

Simulation's cutting edge

The U.S. Army's Simulation & Technology Training Center, or STTC, is part of the service's Research, Development and Engineering Command. Based in Orlando, Fla., the center focuses on getting new and emerging simulation, virtual and artificial intelligence technologies into training and education tools. It partners with others doing research into similar technologies, such as the Air Force, Navy, Justice Department and the Defense Advanced Research Projects Agency. Michael Peck interviewed its director, Col. Craig Langhauser.

What new technologies hold the most promise to change how we use simulation?

I see the biggest challenge area that we have as adaptive tutoring, or using artificial intelligence in the training and education domain. For all education courses, civilian or military, we basically design courses for the slowest student. We teach for the lowest common denominator. If you can use artificial intelligence and tailor the course material to each student's particular strength — whether they're a visual learner or a textual learner — you should be able to train them better in less time. We just hired a person with a Ph.D. in artificial intelligence. We're going to hire another individual who works in the area of modeling human performance. So we're just starting out on this. In the fiscal 2011 budget, we're committing some dollars to this area. We have other organizations like HRED [Human Research and Engineering Directorate at the Army Research Laboratory] and others also trying to orient some of their funding to tackle this problem.

Where are the Army's biggest training needs?

On the physical side, the big need is for dismounted soldier training. There are a lot of challenges. There are reasons why we haven't done this before. A lot of it has to do with, how do you get hardware? How do



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you put it on a soldier? How do you interact with another soldier in this immersive environment? All those soft nonkinetic skills. If he's wearing an HMD [helmet-mounted display], he can't see the face of the person he's trying to interact with. Well, facial cues are important in determining whether a person is lying to you, whether he's being evasive. Those are important skill sets in counterinsurgency. So we have a real difficult problem set, and it's hard to get the technology, great as it is, into a configuration that soldiers can easily use.

So what solutions do you see for training dismounts?

We are looking at brain-computer interface. We are looking at improving HMDs for a wider field of view. Higher resolution so users get more immersion. We're looking at some of the technologies coming out of gaming consoles, like the Kinect from Microsoft or the Wii-

type devices, in order to make a soldier's interaction with a computer system more intuitive. The Army has a huge gaming program called VBS2 [Virtual Battlespace 2]. They're fielding it all over the place. It takes like two pages worth of shortcut crib sheets to figure out how to press all the keys in order to maneuver that avatar. If you can get rid of that keyboard, whether it's with a brain-computer interface in a couple of years or a more visual device like the Kinect, and make it more intuitive for the soldier, then his training is more focused on the training piece instead of the training aid.

One of the challenges in modeling and simulation is counterinsurgency and stabilization. A lot of people I've talked to aren't confident we can create good models for irregular warfare. What are your thoughts?

I agree. It's a tough challenge. As I said, for years we didn't touch it, because the science behind it is so soft. Another one of our challenges is what we call "scalable virtual humans." We think that in order to do that intelligent tutoring, you need to replace some of the instructors with a virtual human. Whether they're using a mobile device, or whether they're at their computer hooked to the Internet, or whether they're using some training that's embedded into their platform, it would be nice to have a virtual character that, when the system recognizes that the trainee is having a problem with a particular piece of material, the avatar would help talk him through it.

Those kinds of situations are kind of easy because they are a very narrow, defined domain that you are dealing with. But when you're talking COIN [counterinsurgency] operations, the number of issues you can have are boundless. I think you're going to have some distinct training areas, and you're going to have a virtual character that does some cultural stuff. But in the mid- and short term, it's going to be really low level, and we're still going to need hu-

man actors to provide that doctorate level training to the soldiers.

You mentioned virtual humans. Can you create a realistic personality for them? One that will allow us predict human behavior?

Not predictive. Our first generation of a virtual human is something we call Sergeant Star, which we created for Army Recruiting Command. And he definitely has a personality, but that personality was created by someone in Hollywood. But to be predictive, or representative of a real person? That's a bit more of a challenge. There are both technical and investment challenges there. But I think within five years, we will have some credible virtual humans out there doing a lot of things. One of the big hang-ups in the area is natural language processing. You are limited in the questions you can ask, and the character has a limited number of responses.

What is the future of counter-IED sims?

Hard to say at this point in time. With no more combat troops in Iraq, it will depend on how things go in Afghanistan, and on how much more money [the Joint IED Defeat Organization] wants to throw at the training piece, as to whether there will be more unique training devices.

Given a tighter defense budget, and the fact that training and simulation doesn't tend to be at the top of the budget priorities, what changes do you see coming?

