armor team with the fire support vehicle (FSV). Covering the avenue of approach was an armor mission. The platoon would find the 1st Brigade, coordinate the flanks, and position along the road favoring my own position. The FSV, tanks, and TOWs would be used to delay the enemy while we deployed, and the infantry would provide protection from the Iraqi soldiers still wandering in the area. I felt that an isolated platoon on the most obvious avenue of approach, surrounded by drifting soldiers, would need a balanced force to deal with the numerous threats.

The task-organized platoon is not a cure-all. It should be recognized as an exception to the doctrinal rule and, at the very least, an option to be considered. The factors of METT-T will determine when and why platoons should be task organized.

A commander should trust his junior leaders to handle this organization and should train for platoon team operations so the group can get used to each other. Some specialized standing operating procedures would help, along with remembering that massed fires—not necessarily massed troops or equipment—are the key.

**Captain John R. Sutherland, III,** is an Infantry Officer Advanced Course small group instructor. He previously served in the OPFOR battalion during 44 rotations at the NTC and commanded a company in the 3d Battalion, 15th Infantry, 24th Infantry Division during Operations DESERT SHIELD and DESERT STORM. He is a 1983 ROTC graduate of Northern Arizona University.

# The 21st Century Land Warrior

**CAPTAIN GREGORY J. DYEKMAN**

The Dismounted Battlespace Battle Lab at Fort Benning is developing a program that will prepare the dismounted soldier for combat well into the 21st century. It begins with a vision of the future dismounted soldier, which is a modular, integrated battlefield fighting system appropriately called the 21st Century Land Warrior. The joint program will support the dismounted land forces of the Army, Marine Corps, and Special Operations forces by making use of emerging commercial technologies and exploiting microelectronics.

This technology push to make high-performance electronics smaller and more rugged will provide the dismounted land warrior with lightweight, man-packed communications, data networking, and sensor modules; protection from a full range of threats; more lethal weaponry; and the ability to operate freely in extreme temperatures and over most terrain. These improvements will give the soldier a technological advantage over his potential adversaries that will contribute to the Nation's ability to deter conflicts or, at least, to win them decisively and swiftly with as few casualties as possible.

Situational awareness and real-time battlefield information are keys to success on the modern battlefield. Dramatic improvements in both lethality and survivability can be achieved through a direct link between modern dismounted soldiers and the rest of the force. Through this network, dismounted warriors will receive digital information from leaders and squad members and will provide continuous real-time information to commanders. This link will improve situational awareness for the individual soldier, the small unit, and the ground and air forces at higher echelons. It will also reduce the risk of fratricide and allow precision munitions to be used more effectively.

Commanders will be able to maneuver forces and dictate battlefield tempo as never before. The 21st Century Land Warrior will be given a tremendous increase in command, control, communications, computer, and intelligence (C4I) capabilities; this will enable small units to better control battlefield movement and tempo, leading to more controlled dispersion and improved survivability and lethality for the entire force.

To achieve this vision, the Dismounted Battlespace Battle Lab is using the 21st Century Land Warrior Top-Level Demonstration (TLD). The cornerstone and integrating effort of the 21st Century Land Warrior TLD is the Generation II Soldier Advanced Technology Demonstration (ATD).

### Generation II Soldier ATD

The Generation II Soldier ATD builds on the Soldier Integrated Protective

Ensemble (SIPE) ATD (Fiscal Years 1990-1993), which pioneered soldier-oriented research and development. The SIPE ATD was specifically aimed at the individual soldier capabilities that could come from the integration and aggregation of state-of-the-art technologies applied through a systems approach.

SIPE provided better individual and collective performance at night and in obscured and chemical environments through improvements in lethality, command and control, survivability, and mobility. For operational use in the 21st century, however, further improvements are still needed in several areas: power, electro-optics resolution, sensor range and accuracy, command, control, and communications miniaturization, and overall integration.

The primary objective of Generation II Soldier is to develop an advanced, affordable, integrated—yet modular and interoperable—head-to-toe individual fighting system that will reach beyond SIPE capabilities but at a weight and bulk that is acceptable to soldiers.

The goal is to integrate various electronic components, individual equipment, weapons, and hazard protection into a functioning, balanced, and unified system of modular subsystems that can be used in various ways. The modular approach will enable commanders to achieve a balance between performance and protection in responding to varying mission (threat and operational) requirements; it will also allow for the task organization that makes the best use of a unit's capabilities.

