

The U.S. Army's PEO-STRI is home to the Engagement Skills Trainer (EST) 2000, which enables soldiers to go through marksmanship training, along with gunnery and tactical instruction.



TRAINING DAY

CENTRAL FLORIDA REAPS ECONOMIC STIMULATION THROUGH SIMULATION

By Justin Campfield



COURTESY U.S. ARMY/DOUG SCHAUB (2)

» It is another hot and dusty day on the streets of Baghdad as a U.S. Army Humvee noisily travels down a desolate, two-lane road. Troops patrol block after block; a monotonous routine that, even for the most astute soldiers, dulls awareness of being in one of the world's most dangerous places. Passing innumerable locals dressed in traditional clothing and a smattering of stray dogs, the patrol dutifully logs the required number of hours before it can head toward base camp later that afternoon.

Just as the single-vehicle patrol makes a right turn near the town center square, a loud blast violently pitches the Humvee into a roll. Inside, the crew quickly reacts, pulling the gunner back into the vehicle just in time to avoid a certainly fatal result. As the Humvee continues to roll, the soldiers attempt to limit their injuries by bracing themselves against all available surfaces.

As the damaged Humvee comes to rest on its roof, the stunned soldiers scramble through the smoke to locate an exit, finding one after the other blocked by mangled steel.

After what seems an eternity, a soldier screams "right rear door open!" With military precision, the soldiers begin to exit the Humvee, some forming a security perimeter while others extract crew mates still inside. Prepared for the potential of incoming fire, the shaken soldiers are thankful to find none. With the situation secure, they begin to assess injuries and administer first aid.

Suddenly a voice cries out over the intercom: "Okay team, let's review your actions."

In an instant the soldiers are transported from deadly Baghdad environs to an air-conditioned, stateside building housing one of the U.S. military's most advanced simulation trainers — the Humvee Egress Assistance Trainer, or HEAT.

Played out hundreds of times each day at bases across the globe, scenes like these represent the rapidly-changing and technically-advanced methods that the U.S. military use to train soldiers for deployment into the world's hot spots.

While the urgent need for this new way of training can be traced to the conflicts in Iraq and Afghanistan, much of the brain power creating these training scenarios can be found in Orlando, home to the world's largest modeling, simulation and training (MS&T) cluster.

MS&T uses specialized interactive technology to realistically simulate situations that are either too dangerous, costly or impractical to practice in real life. MS&T is used to train a wide array of professionals, including emergency responders, commercial pilots and even athletes. In Orlando, the bulk of the MS&T industry is focused on military applications, such as the Army's HEAT, an advanced simulation designed to train soldiers how to survive and safely exit vehicle rollovers.

Largely centered on the east side of town, far from the region's famous resorts and attractions, Orlando's Department



The Virtual Combat Convoy Trainer (VCCT) hones basic combat skills that patrols and convoys frequently encounter, including improvised explosive devices, small-arms fire and ambushes.



Practicing on a patient simulator, soldiers learn to perform a tracheal intubation for a casualty with a blocked airway. This training is part of PEO-STRI's medical simulation program.

COURTESY U.S. ARMY/DOUG SCHAUER

Center for Simulation. "Team Orlando military contracts are now up to about \$4 billion per year and we've estimated that about 40 percent of those contract dollars stay here in Central Florida."

MILITARY MATTERS

To determine the reason behind Orlando's prominence in MS&T, one need look no further than its enviable position as the home to two major Department of Defense simulation commands — the Army's Program Executive Office for Simulation, Training and Instrumentation (PEO-STRI) and the Naval Air Warfare Center Training Systems Division (NAWCTSD). Located in the Central Florida Research Park — which is adjacent to the University of Central Florida, the sixth largest university in the nation — both commands serve as the nerve center, and biggest customers, of Orlando's MS&T industry.

