

## CES 2005

# CES brings new things to light

Gadgets get tiny, TVs get big

By Kathleen Maher

The running dialog the technology industry carries on between its various factions, including consumer electronics, home theater, automotive, home automation, photography, and PCs, gets really loud at the start of every new year when CES, the consumer electronics trade show, comes to Las Vegas. The level of discussion has also changed over the years—there is less bickering and considerably more meetings, and new industry organizations pop up to meet every situation.

In fact, the Consumer Electronics Association itself is one of those organizations founded originally to support U.S. companies. It has expanded its role to involve itself in regulatory issues that may impact the fortunes of its members. At issue this year and every year for at least the last five years is digital rights management.

As all content becomes digital there are more options for capturing, enjoying, and sharing it. This last capabil-

ity has been giving content providers the heebie jeebies ever since Gutenberg invented the printing press or god invented the monk, for that matter. At the same time, the ability to copy and distribute information has sparked the imaginations of creators to drive human progress on from printing to radio, TV, movies, and 3D Imax magic. At CES it's clear that that progress is going to continue over and around barriers.

## Consumer rights

Digital Technology, and specifically DRM, has also given content providers the ability to turn back the clock and make all digital content difficult to share if they want to. The industry has already tried several ill-advised approaches to content protection, including the original DivX format supported by Circuit City and a bunch of Hollywood lawyers, copy-protected Audio CDs, disposable DVD technology from Convex

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Group of Atlanta, and now the broadcast flag. On the other hand, the content providers have prospered as a result of content protection approaches—including scrambling technologies for satellite content and copy protection for DVD. Sure, protections can be broken, but the industry seems to make enough money from those willing to pay up that it settles down from time to time.

Actually, the content providers are already showing signs of settling down

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## MACWORLD SAN FRANCISCO

Photo: Jon Peddie Research



**iPOD NATION**—The crowds file out of Steve Jobs's keynote ready to buy new Mac minis and iPod Shuffles. See Macworld San Francisco coverage, page 23.

## I/ITSEC

# Serious simulation in Orlando

By Ben Delaney

According to its sponsors, the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC) "promotes cooperation among the Armed Services, Industry, Academia, and various Government agencies in pursuit of improved training and education programs, identification of common training issues, and development of multiservice programs."

What this means in ordinary language is that the U.S. military services are using training simulation in a very big way, and they want the motley simulators to work well, work reliably, and to be interoperable among vendors

and services.

The conference was held this year, as it has been every year for the past decade, in Orlando, Florida, home of Mickey Mouse and every conceivable T-shirt shop and franchise food joint in the known universe. Aside from the setting and the awkward timing—usually the week after Thanksgiving—this conference is very well planned and operated. The show has grown out of the hotel ballroom it started in and has grown to over 400 exhibitors and a quarter of the gigantic Orange County Convention Center. Nearly 16,000 people attended this year, up from 15,000 last year, including 1,792 from 44 countries other

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### SIMULATION

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than the U.S.

The four days that the exhibit hall is open are barely enough to see everything. Many of the exhibits are large and complex examples of multi-service, multi-modal simulators—one does not rush through the IITSEC hall.

Like most of the simulation business, military sims are in an evolving rather than revolutionary phase. We are seeing faster, cheaper computers, what the military calls COTS (Common, Off The Shelf) hardware, being spec'ed and applied in every application. In fact, the big-iron vendors—SGI, E&S, IBM, Unisys, and their ilk—were for the most part either showing small COTS systems or were absent. SGI did unveil some big new servers and graphics systems (more on this later). E&S showed its year-old EPX system, which still looks good, and provided a photo-realistic simulation with 3-inch resolution, up to 250-mile visibility, and great detail in 3D features, but it seemed a bit out of place among the plethora of PC-based systems on the floor. Of course, SGI and E&S are offering COTS solutions themselves, so they are far from out of the game.

