

## Technology

### A Few Good Toys

Dyan Machan, 12.09.02

**The U.S. Army has some imaginative ways to annihilate the Saddams of the future.**

As the U.S. Army prepares for war in Iraq (and beyond), it has been moving fast to transform itself from a Cold War relic into a deadly, rapidly deployable force. The last two major U.S. conflicts, Desert Storm and Kosovo, were largely won by the U.S. Air Force before the Army's lumbering tanks ever got there. The Army used to be a sledgehammer; now it needs to be a cordless drill.

Technology will play a big role in this evolution, and that is the purview of **A. Michael Andrews**, the Army's 56-year-old deputy assistant secretary for research and technology. Andrews, a civilian electrical engineer with the rank of a two-star general, oversees 21 labs, 8,600 scientists and engineers and a \$1.5 billion-a-year budget. "We explore the realm of what's possible," says Andrews, who was recruited by the Defense Department after 25 years at Rockwell International. He holds five patents in infrared technology, one of which is the basis for the guidance system on the Army's Javelin shoulder-fired antitank missile.

Andrews gets his inspiration from science fiction like *Star Trek* and the books of Arthur C. Clarke, as well as nonfiction like *Black Hawk Down*, the retelling of U.S. Special Operations Forces' bloody, chaotic street fight in Mogadishu, Somalia in 1993. That book (and later movie) exposed a weakness: Soldiers had to make too many decisions about what they needed in battle and ended up going in unprepared. To correct this, Andrews is eliminating choices by incorporating drinking water, body armor and other features in the uniform of the future.

What worries Andrews most is finding a way to toughen up battlefield data networks. Platoons will be busy monitoring video feeds from their falcon-size unmanned spy drones and receiving biohazard detection data from robotic scouts, all while screaming at one another over a headset. Each soldier may need to consume as much as 5 to 6 megabits per second, a hundred times the speed of a residential dial-up Internet connection. Add in smart weapons talking to satellites and armored personnel carriers talking to one another, and the modern-day battlefield becomes a telecom mob scene.

"Everything relies on a reliable and secure network," says Andrews. "Without it, our vulnerability is exposed." Dreaming the possible is one thing. Making it work is quite another.

#### Soldier Of Tomorrow

The Army's goal is to come up with a uniform by 2008 that will make a soldier better than all that he can be. Helmets will enhance hearing and protect ears from battle cacaphony. Head's-up displays built into the visor will display infrared images to reveal friend from foe on the battlefield. To cut the weight soldiers must carry down from the current 100 lbs. to perhaps 40 lbs., the Army is developing a wheeled robot "mule" that follows a soldier around with equipment for purifying water and recharging batteries. Further out, the Army warfighter of 2025 will be a machine-assisted soldier as deadly and effective as a 1990s-era tank. Lightweight body armor will use plastics made with nanomaterials to deflect a bullet with an electrical charge. Polymers in the uniform will "read" their wearer's surroundings and change color and pattern to render him nearly invisible. Boots may contain a liquid that hardens if the soldier steps on a land mine. Coin-size silicon microturbines will power the soldiers' computer systems.

#### Force Field

The Army is getting ready to test an armored vehicle that can thwart rocket-propelled grenades by sending out an electronic counterpunch that creates a false target in front of the vehicle. How it works the Army won't say exactly. The first design is slated for next spring. The technology will be effective at intercepting grenades moving up to 475 feet per second and may be deployable by 2008. It isn't quite the protective energy-bubble enshrouding the *Starship Enterprise*, but we're getting there. Also under development for 2008: electromagnetic-pulse weapons mounted on tanks or drones to deliver a charge of energy that would fry enemy electronics, turning an unprotected fighter jet into a flying brick.

#### Show Time

A young recruit stands before a 150-degree wraparound movie screen, studying a military drama created by computer-graphics artists. More than 3,500 watts of sound thunder from 13 speakers throughout the room. He sees onscreen that his

unit's Humvee has just struck a car carrying a civilian boy who will die unless he gets to a hospital—fast. Meanwhile a news crew is videotaping the action from the side. The officer calls for a medevac, but a nearby outpost radios that it's taking fire and needs backup. When the recruit heads for the field, abandoning the child, the mother goes ballistic as the news cameras roll. "This is crisis decision making," says Richard Lindheim, executive director of the Institute for Creative Technologies in Marina del Rey, Calif. The Army granted the institute an initial \$45 million a year to create simulations using Hollywood talent. Lindheim says one colonel who tried it said it was too close to what he had experienced in Kosovo; the officer had to leave the room. An upgraded version is due out next year.

### **Attack of the Drones**

Sergeant, we've shrunk the spy plane: The Predator, the unmanned airplane that incinerated a carload of al Qaeda suspects in Yemen last month, is on its way to becoming the size of a sparrow. Each soldier will use his own tiny drone, flying it around a corner to beam back video images into his helmet display screen. Six-inch winged versions under a soldier's control are in development for 2008; future versions will fly themselves via delicate image sensors and global positioning system data. Commercial uses: Farmers could send out a flock of drones to monitor crops; border control would be less labor intensive; and companies could fly the robo-critters over cubicles to make sure employees aren't slacking off.