With an annual budget exceeding \$3 billion, PEO-STRI is the Army's center of excellence for modeling and simulation. Tasked with developing, acquiring, fielding and sustaining advanced training systems — it has more than 335,000 currently in the operation — its almost 1,000 military, civilian and in-house contractors shoulder the responsibility of training nearly every soldier before he or she deploys to Iraq or Afghanistan.

Safely situated half a world away from those conflict zones, Orlando may seem like an unlikely place for such a crucial component of the Army's combat readiness to be located. However, the efficiencies gained by being part of this region's MS&T cluster, and thus close to many of the companies with which it

of Defense commands and surrounding MS&T industry — often referred to by members as Team Orlando — goes mostly unnoticed by residents and tourists alike. But with more than 100 companies and an employee base of approximately 17,000, the defense-related MS&T industry is a major economic player in Central Florida.

And these numbers are growing. Currently the Orlando-based National Center for Simulation is partnering with the Metro Orlando Economic Development Commission (EDC), Florida High Tech Corridor Council, Enterprise Florida and the University of Central Florida (UCF) on a new economic impact study that is expected to show significant growth over its 2003 report. That study put the indus-

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try's local contribution at over \$2.5 billion in gross regional product and \$1.3 billion in direct and indirect sales.

"The numbers today should be higher, given continued growth of defense contracting in modeling and simulation in recent years," says Russ Hauck, executive director of the National

contracts, make it easier for PEO-STRI to quickly meet training needs identified on the battlefield.

"Our Orlando location allows us to team with the primary simulation and training solution providers from the other military services, industry and academia," says Peter Marion, PEO-STRI cus-

tomer support executive. "If we had set out to create the best possible environment to support our mission, we couldn't design anything better than what Orlando already provides."

Those efficiencies have played a central role in PEO-STRI's development of training systems that quickly adapt to the ever-changing and non-traditional tactics employed by enemies.

"The demands of our user commu-

"Specialized requirements" is the best way to describe an Orlando-born project that is one of NAWCTSD's signature innovations and the world's largest military simulator.

nity require that we get products out the door and into their hands in a matter of months, not years, as we have done in the past," says Marion. "The proximity of having all critical elements of the acquisition system in close communications allows us to dramatically shorten our development and production times."

One such example was a request from soldiers for a device that they could use to communicate with Iraqi civilians during the course of their daily activities.

"We sought innovative ideas on something that is commercially available, lightweight and easy-to-use that we could quickly place in the hands of soldiers," says Marion. "The result was installing a software program on an iPod that allows soldiers to select the phrase or instruction they want to communicate from a menu of options. The speaker on the iPod then plays the appropriate phase in Arabic to the Iraqi citizen. All this was done in less than 90 days from receipt of requirement to delivery of the first iPod."

PEO-STRI's research park neighbor, and Orlando's other major military command, NAWCTSD, also finds Orlando to be a good place to do business.

Based in Central Florida since the 1960s and situated in its current location since 1988, NAWCTSD increased its local contingent this year by establishing the Virtual Technology Development and Operations Center. The center, funded in part with a \$300,000 grant from Enterprise Florida, the state's economic development arm, will support a

variety of existing and projected programs, including large-scale, distributed-mission training exercises and the development and evaluation of training simulation technologies. The classified lab was constructed inside NAWCTSD's existing headquarters in the research park.

"The facility not only enhances our ability to develop and test emerging simulation technologies," says Phil Howell,

public affairs director for the Navy center, "but also allows us to integrate those technologies with the real-time training operations of widely-dispersed Joint Service military organizations."

The new center will add to a command that already features approximately 1,000 engineers, scientists and support personnel working on training systems development for a wide spectrum of military programs, including aircraft, surface ships, submarines, and specialized requirements.

And "specialized requirements" is the best way to describe an Orlando-born project that is one of NAWCTSD's signature innovations and the world's largest military simulator.

Seeking to prepare recruits for the potential perils they face at sea, the Navy

UCF ADDS SUPERCOMPUTER TO ITS SIMULATION STRENGTHS

If you think battlefield management is complex, try battlefield simulation. The computing power needed to authentically simulate soldiers, tanks, planes and military command structures isn't exactly found at the local computer store.

