

Shaping the Electronic Battlespace: The HEXJAM

By Captain Dale A. Kornuta and First Lieutenant Brian R. Dunmire

Engineers fight obstacles! Webster defines obstacles as something, material or non-material, that stands in the way of literal or figurative progress. For engineers, obstacles are the task force defense—mines and wire. While not very exciting, they are very effective when properly integrated. They were responsible for 20 percent of tank losses in World War II.

Now engineers have discovered a new obstacle: the hand-emplaced expendable jammer (HEXJAM). It can jam the complete spectrum of frequency-modulated (FM) radios, both single-channel and frequency-hopping!

The HEXJAM is known in the military intelligence (MI) community as a barrage jammer. Since the MI branch is no longer the proponent for hand-emplaced jammers, MI battalions may transfer these devices to engineer units.¹

History

FORSCOM fielded the HEXJAM as an electronic warfare communications device to divisional and corps MI units about 10 years ago. As a one-time issue, Class IX expendable item, accountability for the HEXJAM is maintained at the company level. This means that many MI S4s or property book officers may not know they exist.

There are two problems concerning ground-based jammers:

- To overpower enemy radios, friendly jammers must create a huge radio signature that is easily detected by enemy direction-finding equipment. The large signature makes them artillery magnets, since no enemy commander will tolerate disruptions in his communications.
- To jam an enemy's communications, we must know his radio frequency. We must determine when to jam and then reacquire



Photo by Jennifer Morgan

The hand-emplaced expendable jammer (HEXJAM) is a lunch-box-sized broad-band communications mine.

HEXJAM Characteristics

- Can be set up in 3 minutes.
- Jams all former Soviet bloc radio frequencies; severely restricts radios used by U.S. and NATO forces.
- Operates when buried up to, but not over, the top of the system.
- Range (classified information).
- **WARNING:** A nonhazardous, nonreversible, self-disabling capability prevents unauthorized reuse. Use only the training setting; the operational setting activates the self-destruct feature.
- Activated by a timer, with up to 29.9 hours delay.
- Jams continuously for 2 hours with one SINCGARS battery or for 4 hours with an external adapter and two SINCGARS batteries.
- Can be command activated by shunting wires attached to mounting posts (does not require a blasting machine).
- Has a shelf life of more than 10 years without batteries installed.
- Operates in blackout conditions; has no visual or audio signature.
- Smaller and lighter than an M21 mine, it is made by Fairfield Weston/Schlumberger, Model No. 4286-031. It uses a BA-5590 battery.
- No maintenance actions are authorized. A built-in test check, which includes battery installation, may be exercised at any level; however, it is performed primarily by deployment forces (engineers).
- Requires minimal training to operate (instructions are printed on the device).

the target after jamming. This limits the number of nets that a unit can attack.

Because the MI jamming mission is operational and strategic, a vacuum is created at the tactical level. The HEXJAM fills that vacuum, but the MI community does not have—and does not intend to have—personnel operating where tactical operations occur. Engineers do, and can fill that gap.

Future

We must train young engineers to attack the battlefield—not just the ground—by making them aware of new technologies in our arsenal, such as the wide area mine (WAM), the hush flare, and the HEXJAM. The WAM destroys low-flying aircraft and helicopters. The hush flare (a directional ground flare) prevents the enemy from using thermal and passive night sights. The HEXJAM denies the enemy the FM portion of the electromagnetic spectrum.

Obstacles in the electromagnetic spectrum (such as radios; microwaves; global positioning system receivers; and laser, visual, and thermal sights) must be part of the ground that we shape. We engineers must not restrict ourselves to destroying vehicles and personnel but concentrate on achieving the commander's intent. Disrupting the enemy's command and control slows or desynchronizes his maneuver, thereby supporting the killing systems of the task force. Disrupting the enemy's motorized rifle company or battalion while it conducts breaching operations can have a ripple

effect reaching all the way up to regimental headquarters. Such disruptions may force him to commit follow-on forces early to make up for the forces destroyed in the breach.

Jam Field

A jam field is any HEXJAM or group of HEXJAMs that deny the enemy effective communications on a particular piece of terrain. A jam field is difficult to detect. The enemy hears no static while his equipment is being jammed but clearly hears friendly vehicles nearby. Since jamming only affects reception, everyone outside the jam field can hear vehicles within the field. Therefore, enemy units do not realize they are being jammed even though they cannot communicate with elements of their force at the most critical juncture in their operation.

