

# Full Spectrum Effects Package (FSEP)— Integrating the Latest Technologies for Total Operational Protection

Brett Grosshans and Jim Reinhold

*“Preserving noncombatant lives and dignity is central to mission accomplishment.”*

*—Field Manual 3-24/Marine Corps Warfighting Publication 3-33.5, Counterinsurgency*

**A**s U.S. forces enter their ninth year of continuous combat, there is a renewed call to reduce civilian casualties and minimize damage to local infrastructure across the spectrum of conflict, from stability to counterinsurgency operations. Soldiers are looking for advanced capabilities to adequately discriminate between noncombatants and combatants and to take nonlethal actions from a standoff distance, while still maintaining total force protection.

Members of the 3rd Platoon, 66th Military Police (MP) Co., prepare to test fire the .50-caliber machine gun on the new FSEP variant Stryker. There are two versions of this Stryker in Iraq, both being used by the MPs on security missions. (U.S. Army photo.)

To meet this warfighter requirement, the Army, as the lead service, was tasked to integrate a mission package that includes advanced nonlethal and lethal systems, kinetic and nonkinetic systems, and active protection capability aboard a light-armored vehicle. Through an incremental, rapid development approach across a range of DOD organizations, Soldiers now have a weapons system that enables them to engage an enemy force with multiple nonlethal and direct-fire lethal effects simultaneously.

The FSEP is a combined series of surveillance and detection systems and nonlethal and lethal engagement technologies mounted on an armored vehicle, currently the Stryker Infantry Carrier Vehicle (ICV). Flexible, immediate, and precise, FSEP provides a scalable response—from warning to discomfort to lethal attack—appropriate to the situation. Components include the Long Range Acoustic Hailing Device (AHD), Projectile Detection and Cueing (PDCue), infrared (IR) and visible sensors, and various optical distractor devices, including high-power white lights and laser light sources. The nonlethal weapons suite features the recently added 12-gauge shotgun and 66mm articulated launcher. Lethal force is provided by the .50-caliber machine gun that is standard on the Stryker ICV.

### Determination of Intent

When fighting a war in which the enemy does not wear a uniform, it is difficult for Soldiers to differentiate between noncombatants and combatants. Threat determination is one of the major concerns for Soldiers engaged in current combat operations



Soldiers of the 3rd Platoon, 66th MP Co., learn to calibrate the .50-caliber machine gun on the new FSEP Stryker. (U.S. Army photo.)

characterized by counterinsurgency. While traditional rules of engagement tell Soldiers who they can use force against, they do not specify what those individuals look like.

Using escalation of force (EOF) tactics, Soldiers can better understand intent based on the conduct of potential adversaries. The use of EOF tactics for determination of intent works primarily because it uses nonlethal measures to put potential threats into situations where they must either comply with or disobey the Soldiers' commands. FSEP is the first integrated package

of nonlethal and lethal capabilities to support EOF on the Stryker ICV.

The system's effectiveness is centered in its ability to distinguish between noncombatants and combatants, discern intent, and delay or deter hostile behavior in a variety of missions, while avoiding injury to noncombatants and mitigating collateral damage. FSEP gives U.S. forces the ability to conduct raids and provide route reconnaissance, crowd control, point defense, and convoy and force protection from a single vehicle.

CPT Paul Rothlisberger, 2nd Battalion, 30th Infantry Regiment, 4th Brigade Combat Team, 10th Mountain Division, Fort Polk, LA, was the first platoon leader to use these assets in a combat environment. "FSEP allows coalition forces to communicate their purpose or intent to the public. This level of mutual awareness can prevent

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## Increment 2 allows Soldiers to take all possible measures to mitigate nonhostile injuries and collateral damage while still preserving total force protection.

unnecessary conflict. If the civilian population knows what we are doing in their town, there is less of an opportunity for an incident to arise out of confusion or mistaken intentions,” said Rothlisberger, emphasizing the importance of EOF capabilities in stability and sustainment operations. “This level of transparency with the population sets conditions for leaders and Soldiers on the ground, making their job easier. In this way, FSEP is an enabler/force multiplier. It allows a commander to accomplish a task with fewer Soldiers on the ground.”

### Incremental Evolution of FSEP

Multiple Operational Needs Statements from theater requested the capability to escalate force as needed using non-lethal to lethal measures. Developed in increments, FSEP is a cooperative effort between the U.S. Army Training and Doctrine Command (TRADOC) Army Capabilities Integration Center (ARCIC) Asymmetric Warfare Division, Fort Monroe, VA, and Project Manager Close Combat Systems (PM CCS), part of Program Executive Office (PEO) Ammunition, Picatinny Arsenal, NJ. PM Stryker Brigade Combat Team of PEO Ground Combat Services provided the maintenance and sustainment support of the three Stryker ICVs, as well as extensive technical, test, and logistical support during the development and fielding process. The Naval Surface Warfare Center, Dahlgren, VA, led the physical construction and integration of the system from inception.

FSEP Increment 1 was intended to demonstrate the technology integration

and tactical application of the system. Capabilities included high-power lights and lasers for target designation and illumination, long-range AHD for communication, IR and visible sensors for exterior situational awareness (SA), and acoustic shot detection and slewing. Three Stryker platforms with the integrated capabilities were sent to theater in November 2007 for an operational assessment on the feasibility of a vehicle-mounted, integrated EOF capability. The platform viability proved significant, but more capabilities were needed.

### Shove Capability

Operational assessments on Increment 1 called for the addition of a “shove” capability to FSEP. Reports indicated that once individuals or crowds got within a certain distance of the vehicle, Soldiers needed the ability to stop them from advancing farther or make them retreat. The shove capability is the last step in a scalable response—shout, show, shove, shoot—before employing lethal force.