### On the floor

In no particular order, let me tell you about some of the more interesting products and companies I visited in the exhibit hall.

#### New from Christie

Christie Digital Systems showed some of their newest displays and control systems. One of the nicer projectors on the floor was their Matrix 3000, a single DLP, dual-lamp system with an impressive 3000 lumens of brightness and a contrast ratio of 4000:1. It provides 1400 x 1050 resolution and weighs just 36 pounds. Christie showed this system in a dual-projector setup, and the display, which was about 8 feet square, was gorgeous, despite a slight edge-blending problem that they said was due to a lack of setup time. The small size (about 15 x 20 x 10 inches) and light weight make this system easier to move and simpler to install, either suspended or on a platform. And since the system can be used with just one of the lamps lit (at half the brightness), it

provides a fail-safe mode in case of lamp failure.

Christie was also showing its surveillance command center concept, based on a Netmaster FRC5100 controller, which can accept multiple inputs and control up to 32 tiled displays. The system includes network, video and computer inputs, and hot-swappable components to maximize up-time. The system is intended for emergency management, broadcast control rooms, and situational awareness applications, and was driving three stackable 50-inch cube displays to provide a 3840 x 1024 display with multiple windows showing live video and data simultaneously.

Also interesting in Christie's booth was their Network Management Console. Many Christie projectors are coming equipped with an Ethernet connection, and when they are placed on a network the master control station can monitor and oversee a large installation. As more projection systems are coming online, and as the applications running on them become more critical, this sort of system fills the need for centralized control. The graphic interface lets the operator see each system on the network and ascertain its status visually. Burned-out lamps or off-line status is visible, as well as a wealth of other information. The photo in Figure 1 shows the Management Console as it was used to monitor the systems in the Christie booth at IITSEC.

Finally, Dave Flugeman has joined the company to head a new Immersive Solutions Group. Dave spent quite a while at E&S, but moved to Christie in the past year as E&S has contracted. He and Scott Richardson, recently of SGI, will be working to ensure that Christie's systems are getting their share of the immersive simulation market. Dave told me that Christie has the most complete product line for these applications, and he seemed quite happy with this new job, which consists largely of facing down Barco and the other display heavyweights.

#### The sandbox goes digital

One of the most fascinating devices on the IITSEC floor was the XenoVision Mark III Dynamic Sand Table developed by the Maryland company Xenotran. Designed to replace the tables filled with actual sand used by the

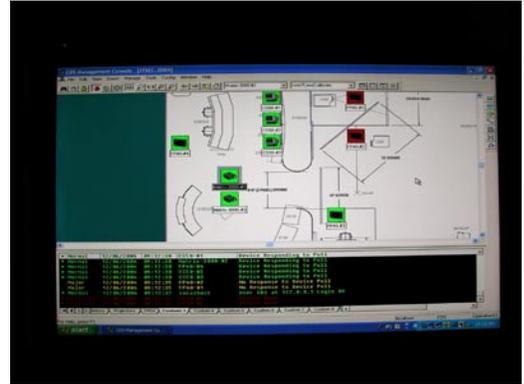


FIGURE 1. Christie's Management Console provides an overview and stats on the complex installation in their booth at IITSEC.

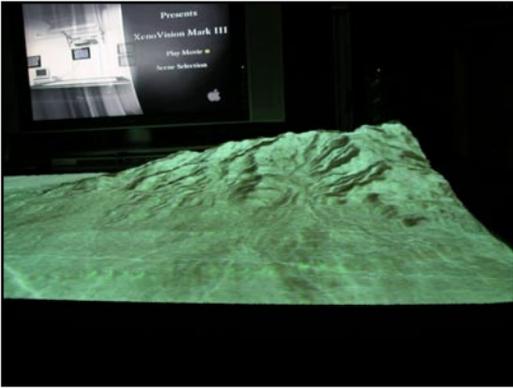
(Photo: Ben Delaney, CyberEdge Information Services)