If the operations training budget gets hit hard, the first thing you're going to see disappear is those civilian actors that are at NTC [Army National Training Center] and all over the place. We hire those actors to provide cultural interaction with soldiers, and they cost a lot of money. When the training budgets go down, that's one of the first areas we're going to cut.

So simulations will be a part of the future in cost-cutting?

The vice chief of the staff of the Army has stated that even with a future of reduced budgets, we need to start looking at simulations, and simulations for qualification. It's like the [Engagement Skills Trainer 2000]. You don't qualify with that simulation. You prepare to go to qualify on the marksmanship range. The vice chief is asking, are these simulations good enough to qualify digitally, and then maybe every two or three years you do a live exercise? The Army is looking at doing more virtual certifications.

Then you see STTC as helping the Army cope with tighter resources?

There are a lot of training devices fielded and supported by PEO STRI [Program Executive Office for Simulation, Training and

Instrumentation]. We're looking at component technology that can enhance those training devices, make them more realistic and immersive. One area is marksmanship. There are some advanced marksmanship techniques that we need to be teaching our soldiers. They are using them in combat, but they don't have any place to really train with them. We don't have enough ammo to do them on a training range, and the EST2000 was only built for basic marksmanship training. We're looking at some advanced marksmanship technology, sort of like a system upgrade for EST2000.

It sounds like you've reorganized STTC.

When I got here two years ago, we were very big into embedded

training. I came in and made an assessment that technology-wise, embedded training is mature. It's now a matter of the system PMs [program managers] — the PM Abrams and Bradleys and Strykers — figuring out exactly what they want to put on their vehicles, and then going to get the technology and integrating it. So we kind of turned off the spigot on embedded training and we're shifting over to other areas, primarily dismounted soldiers and intelligent tutoring.

So what exciting things can we look forward to from STTC?

I already mentioned intelligent tutoring. We're making significant change in personnel and resources to tackle that problem. Scalable humans is another big

challenge. And the third challenge is the dismounted soldier regime. [Program Manager Combined Arms Tactical Trainer] is in the process of procuring some dismounted soldier ensembles. But given the state of the art, there are lots of things those systems can't do. A soldier can't throw a hand grenade or do certain movement techniques. So we're looking at the next-, second- and third-generation of training capability. This is a growth area for us. We're starting to put a lot of dollars in it to enhance whatever the device they get. We don't know what it is yet. But we do know, based on our assessment of the technology at this point, that they can't do certain things. Part will be mixed and augmented reality. ■



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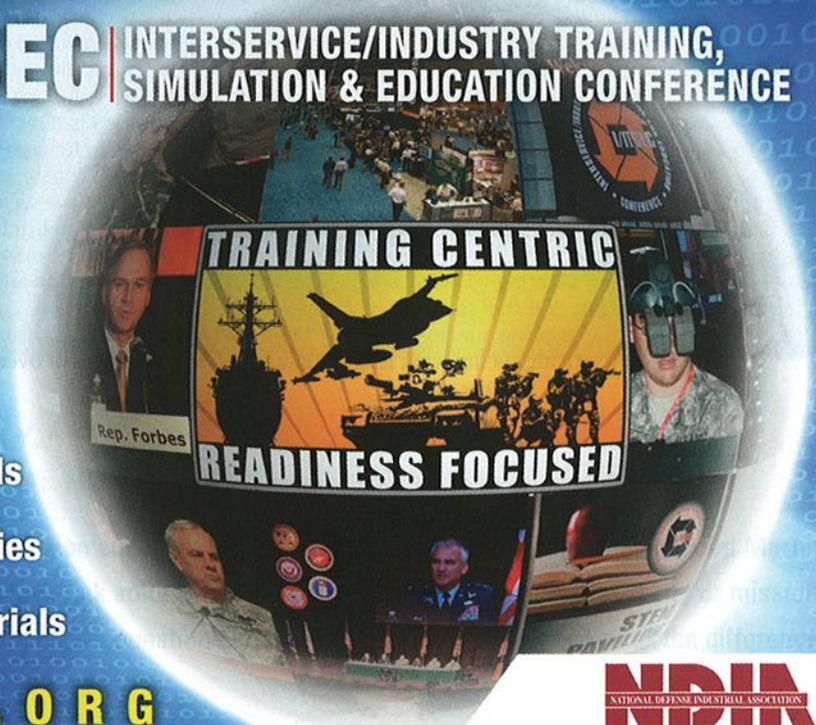
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