Increment 2 added a 12-gauge shotgun and a 66mm articulated launcher, firing nonlethal ammunition, to FSEP. Both weapons are fired remotely from within the vehicle and have slew capability. Soldiers are now aiming a weapon at the threat, even though that weapon fires nonlethal ammunition. If the adversary still advances on the Soldier, the next step is a weapon that can kill him or her. It is a clear determination of intent. Increment 2 nonlethal weapons supplement the .50-caliber machine gun that is standard on the Stryker ICV. Increment 2 allows Soldiers to take all possible measures

to mitigate nonhostile injuries and collateral damage while still preserving total force protection.

Increment 2’s success was the result of the coordinated efforts of multiple organizations and using lessons learned from U.S. Marine Corps (USMC) EOF efforts to expand upon the capabilities provided. Joint PEO Chemical Biological Defense/Joint Product Manager Reconnaissance and Platform Integration provided technical support and funding for development of the 66mm launcher system. The U.S. Army Armament Research, Development, and Engineering Center provided the technical support and documentation required to deploy the vehicles. The U.S. Army Test and Evaluation Center was responsible for the expedited testing and evaluation of the systems. In addition, user representatives from ARCIC and TRADOC Capabilities Manager Stryker played significant roles in the design, development, and fielding. Funding was provided by ARCIC and the Office of the Secretary of Defense. General Dynamics Ordnance and Tactical Systems developed an articulated 66mm launcher system, which was modified to meet FSEP requirements.

### 360-Degree SA

Increment 2 upgrades also added two daylight cameras for a total of 12 daylight cameras and 12 IR cameras, positioned on the front, back, and sides of the vehicle. All cameras are projected inside the vehicle on the operator’s display. The cameras’ dual-stream output allows for simultaneous live monitoring and high-resolution recording. These cameras provide complete SA around the vehicle with the hatches buttoned up, the original intent and capability of the vehicle.

The PDCue system is an acoustic gunfire detection system optimized for the detection, location, and rapid engagement of incoming fires/snipers. The

combination of acoustic and IR sensors permits detection by flash or sound, even while the vehicle is on the move. PDCue microphones are mounted at the four corners of the vehicle, providing 360-degree detection, day and night. Detected targets are displayed inside the vehicle on the operator's screen, with location provided in range, azimuth, and elevation. The .50-caliber machine gun then slews to the target and locks on, awaiting engagement.

The AHD produces a highly directional sound beam, allowing users to project warning tones and voice commands beyond small-arms engagement range. It is used to encourage compliance and avoid interference with the FSEP, helping Soldiers more effectively determine the intent of a person, crowd, or vehicle at a safe distance. Soldiers can use AHD to get an individual's or crowd's attention and give them instructions, such as ordering a crowd to disperse or asking the population to stay indoors as a convoy passes through town. "If they follow the instructions, it is an indication of nonhostile intent," explained Rothlisberger. "If they don't comply, it could be an indication of trouble." The Phraselator, a multiple-phrase translator, is included with the system,



The rear nonlethal Remote Weapon Station was added to the Stryker ICV to support several FSEP components, including the long-range AHD, high-power white lights, and the 12-gauge shotgun. (U.S. Army photo.)

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permitting the operator to select from a large list of prerecorded messages appropriate for the mission. The Phraselator can be connected to the AHD for projection of the messages.

FSEP also offers optical distractors and long-range illumination to facilitate reconnaissance, target location, and/or deterrence, including high-power white lights and laser light sources. When used properly, the devices offer Soldiers a variety of desirable nonlethal effects. For example, the green beam laser, used to get an individual's attention in Iraq, has proven very effective. Locals have learned that if you see a green laser, stop what you are doing.

### System Integration

The synergy provided by the suite of FSEP's nonlethal and lethal systems permits complete SA, as well as scalable EOF capabilities for the entire crew. This integration of multiple systems on one platform allows the commander to match the appropriate effect to the situation at hand, delivering immediate, tailored, and precise responses without the latency period inherent in requesting and coordinating external assets. FSEP also provides combat support capabilities currently needed by operational commanders without placing additional demands on existing resources. Capable of protecting itself from small arms, snipers, and other ambush teams, FSEP offers protection and improved SA to other vehicles and units operating in cooperation with it.

Against an enemy that employs asymmetric tactics, our forces must also be adaptive. The integration of multiple FSEP effects and the ability

to employ compound nonlethal systems simultaneously makes it difficult for the enemy to adjust or adapt future tactics and techniques.

FSEP provides a new capability that broadens the Soldier's options for countering enemy actions and enabling maneuver, while contributing to total force protection. Its modular design supports integration on additional vehicles and expanded usage, particularly for route clearing, convoy protection, and other security missions. Although the operational environment may vary in future conflicts, U.S. forces will continue to be faced with tactical situations where a range of effects—from warning and persuasion, to discomfort and pain, to lethal engagement—will be required to meet the requirements of the battlefield.

**BRETT GROSSHANS** provides contract support to PM CCS through BRTRC. He holds a B.S. in general sciences from the University of Iowa and an M.B.A. in project management from Jones International University. Grosshans retired from the USMC in 2004.

**JIM REINHOLD** is a Project Officer with PM CCS. He holds a B.S. in mechanical engineering from the University of Delaware and an M.S. in management from the Florida Institute of Technology. A U.S. Army Acquisition Corps member, Reinhold is certified Level III in program management and systems planning, research, development, and engineering (SPRDE)-systems engineering and Level II in SPRDE-program systems engineer and test and evaluation.