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Successful War Games Combine Both Civilian and Military Traits

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by Michael Peck

Commercial war-game designers can provide realistic and user-friendly simulations far more cheaply than the military's own multi-million-dollar systems, some experts argue. Yet, developers and operators of big-ticket simulation systems counter that off-the-shelf games lack the official testing and validation needed for accurate models.

This is more than a technical dispute. It is a clash of cultures.

On one side are nimble and innovative commercial game companies, whose simulations focus on intangible factors of warfare such as morale. On the other are the military's tried-and-tested simulation centers, whose models are thoroughly grounded in empirical and quantifiable measures of firepower.

Either way, commercial games are bound to play a greater role, officials said. "People in the Department of Defense will go to commercial designers and say, 'your game is almost what we want. Instead of paying millions to design it ourselves, maybe you can customize it for much less,'" predicts Col. Matt Caffrey, professor of war gaming at the Air Command and Staff College and a senior reservist in the Air Force Research Lab's Information Directorate in Rome, N.Y.

The Army used commercial game designers for America's Army, a first-person-shooter match that has become a successful recruiting tool. But the adoption of civilian war games by the Army has been unofficial and haphazard, as usage varies with instructors' whims and pinched training school budgets.

"A lot of what has been done has come from end-of-year money, when people find they have a little extra and are willing to try something speculative," said Doug Whatley, CEO of Breakaway Games, a Hunt Valley, Md.-based game developer that has turned out commercial war games, such as Austerlitz and Waterloo.

Commercial war games bear a striking resemblance to the military's own strategy simulations. Aimed at demanding hobbyists with expertise in military history, they allow players to command tank platoons, relive campaigns such as Waterloo and Guadalcanal, or even change the outcome of World War II. Heavily researched and extremely cerebral, these games often are laded with rules for morale, fatigue, logistics, command and control, and other factors.

It is precisely this kind of strategy games that the military needs, argued Caffrey. "We have majors here who are going to be squadron commanders and staff officers," he said. "At that level, you're not worried about stick-and-rudder. You're worried about coming up with the phases of campaigns and orchestrating airpower within a joint campaign plan."

Proponents say that surviving in the Darwinian consumer game market has given commercial designers several advantages over simulations produced by the military and large defense contractors. For one, they are definitely cheaper. Designer John Tiller said he spent about eight months and less than \$100,000 to design the first of his Panzer Campaign series of operational-level war games, which retail for about \$50. The Defense Department's JWARS (Joint Warfare System) theater-level model, developed by CACI and AT&T, already has cost \$30 million to \$60 million.

Commercial games also are produced much more quickly. While funding for JWARS began seven years ago, the Entropy-Based Warfare (EBW) model, developed for the Defense Department by Booz Allen Hamilton and Breakaway Games, went from board game to fielded computer simulation in four years.

"There is interest in commercial games, because the senior military guys are saying, 'I can't wait two years [for in-house simulations]," said Booz Allen principal Mark Herman, a war game designer who created EBW. "There is a

perception that 'if I can go to a CompUSA and get a game that I can get some insights and answers out of, why can't we do that?'"

Armor School

Many say user-friendliness and accessibility is where commercial games have their real edge. One example is TacOps, a Windows-based, platoon-level game capable of running on antiquated 300-Megahertz PCs. Designed by a retired Marine major, I.L. Holdridge, TacOps has been modified into a training tool used by the Marines, the Canadian and New Zealand militaries, the Army's Command and General Staff College and the Armor School at Fort Knox, Ky.

The Army's Training and Doctrine Command (TRADOC) has never sanctioned TacOps. The 16th Cavalry at Fort Knox obtained a license of TacOpsCav—a militarized version of the commercial game—for free, and unlimited distribution for military training purposes.

"I can teach someone to be user-capable with TacOps in a half-hour. It takes them a day to become a talented user, and they like the game so much that they take it home," said Maj. Michael Muller, a Marine Corps armor officer who is currently an instructor at the Armor Captain's Career Course at Fort Knox.

Muller contrasted the TacOps learning process with the three days of JANUS training for Armor School students.

Designed 30 years ago to model nuclear effects, the ubiquitous JANUS has been upgraded steadily into the Army's primary ground combat game.