If the enemy's direction-finding systems find the jammers, they can only report that fact, because the standard opposing force (OPFOR) tactic is to use heavy artillery or rocket launchers to destroy jammers. His problem now is that the jammers are "in the wire" with his forces.

The HEXJAM's small size and delayed activation make it a flexible munition. Its disrupting effect is truly nondiscriminatory, affecting engineer, artillery, and maneuver personnel. Engineers in the breach—or one terrain feature short of the obstacle—lose their communications. Forward observers supporting the breach experience disruptions. The assault force awaiting the breach and the support-by-fire team that never gets the call to mass or shift fires are also affected.

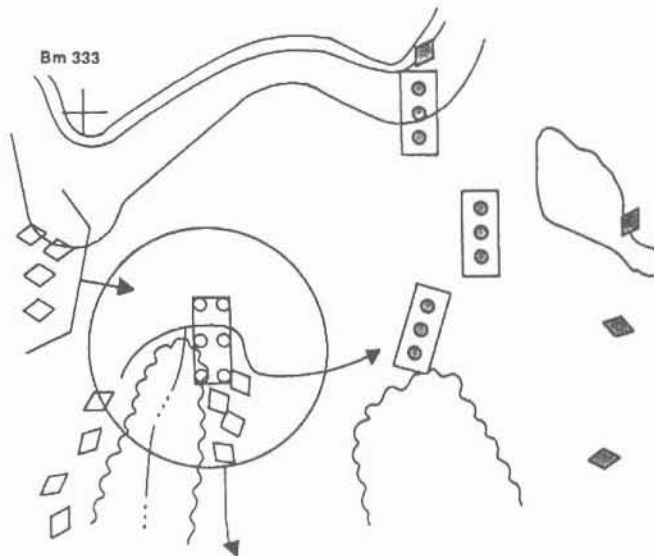


Figure 1. OPFOR Deliberate Breach Deployment



LEGEND

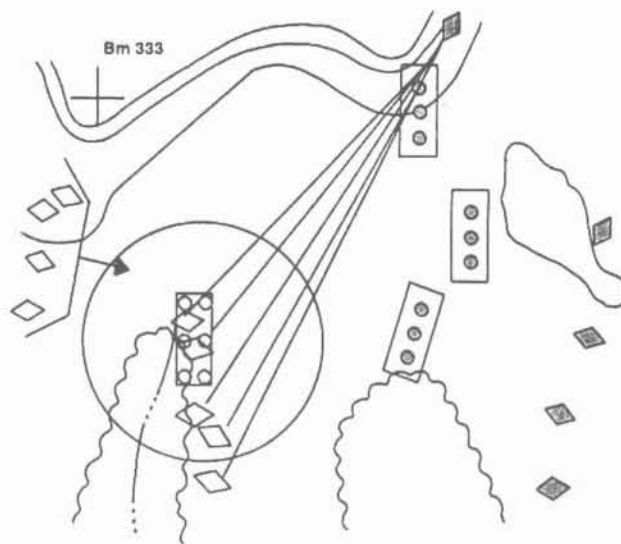


Figure 2. BLUFOR Defeating Enemy Plow Tanks

When the enemy is in the defense, HEXJAMs pushed forward with the scouts isolate security forces, thereby disrupting the entire enemy security zone.

Operations

Alpha Company, 588th Engineer Battalion, Fort Hood, Texas, used the HEXJAM during recent training. The following examples typify the effects the HEXJAM produced on the battlefield.