military to visualize battlefields, this system dispenses with the sand and replaces it with 7,000 aluminum rods, an air compressor, a sheet of rubber, and a projector. (See photos, next page.) The rods are arrayed on end with an actuator, operated by compressed air, at the base of each one. They are covered by a rubber sheet, which is pulled snugly down on them by a vacuum pump. Above the table are a projector and mirror system that project a terrain image onto the surface. The result is a 3 x 4-foot table capable of modeling terrain with a 6-inch height variation. Since the graphics, which can be thought of as a huge texture map, are projected from any video source, they can contain live imagery, such as moving vehicles. The display is full color, and the graphics hide the coarseness (since the rods are about  $3/8$  inch in diameter) of the actual physical model. The model takes 2 to 4 minutes for a complete change.

The 3D model is created with two inputs: an elevation file, which is used to configure the terrain, and an image file, which is projected on the surface. Xenotran developed a projection system that provides image correction software to modify 2D images for proper display onto the 3D surfaces. The XenoVision Mark III is controlled by a PC and can be accessed locally, across a Local Area Network, or via an Internet connection. The system shown at IITSEC was a prototype, funded by an Army Corps of Engineers SBIR grant in June 2001 to the tune of around \$200,000. The system will retail for under \$100,000.

Xenotran was one of several companies exhibiting with Anteon, which was demonstrating a mixed input train-

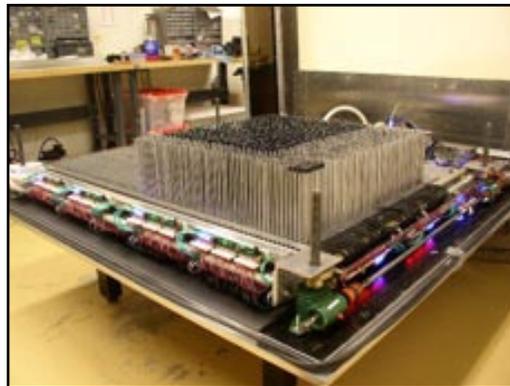
## SIMULATION



**FIGURE 2.** The Dynamic Sand Box from Xenotran, shown here from the side to reveal the actual elevation of the model, was one of the most wiz-bang devices at I/ITSEC. (Photo: Ben Delaney, CyberEdge Information Services)

ing and control scenario. In the Anteon booth one found, in addition to the digital sandbox:

- Atlantis Cyberspace, showing their networked virtual training system, which in this incarnation consisted of four stand-up game pods in a container that were networked to each other for use in dismantled infantry training, and coordinated with ...
- Anteon's MOUT (Military Operations on Urban Terrain, a major catchphrase at this year's meeting) trainer, which consists of a couple of stacked containers that internally replicate a rather shoddy apartment, in which killing people at home may be practiced, and which also is filled with video cameras that relay the internal goings-on to a control center, and ...



**FIGURE 3.** Here's the Dynamic Sandbox with the skin removed. Looks simple enough. (Photo: Xenotran)

ture of sim-based training, especially for urban combat. The system combined, in Anteon's phraseology, "live, virtual, and constructive simulation" to provide a more complete experience to the trainees, and to provide better control, evaluation, and after-action briefing capabilities to the trainers.

## Fighting in the streets

If there was one common theme at I/ITSEC 04 it was Urban Combat. Not surprising, given the situation in Iraq, U.S. military planners are doing their best to determine effective strategies to use against urban guerrillas, and are also desperate to train our troops in recognition, avoidance, and countermeasures for urban warfare, especially IEDs (Improvised Explosive Devices) and attacks on convoys.