The Generation II Soldier System will consist of the following five major subsystems:

**Integrated Headgear Subsystem (IHS).** The IHS will use the soldier's ballistic protective helmet shell as a platform for communications, hearing augmentation, an integrated night vision mobility sensor, and a high-resolution display for sensor and computer output.

**Individual Soldier's Computer/ Radio (ISC/R).** This voice-controlled, secure computer/radio will create, store, and display information; provide an interface with Generation II soldier sensors (chemical detectors, personal status monitors, thermal sensors, range finders, combat identification interrogators and receivers); provide position and navigation data through an inertial navigation device linked to a global positioning system (GPS) receiver; and provide wireless transmission of voice, data, digital reports, and imagery (thermal and video). The soldier will view information through a hand-held color display or through the integrated headgear subsystem display. The ISC/R will be linked through the single-channel ground and airborne radio subsystem (SINCGARS) into the combined arms command and control digitized network, providing a selection of real-time information directly from individual soldiers to higher echelon commands.

**Weapon Interface Subsystem (WIS).** This interface with the Objective Individual Combat Weapon of the future will allow a soldier to view the weapon reticle on his headgear display. The Generation II Soldier System will also be compatible with other infantry weapon systems (such as Javelin, multipurpose individual munition, M16A2, M60, M249, M203).

**Microclimate Conditioning (MCC) Subsystem.** The MCC will be a self-contained, lightweight, backpack portable cooling system that will improve the soldier's performance in temperate-to-hot climates, especially when he is wearing chemical protective gear. This subsystem will maintain an individual soldier's thermal equilibrium for up to four hours of operation. *(See also MCC item in INFANTRY, March-April 1994, page 8.)*

**Survivability Subsystem.** This subsystem will give the soldier better multiple-threat protection (primarily through signature reduction and small-arms ballistic protection for the torso) and will include an advanced load-carrying capability that distributes the load for maximum comfort.

The following additional technology efforts are to be integrated with the Generation II Soldier System ATD and to support the 21CLW TLD:

**The Objective Individual Combat Weapon (OICW) Technical Demonstration (TD).** The operational and organizational goal is to provide a single weapon to replace the M16A2 rifle, the M203 grenade launcher, and selected M249 machineguns. The weapon is envisioned as an integrated system highlighted by full-solution fire control that can identify and acquire a target and provide feedback on the engagement; kinetic energy projectiles; and fragmenting air-burst munitions.

**Thermal Weapon Sight Mine Detection (TD).** The Battle Lab will assess the feasibility of using thermal imagery through this sight as an effective means of detecting mines. An interface between the soldier computer and the integrated helmet system will alert the soldier to the presence of a mine field and give him a means of avoiding the mines when crossing it.

**Forward Observer-Forward Air Controller ATD.** The FO/FAC ATD, sponsored by the Marine Corps, will demonstrate the soldier's ability to accurately determine his own location and that of a target, identify a target, and adjust fire.

**Commercial Communications Technology Test Bed.** This program, sponsored by the Advanced Research Projects Agency, will demonstrate commercial communications hardware and the linkage of the individual warrior to the other force structure elements, thereby showing improvements over the present SINCGARS.

**Integrated Sight Modules TD.** This effort will demonstrate the integration of range finder, compass, combat identification interrogation, and transponder elements to support OICW and FO/FAC.

**High-Resolution Helmet Displays and Sensor Modules TD.** This TD will demonstrate advanced display and sensor capabilities under a horizontal integration approach for land warriors, helicopter crews, and armored crews.

Essential to the improved operational effectiveness of the soldier is the best possible integration of the collective 21st Century Land Warrior Generation II Soldier subsystems and components and, as a result, the most effective relationship among them. There are numerous benefits to be derived from 21CLW

TLD that will greatly improve the soldier's ability to succeed on the future battlefield.

