Bullseye!

Future Combat Systems hits the ground running.

U.S. Army soldiers recently put FCS prototypes to the test in realistic field training. The results confirm that Army modernization is right on track.

By Jay Spenser

In the western desert where New Mexico and Texas meet, a U.S. Army squad advances warily from building to building. These soldiers in camouflage battle dress are part of a mock combat exercise evaluating high-tech capabilities of Future Combat Systems (FCS), the Army's transformational modernization program.

Checking a building and finding it empty, the squad leaves behind an urban unattended ground sensor (U-UGS). The compact device will alert them if anyone enters this previously cleared structure, potentially posing a threat from the rear. Its availability means that a soldier no longer has to be left behind to protect his advancing comrades.

Its numbers undiminished, the squad arrives at a windowless building. Instead of sending his troops into the unknown, however, the squad leader has a soldier send inside a small unmanned ground vehicle (SUGV). Guided by remote control, this robot rolls inside and searches the structure. It is empty, but the SUGV's live video feed reveals tripwires – the place is booby trapped! Had this been a real combat situation, the SUGV might have saved the entire squad.

Nearby, a platoon leader and his sergeant establish a checkpoint after having their troops deploy tactical unattended ground sensors in the greater vicinity. When several of these T-UGS detect suspicious activity, the lieutenant orders a Class 1 unmanned aerial vehicle surrogate sent aloft to investigate. The barrel-shaped UAV, which can hover over the battlefield, sends back stabilized telescopic imagery identifying the source of the alert: in this case wildlife, but it could just as easily have been armed foes.

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Class I Unmanned Aerial Vehicle

The Future Combat Systems (FCS) Class I Unmanned Aerial Vehicle (UAV), developed in partnership with Honeywell, is backpackable and provides dismounted soldiers with unprecedented reconnaissance, surveillance and target acquisition capability on the battlefield. During Experiment 1.1 interoperability between FCS and current force systems was demonstrated when real-time video imagery taken from the Class I UAV was relayed into the cockpit of an AH-64D Apache multi-role helicopter during mock combat exercises.

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Futuristic field trials

Scenes like these played out this past January and February during the third and final phase of FCS Experiment 1.1, an eight-month test and verification effort that began in July 2006 with systems engineering integration work in the laboratory before migrating to the field for its second and third phases.

The experiment marked the first integrated tests of some of the prototype hardware and software that eventually will be comprised in FCS, a network-centric system of systems that links soldiers, manned and unmanned ground and air vehicles, sensors and other assets in an integrated, information-rich battlespace. Boeing and its partner Science Applications International Corporation (SAIC) function as Lead Systems Integrator for FCS.

Integrated systems performance in a field environment was the focus of Phase 2, which was conducted at the Army's White Sands Missile Range and Ft. Bliss test complex and involved engineers from Boeing, SAIC and FCS One Team partner companies.

The culmination of FCS Experiment 1.1 was a live training exercise at the test complex involving Army soldiers who operated early prototypes of actual FCS hardware and software – including the equipment described above – in realistic combat scenarios. During these field trials, the soldiers also employed a fleet of stretched and modified Humvees that simulated manned FCS ground vehicles still in development. These vehicles, which acted as surrogate command-and-control vehicles, were equipped with early versions of FCS battle command software that provides soldiers with a single common operating picture of the battlefield, as well as Joint Tactical Radio System Ground Mobile Radios to distribute information. Interoperability with other current Army systems, such as the Boeing-built AH-64D Apache Longbow attack helicopter, was also demonstrated.

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Small Unmanned Ground Vehicle

Soldiers participating in a Future Combat Systems (FCS) Experiment 1.1 mock combat exercise use the Small Unmanned Ground Vehicle (SUGV), developed in partnership with iRobot Corporation, for conducting operations in an urban environment to clear buildings and detect enemy combatants. These man-portable, robotic vehicles can be employed for high risk activities such as surveillance in buildings, tunnels and caves, or detecting explosive devices, without exposing soldiers directly to the hazards.

Soldiers rate FCS toolkit invaluable

At this testing's conclusion, the soldiers, many of whom were veterans of combat in Iraq or Afghanistan, proclaimed their networked FCS toolkit invaluable for high-risk activities. In addition to mitigating a spectrum of risks routinely faced by current military forces, these selected systems greatly increased efficiency and effectiveness.

"I think the UAV is a great asset," commented one soldier. "It's up there. As we're moving forward and we're clearing one building, it can let us know, hey, this building over here – we have guys running toward you or running away to the next building. It can let us know what's going on."

Soldiers also saw the immense value of the SUGV for surveillance in buildings, tunnels and caves, as well as for detecting explosive devices without directly exposing soldiers to hazards. I don't know what this robot cost, but I know what the Army pays to equip and train a soldier, and there isn't an amount of money you can put on saving the lives of soldiers by using robots like this one.

> With FCS, the whole is greater than the sum of its parts.

The UGS similarly drew high praise. "You put them up and don't have to leave a soldier behind," observed a squad commander. "The platoon sergeant can see, okay now, we have a hit here, we have an intrusion here. We can go back and investigate and that's great. In fact, all these systems are priceless."

With FCS, the whole is greater than the sum of its parts. But as Exercise 1.1 shows, each of these parts is itself critical to safety and success in combat. Three planned spinouts of selected FCS systems will provide an early infusion of FCS capabilities in the current force.

"Experimentation is critical to FCS program success and most importantly will help enable the early spinout of key capabilities to the current force in 2008," says Dennis Muilenburg, vice president and general manager of Boeing Combat Systems and FCS program manager. "The successful completion of Experiment 1.1 further validates the progress and maturity of selected FCS technologies and demonstrated interoperability between FCS and current force systems."

Of course, the soldier's opinion is the ultimate validation of FCS. After the exercise, one platoon leader said, "The bottom line is victory on the battlefield at much lower cost."

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Tactical-Unattended Ground Sensors

Future Combat Systems (FCS) Tactical-Unattended Ground Sensors (T-UGS), developed in partnership with Textron Systems, provide soldiers with unprecedented situational awareness on the battlefield through improved target detection, location, classification and transmission among other capabilities. Equipped with acoustic, seismic and infrared sensors, T-UGS can be used to perform mission tasks such as perimeter defense, surveillance, target acquisition and situational awareness; and are currently among those FCS technologies slated for early spin out to the current force beginning in 2008.

Urban-Unattended Ground Sensors

Soldiers participating in a Future Combat Systems (FCS) Experiment 1.1 mock combat exercise place Urban-Unattended Ground Sensors (U-UGS) inside a previously cleared building to monitor its status and warn if it has been re-occupied by enemy combatants. U-UGS, developed in partnership with Textron Systems, provide a leave-behind, network-enabled reporting system for situational awareness and force protection in an urban setting, and are currently among those technologies slated for early spin out to the current force beginning in 2008.