Like Anteon, most of the major defense contractors and subs were eagerly showing their version of urban warfare training. It seemed that every booth was showing a convoy passing through the dangerous urban canyons of replica Mosuls, Baghdads, and Falujahs. Many of these sims were pretty good, a few were ludicrous, and several seemed actually useful. BBN (formerly Bolt, Berenak, Newman), developers of SimNet, one of the first useful computer graphics military simulators, shared a booth with a nine collaborators, showing a system called DARWARS (which doesn't seem to stand for anything, but can be understood as DARPA WARfighting trainer). The DARWARS website ([www.darwars.com](http://www.darwars.com)).



**FIGURE 4.** Here we see some typical soldiers waiting anxiously for their urban assault to begin on the Anteon MOUT simulator. We also see a squad of infantry using the Atlantis Cyberspace training system, also in the Anteon booth. Finally, the C2 display center shows how Anteon's technology can fuse data from a variety of sources into a meaningful command center display. (Photos: Ben Delaney, CyberEdge Information Services)

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[darwars.net](http://darwars.net)) defines the program like this:

“DARWARS is a DARPA-funded research project to accelerate the development and deployment of the next generation of training systems. These low-cost, mobile, web-centric, simulation-based systems will take advantage of the ubiquitous presence of the PC and of new technology, including multi-player games, virtual worlds, off-the-shelf PC simulations, intelligent agents, and on-line communities.”

DARWARS is designed to train at several levels: individuals, teams, and teams of teams, with what is termed “experiential training”—immersive simulation that is largely platform independent and uses COTS hardware and PC gaming techniques to bring the training to the theater and provides networkable strategic and tactical training among individuals and groups in geographically diverse locations.

BBN developed the DARWARS core, and two applications built on it: DARWARS Ambush and DARWARS Joust. Bruce Roberts, BBN’s PI on the project, explained to me that the primary objective of DARPA for the DARWARS project is to be able to deliver training wherever and whenever it is needed, by way of a web browser. He worked closely with DARPA’s program manager, Ralph Chatham, to create a system that will provide deployed training to our troops, and that can provide rapid updates whenever new curricula are added.

DARWARS is based on a set of open APIs that enable instructional materials developers to create scenarios and deliver them to low-cost systems with hardware independence. The system is deployed now, and the Ambush application currently offers around 20 scenarios that are intended to help ground troops in convoy learn to better avoid and manage potential ambush situation in urban and rural settings.

### Embedded training

Quantum3D was showing some good stuff in their booth. Their latest



FIGURE 5. BBN and DARPA set up a training “tent” just off the show floor where they demonstrated DARWARS. (Photo: Ben Delaney, CyberEdge Information Services)



FIGURE 6. Here is a typical DARWARS training system—a COTS laptop running Ambush in a browser. (Photo: Ben Delaney, CyberEdge Information Services)

IG, the Independence 2500, was being demonstrated with a naval simulation showing a large ship at sea in rolling waves. The I-2500 is optimized to provide 60 Hz (as well as 30 and 120 Hz) QXGA resolution (2048 x 1536) from each of its stack of subchannel renderers (SRs), and provides a modular architecture supporting many SRs, compositors, storage systems, and sensor modules in 35U or 12U racks. VP of marketing Joan Wood told me that while the largest system Quantum3D has assembled to date included 32 SRs, she sees no limit to how big an I-2500 IG could get. The system supports up to eight rendering units per channel, and can also provide high dynamic range channels.

Quantum also was demonstrating their 16-bit sensor simulation system, which provides highly realistic portrayals of data from radar, night-vision goggles, and, as I saw at the show, forward-looking infrared (FLIR). This system provided very good-looking imagery, and is available as an add-in for the Independence 2500 system.

But that’s not what I want to talk about. Quantum3D was also showing Thermite, their wearable, battery-powered computer that includes Nvidia GeForce Go 5200 graphics, a 1-GHz Transmeta Caruso CPU with up to 512 MBytes of RAM, shock-resistant hard disk (in various sizes), video in and out, Ethernet, Bluetooth, PCMCIA, USB, and an external, standard military-issue battery pack that provides 4 to 8 hours of use. The whole package, excluding batteries, weighs just over 1 kilo.