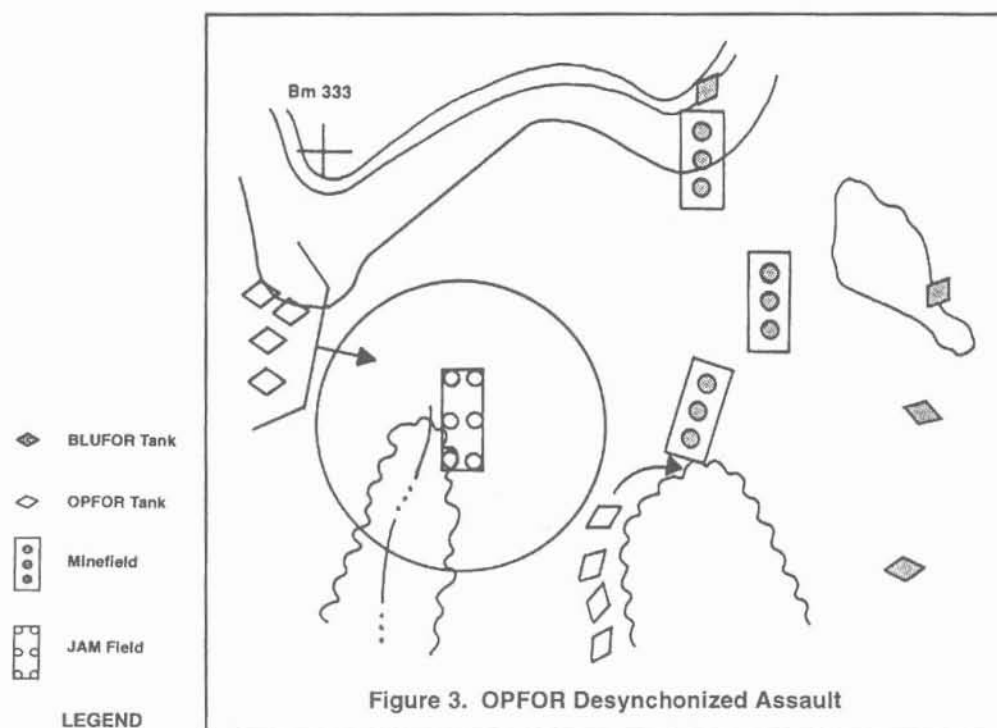
Action. Company/team lanes were conducted in the 1-kilometer-wide avenue of approach south of Bench Mark 333 (Figure 1). The ground the maneuver commander chose for his defense was bound by a steep, wooded mesa on the north and forested, low ground on the south. The jam field was placed forward of the main defensive belt in the low ground and covered by the keyhole tank on the extreme north of the main defensive position.

The OPFOR tank company maneuvered to conduct a deliberate breach. The support force deployed on the

intervisibility line south of Bench Mark 333 and established a support-by-fire position. The jam field was activated using the time-delay function, which allowed the engineers to clear the battlefield before the direct-fire engagement.

The support force skirted the low, vegetated ground in the south and the OPFOR commander moved with his breach force of four plow tanks into an attack position within the jam field. The attack stalled for 10 minutes while the OPFOR commander attempted to regain communication with his platoons. In the absence of orders, the security force worked the low ground to the south, off the map and out of the battle. The blue force (BLUEFOR) keyhole tank then annihilated all the plow tanks in a short, one-sided fire fight (Figure 2). Eventually, based on the platoon leader's understanding of the commander's intent, the security force conducted a desynchronized platoon attack (Figure 3, page 41).

Effects. The OPFOR commander and plow tanks were effectively removed from the fight, desynchronizing the attack. The commander never realized he was being jammed because he maintained constant communication with his wing tank even though he lost communication with all of his



platoons. The security force passed through the jam field with little effect, because it was not assigned a critical mission at the location of the jam field. The jam field was covered with fires, allowing it to produce the maximum effect.

Action. During Task Force Lane's offensive operations, scouts from the 3-67 Armored Battalion, Fort Hood, placed HEXJAMs near vacant enemy fighting positions before the positions were occupied. With less than 10 minutes of instruction, the scouts effectively employed the HEXJAMs. The devices were activated using the time-delay function based on line of departure plus movement time.

Effects. Tank commanders were observed dismounting to develop hasty hand and arm signals, which became their only means of communication during the battle. Lacking radio communications, the tanks could not coordinate direct fires. Their higher headquarters could not effectively control them nor could they carry out the plan for indirect fires, since they could not hear their fire support officer. This led to destruction of the tanks and desynchronization of the OPFOR defensive fight.