Thanks to U.S. Army grants totaling \$2.6 million, the University of Central Florida is the proud owner of an IBM-designed supercomputer strong enough to calculate more than a billion income tax returns in one second. Of course, the university has more productive ideas for the supercomputer, as it expects it to drastically increase the Institute for Simulation and Training's (IST) ability to conduct large-scale, virtual combat training scenarios.

In addition to the benefits that the supercomputer will provide to the university's military applications, the advanced computing power will also provide quicker results when used for research computations.

"We plan to learn better ways to perform numerous operations at the same time, taking advantage of the system's many parallel processors to return results that operators can see and interact with directly," says Randall Shumaker, IST director. "Improving our ability to interact with large-scale Army simulations will help open new doors to getting real-time results from high-performance systems."

In its current configuration, the computer can store the equivalent of 500,000 copies of the *Encyclopedia Britannica* or 40,000 music CDs. After a second-phase upgrade to be performed at the end of this year, its capacity is expected to triple.



Digital artist Greg Marcus with UCF's IBM-designed "supercomputer," the force behind battlefield simulations.

COURTESY UCF/JACQUE BRUND



Ryan Faircloth and Leticia Izquierdo – computer engineers with NAWCTSD – conduct a communications check during preparation for the opening of its new Virtual Technology Development and Operations Center (VTDOC) in Orlando.

tasked NAWCTSD to develop a training simulator that immersed personnel in realistic battleship situations, including missile strikes, fires, explosions and flooding.

The result is the 210-foot long *USS Trayer*, a three-fourths scale model of a modern guided-missile Navy destroyer. The \$83 million “ship” is housed in a 157,000-square-foot building and is designed to look like it is floating on the 90,000 gallons of water surrounding it.

Located at the Navy’s Recruit Training Command at Great Lakes, Illinois, the simulator was developed by NAWCTSD with the help of numerous local companies, including i.d.e.a.s., a creative content studio based on the Orlando backlot of Disney’s Hollywood Studios that produces entertainment, learning and marketing content for media and immersive platforms.

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With training scenarios based on actual events, such as the terrorist attack on the *USS Cole* in 2000, *Trayer* uses advanced simulation technology to create challenging and realistic training scenarios for recruits. Over the course of the

12-hour training sessions, sailors experience realistic shipboard motions, ocean sounds, engine noise, and emergency situations, complete with real flames and water, as a test of the skills and teamwork learned in basic training.

SIMULATING SMELLS

To be sure, sights and sounds are the most often utilized senses in MS&T military training applications, but the sense of smell is finally getting its due. Dynamics Research Corporation (DRC) recently partnered with UCF’s Institute for Simulation and Training (IST) to win an Army contract that seeks to introduce soldiers to the smells they are likely to encounter on the battlefield.

“Research shows that odors create more of a sense of immersion and immersion better creates a sense of presence that leads to better performance of

the task being trained,” says Dr. Lee Lacy, director of modeling, simulation and training for DRC Orlando. “Odor brings up memory. So if you experience a smell in the real world that you smelled in training, you are more likely to remem-

ber what you are trained to do.”

Lee says that while smell has been used for many years to sell products — think of the cinnamon bun retailer pumping a faux fresh-baked smell into an airport food court — this application of olfactory simulation will be applied to situations that are literally life or death.

“We are focusing on soldier training, specifically targeting medical treatment,” says Lee. “We are going for ambient odors like a burnt uniform or spent fuel. If you come across an improvised explosive blast and begin trying to triage those victims you’d encounter those smells.”

Based on pioneering olfactory simulation research performed by IST, the project is an example of the synergy often found between the military, private industry and UCF.