There is a pressing need for Thermite, a mil-spec system that costs around \$10,000. It is able to provide embedded training, a hot item in the DoD these days. The concept is that troops train wherever they are, with the actual equipment that they use for their daily tasks. The control systems of up-and-coming military equipment and vehicles will be designed not just to monitor and control the weapon system or vehicle, but also to provide training on the system during down time. That’s technically pretty simple when you’re talking about a tank or armored personnel carrier where another few pounds of computer doesn’t much matter. But training dismantled troops with embedded systems means building computers, communications, sensors, and displays that a soldier can wear while doing what soldiers do—running, falling, shooting, ducking, and working with the members of their squads.

In order to accomplish this, Quantum3D worked with the U.S. Army Research Development and Engineering Command (RDECOM) to create the DAGGERS training system. The full system consists of a Thermite computer and batteries, all worn on the soldier’s vest and belt, motion trackers embedded in the flak jacket, and a helmet-mounted display. The plan is to outfit entire squads with these systems, and

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let them train in simulated environments that are correlated for all participants. This has been a dream of VR training designers for years, and now it appears about to be realized. According to Quantum3D's literature on the system, with DAGGERS, "Squads will be able to plan missions via the stealth interface, rehearse their course of action prior to the actual training exercise, conduct virtual training exercises while engaging intelligent computer generated forces, and perform an After Action Review (AAR) complete with unit scoring and performance assessments."

If it works as advertised, DAGGERS will provide the type of simulation for dismounted infantry that pilots have had for years. However, the task is considerably more daunting, as large-area tracking, correlation of the virtual and real worlds, providing updated and accurate scenes and situations to all participants, and many other issues make this a significant challenge. I am looking forward to an update after system testing progresses.

### Briefly noted

Multigen showed updated versions of Creator and Vega Prime. The Creator improvements focus on ease of use and the new wizards they have created to automatically build roofs, billboards, trees, and even bridges; these wizards seemed to be very efficient. They also have created what they call "intelligent primitives" that make modeling faster and easier. The new version of Vega Prime is claimed to be 15% to 40% faster at runtime, with improvements in memory usage and database paging. Vega Prime also includes new controls for weather, including volumetric clouds, precipitation, lightning, and shadows. Multigen told me that FY '03 improved over '02 by 35% and that '04 was showing another 15% improvement in revenue on top of that.

SGI was in good form at IITSEC, showing their new Prism IG and talking about how good their government business is. Prism is the successor to Infinite Reality, running Linux as its native OS with an entry price of less than \$30,000. They also demo'd Performer running on Linux. For the second year at IITSEC, SGI emphasized that it is now far more than a graphics company—40% of its business is with the government, and most of that is servers and large storage systems.



**FIGURE 7.** Samuel Grimes tries on the DAGGERS outfit with the assistance of Quantum3D's Arnold Estep. The box in front of them contains the tracking system. The gun, as well as the soldier's head and body, are all tracked. The Thermite computer and battery pack are hung on the back of the vest. (Photo: Ben Delaney, CyberEdge Information Services)

### Finally

If you are interested in VizSim you used to have to go to Siggraph for a fix every summer. But the new reality is that much of the most exciting work in the field, which has always had education and training as a primary mission, is happening in military circles. IITSEC is the show to see the most of this technology in one place. It has grown larger than Siggraph, and for my money is now the best VizSim show in the world. And there is another benefit: no matter how you feel about our political reasons for using our military, when you go to a conference like this and talk to the men and women who are doing the tough work, and the people who support them, you cannot help but be impressed by their dedication, honor, and honesty. I have learned a lot



**FIGURE 8.** Here's the Thermite system from the back. The batteries are in the pouch and the computer is mounted below them. (Photo: Ben Delaney, CyberEdge Information Services)

at IITSEC, and look forward to continuing my matriculation. And if you want to see some of the best simulation applications for training, you should be there, too. ▲

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