



DEPT. OF DEFENSE PHOTO BY LANCE CPL. C.D. CLARK, U.S. MARINE CORPS

# Bird's Eye View *of the Battlefield*

Reconnaissance round will give battlefield soldiers an advance look at what's ahead.

by RICK ROBINSON

**S**oldiers in battle are always trying to discern what's in front of them. Both victory and survival can depend on it. Yet too often, buildings, hills, forests and jungles get in the way.

Now a Georgia Tech Research Institute (GTRI) project is developing a novel way for small ground units to see past obstacles. Called the "reconnaissance round," it would let soldiers use small artillery weapons almost like a periscope. They could fire skyward a device that transmits images of nearby terrain back to a laptop computer, which is standard equipment now among infantry units.

The reconnaissance round is the idea of Charles M. Stancil, a senior research engineer at GTRI's Aerospace, Transportation and Advanced Systems Laboratory.

"The typical situation an infantry unit will encounter is a small number of hostile forces, and the unit does not know exactly where the enemy is," Stancil says. "Soldiers will be able to fire the recon round and have photos relayed to them right

over the battlefield so they can see from a vertical perspective how the enemy is positioned."

Currently, a ground unit requiring aerial information has to go up the chain of command to request satellite images or aerial photos from an uninhabited aerial vehicle such as Global Hawk. The process is time-consuming, and equipment use is expensive, Stancil says. By contrast, the recon round promises to be quick, convenient and relatively inexpensive at \$1,200 per device.

The 2-pound, 6-inch-long reconnaissance device, made from off-the-shelf parts such as digital camera components, would be used in weapons like mortars that launch shells high in the air. Far above the battlefield, a separation charge opens a parachute, and the surveillance device floats down, transmitting digital images as it descends.

"It can detect a human being from 1,800 feet in the air," Stancil says.

Typically deployed at a height of about 1,800 to 2,000 feet, the reconnaissance round has a field of view of 600 feet by 400 feet and can view terrain as

**Above: U.S. Marines provide cover fire during a simulated hostage rescue mission at Camp Lejeune, N.C.**



development this fall. Such a “go” decision would likely kick off recon-round development for three other compatible weapons — the 60mm mortar, the 4.2-inch mortar and the 40mm grenade launcher.

To minimize per-unit costs, the development team opted for a fixed-lens system, rather than a sophisticated zoom lens. Some sources quoted prices of \$15,000-plus per lens, Stancil says, but his team found an existing lens system that only cost about \$75.

Black and white ground images seem to work as well as color, he adds. Black and white may turn out to be more practical, too, because the smaller file size of such digital images enables faster transmission than larger color files.

Stancil emphasizes the system's simplicity, as well as its speed and relatively inexpensive price tag. Also, front-line troops can use the device easily under pressure.

“We have put a great deal of effort into simplifying the interface,” he says, “so that all you have to do is point and click, and then open it up and see the imagery.”

The need for a device like the reconnaissance round first occurred to Stancil, a retired Army officer, when he was fighting in Vietnam.

“I happened to be in a situation where I really, really needed to see what was on the other side of a hill,” he recalls. “I made a promise to myself, that if I ever had the opportunity to fix that, I would.”

For the numerous tests necessary to fine-tune the user interface, Stancil's team developed a special nitrogen-propelled launcher so it could test-fire the recon round many times.

The team used Atlanta-area sod farms as a substitute for a government test range for the compressed-gas-launcher test. The sprawling sod farms have many attributes of a military test range, including a remote location and a dearth of trees and utility wires.

“Using these farms has saved tremendous dollars and time,” Stancil says. “If we had to go to a government range every time we wanted to test-fire, we wouldn't be anywhere near the point of achievement that we are now in the program.”

■ Contact Charles Stancil at 770-528-3224 or [charles.stancil@gtri.gatech.edu](mailto:charles.stancil@gtri.gatech.edu).

**Researchers have developed a device called the “reconnaissance round” that soldiers would fire into the sky. The device transmits images — such as these taken during a demo — of nearby terrain back to a laptop computer, which is standard equipment now among infantry units.**

Soldiers will be able to fire the recon round and have photos relayed to them right over the battlefield so they can see from a vertical perspective how the enemy is positioned.

far away 3.1 miles (5,000 meters). The device sends back four to five digital photos before it hits the ground, after which it self-destructs to prevent use by an enemy.

Currently, no such shell-based reconnaissance devices exist in the military arsenal, Stancil adds.

The reconnaissance round is mechanically analogous to an illumination round, which is typically fired from a mortar and uses a flare suspended from a parachute to light up the area below. Although the recon round has good low-light performance, it could be used in conjunction with an illumination round in extreme low-light situations.

Researchers are now testing and validating the recon round, now entering its second year of development. A working prototype has been successfully test-fired from an 81-millimeter mortar at a military range, and Stancil's team is fine-tuning the device using a compressed-gas-propelled launcher.

Stancil hopes to have the recon round approved by the military for full-scale engineering



IMAGE COURTESY OF CHARLES STANCIL