“When the Army announced interest in performing this type of project, we contacted IST because of their research in this area,” says Lee, who oversees the 30 employees in DRC’s Orlando office. “We are leveraging their experience in building the olfactory simulation systems with our experience in simulation research, medical training and transitioning the technology.”

According to Lee, partnerships with local entities, such as that illustrated by its relationship with IST, are a big part of why the Massachusetts-based company has an Orlando presence.

"Orlando is where the customers are and the area has the critical mass," says Lee. "We view it as the simulation capital of the world."

ENVIRONMENT FOR GROWTH

Other MS&T companies that have found Orlando to be good for their bottom lines are Engineering & Computer Simulations (ECS) and Adacel.

In the past year, ECS has more than doubled its revenues and expanded its offerings to online, virtual-world education. ECS President Waymon Armstrong credits this region's MS&T environment as a big part of the company's recent success.

"It is difficult to duplicate the synergy among the federal, state and local government, academia and industry in Central Florida," says Armstrong, whose company has a growing workforce of about 25 employees. "We feel that we are part of a growth industry, and good leadership and vision for the future continue to fuel the growth. We are located very close to some of our key customers and the talent pool contributes to a first-class workforce."

ECS's growth during the past year was punctuated by its first-ever contract with the Department of Homeland Security. When completed, the \$30 million deal, called the Joint State Response Training System, will add a serious spin to the technology found in the popular virtual world *Second Life* by educating first responders in a virtual classroom.

Featuring a 3-D, secure social network, instructors and students will interact and collaborate with each other through online representations of themselves, or avatars. The virtual training will allow individuals located anywhere in the world with Internet access to receive realistic and timely training for disaster response and other important mission rehearsals.

In the aviation industry, simulation has long been used to train pilots and air traffic controllers. But the Orlando hub of one MS&T company has developed a successful training product that addresses a less obvious, but potentially

just as dangerous, aspect of airport operation ... the hundreds of service vehicles that swerve and dodge passenger-loaded airplanes on the tarmac of every airport in the world.

Adacel, an Australian company with major operations in Orlando, has developed the Flightline Driver Simulator, a site-specific airport familiarity simulator that trains baggage, fuel, catering and other service drivers to safely maneuver complex airport areas and roads.

Besides accurately simulating each customer's airport, the Orlando-developed simulator can also model vehicle speeds and handling characteristics, realistic lighting conditions and even adverse weather such as fog, rain and snow.

While Adacel's simulator trains drivers to handle adverse elements, weather is one of the reasons Adacel located major operations in Orlando, according to Tom Evers, the company's director of marketing and communications.

"We chose to set up in Orlando primarily for location," says Evers. "Its weather and attractions are a big benefit. It is much easier to convince clients to visit our site for briefings and demonstrations of our products. And many key trade shows occur in the city because it is both a military and civilian simulation hub."

NEW FRONTIERS


Supporters of the Orlando MS&T

industry feel the region is well positioned for what may be the industry's next great area of innovation — medical simulation.

"A major area of emphasis, especially over the last couple of years, has been medical and healthcare-related simulation research and development," says the National Center for Simulation's Hauck. "This area has obvious and important applications, both for our military and civilian communities."

Within miles of Orlando's core MS&T cluster at the research park is the new "medical city" springing up in southeast Orlando's Lake Nona area. Soon to be home to the Burnham Institute for Medical Research, UCF's recently announced College of Medicine and a new Veteran's Affairs hospital, the local MS&T industry is already looking for synergies and partnership opportunities.

"We've tried to parallel and complement the development of the medical school, the VA hospital and all of the things happening in Lake Nona," says Hauck. "We've worked to develop Orlando's reputation as a top place for medical simulation and that continues to be a top priority."

And with its history of innovation driven by cooperation between the government, industry and academia, it shouldn't be too long before Orlando's MS&T industry begins to produce medical simulation technologies that further cement its standing atop the MS&T world. 



Adacel's Flightline Driver Simulator trains baggage, fuel, catering and other service drivers to safely maneuver around the airport.

COURTESY ADACEL