Muller said that instead of waiting weeks for the base simulation center to schedule and design a JANUS scenario, he can use TacOpsCAV to construct an exercise for six students in a matter of minutes. "Maybe you're illustrating a point, and it's not driving home. So you stop for 10 minutes and create a TacOps scenario. Then, you have them fight it out. You can run a small scenario with a dozen guys and five or six computers, and do a company-level scenario in less than two hours."

Designed to be used by multiple computers linked to a host PC, and including features such as thermal sights and unit doctrine, TacOps is realistic enough to be a legitimate training tool, Muller said. "It's ultimately not as realistic as JANUS, but what does it cost to run TacOps? Nothing."

JANUS requires \$2 million per year for maintenance, upgrades and the salaries of the operators at base simulation centers, according to the National Simulation Center at Fort Leavenworth, Kan.

Yet, simply looking at price tags is misleading, say defenders of the big, traditional military simulations. "One of the reasons it costs so much money and time to build a JWARS is that you are using validated algorithms with real world data and weapons," said a government manager familiar with the program.

"There has been lots of research done to verify that these complicated algorithms fully represent the way our systems operate," he said. "Let's say one battalion attacks another. Our algorithms and real-world experience might suggest that the attacker has a 90 percent chance of destroying a particular system. Commercial games might use a much simpler algorithm that concludes there is a 60 percent chance of a kill."

"If the purpose of these games is pleasure, that's great," the manager continued. "But if you're using a model to make billion-dollar force assessment decisions, you want to make sure the algorithms are right. Because there is a big difference between a 60 percent and a 90 percent probability of something happening."

More Realistic

One issue that rubs the nerves of commercial and military designers alike is the question of who creates the most accurate simulations. Critics accuse JANUS, BBS [Battalion/Brigade Simulation] and their ilk of being firepower-fetish attrition models that award victory to whoever has the biggest guns, rather than giving equal weight to soft factors such as morale, fatigue and cohesion. Such considerations have long been featured in commercial computer and paper war games.

Booz Allen's EBW, currently in evaluation by the Joint Chief of Staff, was expressly designed to replace the conventional attrition model with a theater-level system reflecting the chaos and disorder of battle. EBW units crumble as their cohesion erodes under stress, fatigue and psychological warfare. The outcomes of historical battles were determined by these factors, says Herman. "Without them, you cannot explain why Napoleon lost the battle of Waterloo."

Indeed, the Center of Army Analysis found that fewer than 20 percent of battles can be explained by attrition theory, said Booz Allen manager Mark Jacobsohn. EBW's soft factors are partly based on intensive research of historical conflicts.

But defenders of traditional simulations argue that soft factors are simply too unreliable for military simulations. Why, for example, should one brigade be arbitrarily assigned a morale level of 4 on a scale of 1 to 10, while another brigade is rated an 8?

That is why JANUS has no morale rules, said Capt. James White, a National Simulation Center validator. "JANUS soldiers are perfect soldiers." Yet, White believes it too risky to include features neither quantifiable nor able to pass the rigorous software validation process. "Their goal is to make entertaining games. Our goal is to make accurate ones."

Thus, the NSC neither recommends nor discourages use of commercial games, though the issue is being discussed at higher levels, according to White. In the meantime, he estimated that creating simulations with validated soft factors "might be a generation away."

TacOps designer Holdridge sharply dismisses the notion that commercial and military-designed simulations are competing against each other. "TacOps isn't replacing anything. It is a limited fidelity, low-end, poor man's CPX [Command Post Exercise] event generator. A unit should properly prepare itself by trooping down to a base simulation center and working with JANUS or whatever the current multi-million-dollar sim is."

Some optimists foresee a middle ground where the military has an array of commercial and in-house games to choose from. Jacobsohn suggests commercial games can point the way for big military simulations. For example, a commercial game used to plan a theater-level air campaign might discover that hostile antiaircraft weapons will be a major impediment. Military simulations—whose algorithms and databases contain classified details of U.S. and hostile equipment—can determine specific routes for aircraft to avoid those weapons.

