents an hour, Katz said. "The cost argument is huge."

Because Spearhead II is HLA compliant, he said, not only can it work over the Internet, with players connected remotely, but it also can connect Spearhead II to other HLA-compliant simulations. The introduction of HLA into the video game industry, Katz added, "will offer interoperability between different games, something the video game industry has been struggling to achieve."

HLA enables each game to interact with new entities—such as soldiers or vehicles—from another game, he said. The technology used by Mäk to make simulations HLA-compatible is a piece of networking software called VR-Link.

The company is working on other military video-game projects, which it hopes to sell commercially. These include:

- MAGTF XXI—This video game was developed for the Marine

Amphibious Technology Directorate at Quantico. It is a real-time tactics game that has been adopted by the Marine Corps University to support its training program. A player takes the role as commander of a Marine Expeditionary Unit, controlling a brigade-level force of up to 2,000 Marines. Managing the deployment of assets and controlling maneuvers, the trainee has a 3-D view of the battlefield, which can be zoomed, panned and rotated. MAGTF means Marine Air Ground Task Force. It will be played over the Internet, in a distance learning environment.

- Battle Command 2010—Designed for the Army's Battle Command Battle Lab, at Fort Leavenworth, Kan., this game is a command tactics trainer for brigade level. It will be used at the Command and General Staff College, embedded in the courseware. BC2010 creates a simulation environment to evaluate the skills, knowledge and attributes of potential Army leaders. Trainees command their forces, communicating with other participants via an on-screen chat box or voice-over-net. They watch the battle unfold through 2-D and 3-D displays, modifying their original battle plan as needed.

BC2010 contains an after-action review component that allows instructors to comment on trainee performance. The simulation also permits after-action-reviews to be conducted over the Internet.

The company is about to start the development of Army Commander 2010, which is similar to Battle Command 2010, but tailored for the Army's Communications and Electronics Command. It is a division-level C3I commercial-grade video game for conducting what-if analysis of battlefield plans. AC2010 focuses on intelligence modeling, weather and logistics, to enable trainees to perform course-of-action analysis.

"The concept of distance learning over the Internet with embedded games is coming like an avalanche," he said. "I predict that, in four or five years, that is going to be the absolute norm for training throughout the entire Defense Department. Whereas the large expensive systems, such as dome flight simulators, are going to become less and less depended on for tactics, communications, strategy type training."

Mak partnered with Sonalysts, a Connecticut-based company, to adapt the Fleet Command video game for Navy distance learning courses.

The cost of transitioning legacy simulations to the HLA standard varies depending on the simulator, said Katz. The Defense Modeling and Simulation Office estimated the average cost of making a simulation HLA compliant is about \$50,000. Katz believes that is a "pretty reasonable amount." Some might cost more, he said, because some government programs prefer to not use commercial tool kits and write their HLA integration themselves. "That could cost from one to two million dollars."

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Even though the Pentagon mandated that all simulations be HLA compliant by October 2000, Katz predicted it will take two to three more years to achieve that goal. "It's happening slowly but surely."

Others in the simulation industry, meanwhile, are not sold on the virtues of video games.

"Video games are video games," said John Lenyo, vice president for business development at BAE Systems Flight Simulation and Training, in Tampa, Fla. "The reason you can do a game on a PC but you need a full-fledged simulator to do a simulator is the computer power isn't there, and there are shortcuts everywhere to make it fit on a PC. Huge shortcuts," he said in an interview.

Video games are about eye-hand coordination, he noted. "There are benefits, but they are not a replacement" for real simulators. A \$29 game "will never be like a \$29 million simulator," said Lenyo. "The reason it costs \$29 million is because it is much more sophisticated."