The following are specific capability benefits for the individual soldier in these areas:

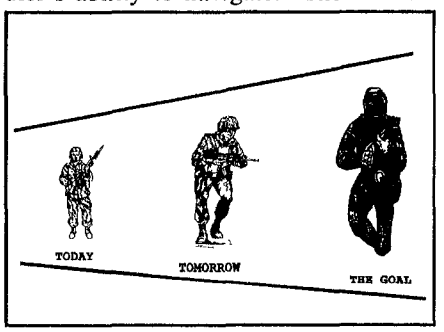
**Lethality**. The sensory interface with advanced and existing individual weapons and with the integrated sight module will allow soldiers to bring more lethal munitions to bear faster and more accurately. Individual soldiers will be capable of detecting targets at longer ranges and throughout a full spectrum of battlefield conditions (at night, through obscurants, wearing NBC protective gear). The 21CLW will be able to engage targets more quickly, especially at night, as well as targets that are not exposed (indirect viewing). Forward deployed soldiers will be able to send real-time target data directly to the combined arms team on the battlefield, including target coordinates and near real-time target imagery (at night and through obscurants).

**Survivability.** Modular multi-threat protection with vital area coverage will provide protection from selected assault rifles, machineguns, and indirect fire flechettes. Integrated combat identification transponders and interrogators will play an important role in reducing fratricide and increasing battlefield situational awareness.

Other planned 21CLW capabilities that will improve survivability include signature reduction (visual, near infrared, thermal, noise, and electronic), in-stride mine avoidance, and a chemical detection sensor linked through the ISC/R. The chemical sensor, linked to the computer, will generate an automatic report of the detection location and the type of threat. Adjacent units will be able to define areas of contamination and advise subordinates as needed.

**Command and Control.** Improved situational awareness will be realized through "networking" real-time digitized position and navigation capability through a GPS receiver, digitized maps, and an inertial navigation device, all integrated through the ISC/R. Awareness of both the enemy and friendly situations will be improved. Soldiers will be able to view any combination of overlays, including friendly, enemy, fire support, and obstacles. Decision making, planning, and reporting will be faster. The computer will provide optimal route planning with respect to mission requirements, known or suspected enemy locations, ease of trafficability, operational control measures, water and other environmental hazards, and GPS satellite visibility. The soldier will be able to transmit and receive any series of preformatted digital reports, including SALUTE (size, activity, location, unit, time, and equipment) and call for fire.

**Mobility.** GPS and improved situational awareness will improve the soldier's ability to navigate. The helmet-mounted sensors will also improve his ability to move on the battlefield at night or in adverse weather. A total systems design will also reduce the overall soldier load.




**Sustainability.** An improved modular approach to individual strength will permit the soldier to operate in greater environmental extremes through the use of the microclimate conditioning equipment. The MCC subsystem and integrated, modular NBC protective gear will permit soldiers not only to survive but also to perform their missions effectively for longer times in a contaminated battlefield environment. A personal-status monitor linked to the ISC/R will provide individual guidance to sustain performance and prevent injury.

The 21st Century Land Warrior/Generation II Soldier ATD will consist of two demonstrations with differing approaches and objectives. The primary objective of an interim 1996 demonstration will be to ensure the fundamental viability and capability of the digitized network. This demonstration is expected to consist of using initial prototypes to ensure hardware functionality, human factors compatibility, and integration with developing command and control protocols.

A culminating field demonstration slated for 1998 is expected to consist of a light infantry platoon conducting a series of situational training exercises or field training exercises to demonstrate enhanced lethality and survivability as a result of linking the soldier into the digitized command and control network. The system will then transition to engineering development under the control of the Program Manager-Soldier. As a result of this effort, it is anticipated that less engineering development will be required to field the entire 21st Century Land Warrior.

The Battle Lab will play a major role in defining the 21CLW through the rapidly emerging Land Warrior Test Bed. A simulation suite of constructive combat models and man-in-the-loop (virtual reality) simulations will quantify the technical and operational effectiveness of the individual and combined demonstrations. These analytical tools will play an important part in guiding the overall effort.

The 21st Century Land Warrior will bear increasing responsibility for the success of our Nation's policies and objectives. The program must maintain capabilities that more than match those of any threat on the future battlefield. Arriving virtually unannounced anywhere there is a crisis, the 21st Century Land Warrior will be a key instrument in the dominance of land forces.

The Dismounted Battlespace Battle Lab continues to be committed to ensuring that the dismounted combat soldier has what he needs to remain the key element of forced entry and the cornerstone of force projection.

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**Captain Gregory J. Dyekman** is assigned to the Operations Research Branch, Dismounted Battlespace Battle Lab, at Fort Benning. He previously served in the 2d Infantry Division in Korea and in the 101st Airborne Division. He is a 1984 graduate of the United States Military Academy.

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