Caffrey, the Air Force colonel, sees off-the-shelf commercial games routinely used for professional development, as commanders recommend them just as they would recommend certain textbooks. Militarized commercial games, with added realism, will be part of the standard equipment at professional military schools. And when highly accurate models are needed for force assessment and budgeting, then large contractor-designed simulations like JWARS will come into play. Even for the large games, "users may not know that 20 percent of the model's code was originally written for a commercial war game," Caffrey added.

Commercial Designers

Caffrey brought together commercial game designers and military simulation experts at a conference last July in Rome, N.Y. Officers in starched uniforms and game designers in Hawaiian shirts and ponytails are not a natural match. But it is obvious that these designers are seeking a piece of the military market.

The problem for commercial designers is that their war games emphasize brainpower and analytical thinking, instead of eye candy and eye-hand coordination. With today's short attention spans, this is a guaranteed method for not selling products. Thus, designers welcome opportunities to obtain stable and relatively lucrative government contracts. It is also a chance to take a break from hobbyists whose passion for historical accuracy frequently veers into obsession in Internet chat rooms ("This game stinks! It says the 1st Infantry Division used the M-1234A at Normandy! Every idiot knows it was the M-1234B!").

Tiller and Holdridge represent one end of the commercial designer community—lone creators who basically operate out of their homes. The Air Force's Office of Scientific Research recently awarded a \$100,000 Small Business Technology Transfer Program (STTR) grant to Tiller, whose battalion-level Panzer Campaign series uses a common game engine to recreate a dozen campaigns from Normandy and Kursk to the 1967 Six-Day War.

The Air Force wants him to refine the artificial intelligence in these games, and then use that knowledge to enhance the AI in other computer war games.

"My approach is to take a game engine and develop it into a series on various historical periods," said Tiller, who is also demonstrating his campaign-level Modern Air Power game to the Air Force. "I could use Modern Air Power as a game to cover anything from North Vietnam to Iraq."

Tiller predicts defense dollars will attract commercial designers. "With the low overhead of commercial war gaming, even SSTRs and SBIRs [Small Business Innovative Research Program] are very attractive to developers," he said. "You won't attract a Microsoft with that amount of money, but you can certainly attract a commercial designer."

"When I sell a commercial game, I can sell it for \$40 and get a certain payback. SBIR is more sustained funding. I can count on that \$100,000 for nine months, and it justifies more sustained effort developing a war game's AI."

At the other end of the development community are relatively large and successful commercial developers like Breakaway Games, whose staff of 50 includes several veteran designers. The company designs and codes games that are then marketed by publishers. Its latest empire-builder, "Emperor: Rise of the Middle Kingdom," has so far sold 300,000 copies at \$40 each.

With computer game publishers typically giving developers like Breakaway a royalty of 20 percent on every game dollar, potential profits are greater than those for government simulations, according to Whatley. But higher profits inevitably generate higher risks.

Fickle consumers may shun a game that cost publishers and designers millions of dollars in development costs.

Breakaway Games is working on a variety of government projects for clients ranging from the Special Operations Command and various intelligence agencies to the Department of Justice. Whatley expects that of the company's estimated \$6 million in revenue this year, half will come from government contracts. The Entropy-Based Warfare project alone has garnered it \$4 million to \$5 million over the past six years.

However, commercial designers will not have an easy time breaking into the defense market, warns Booz Allen's Herman. "They have absolutely no idea how arcane federal acquisitions are. They think it's just, 'hand me the money, and I'll do the work.'"

Whatley agrees with Herman that commercial designers should team up with a larger contractor, as Breakaway has done with its government projects. "So much of contracting with the Defense Department is knowing the right person to present the idea to," Whatley said. "Even after five years, we still don't feel totally comfortable that we are the best sales force for our own ideas."

For a traditional government contractor such as Booz Allen, using Breakaway to develop EBW was cheaper, quicker and more effective, Herman said. "Commercial designers are not prejudiced by the current system. They can approach it as historians rather than career officers, game designers rather than physicists."

Whatley said creating games for consumers keeps his developers fresh. "It's the commercial side that pushes the envelope. It's the creative spark that generates a lot of the advancement. That's why our code is as cutting-edge as you can get."

Herman sees commercial games gaining clout in certain roles. "If you want operational code for a weapons system, you wouldn't use commercial game designers. They have a very rapid build process, and it's often a little shoddier. But if it's for things that don't get anyone killed, you can get a product that is much cheaper and frequently better."