Strengths

The HEXJAM is an inexpensive, simple, and effective tool that has a tremendous effect during training exercises. Because there are no open frequencies to jump to, the broad-band jamming makes conventional antijam techniques ineffective. It can be set up in 3 minutes, requires minimal training, and is capable of continuous jamming operations for a period of 2 hours with one single-channel,

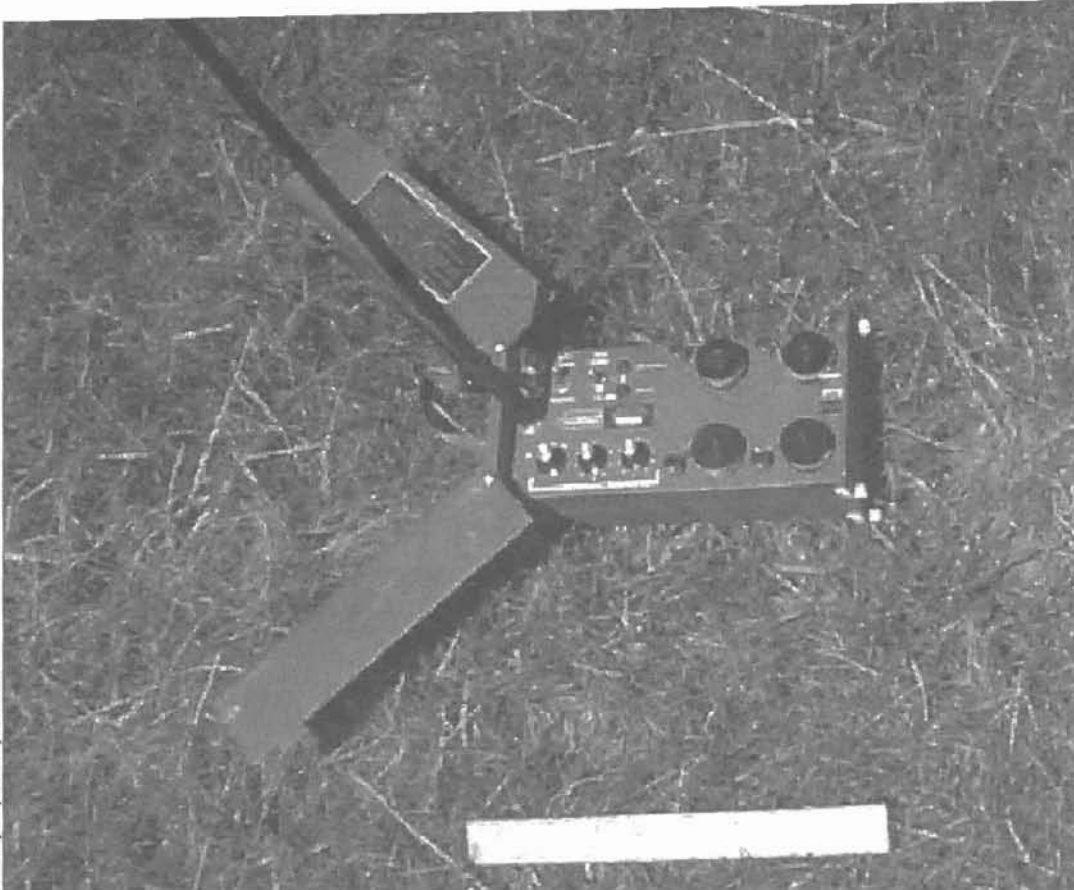
ground-to-air radio system (SINCGARS) battery. The HEXJAM is nonhazardous and nonreversible and has a self-disabling capability which prevents unauthorized reuse by the enemy. It can be activated by a timer with up to 29.9 hours of delay (see chart on page 39). The command activation system is accomplished by shunting ordinary wire. Many HEXJAMs can be "daisy chained" together. The effective area of the HEXJAM indicates the capabilities of the next generation of mines being fielded.

Limitations

Like any minefield, the HEXJAM must be integrated into the scheme of maneuver. Most importantly, the jam field must be placed where the enemy needs to communicate via FM radio. Integrating engineers into the S2's intelligence preparation of the battlefield (showing the enemy's decision points) is critical to the successful emplacement of the HEXJAM.

Communications minefields will require special rules of engagement or obstacle restrictions, such as in observer/controller locations. Its short operational time requires excellent intelligence on the enemy time line or command detonation. The batteries required for the HEXJAM must be requested through the task force several months before a training exercise. The new rechargeable SINCGARS batteries will mitigate this drawback somewhat.

The HEXJAM was designed to target potential enemy radios. As a possible friendly antijam TTP (tactic, technique, and procedure), single-channel antijam frequencies are available at the top of the FM radio spectrum.



The HEXJAM works by denying the enemy the FM portion of the electromagnetic spectrum.

The HEXJAM is no longer in the supply system. It is available from the Delta Company (General Support) or the Long Range Surveillance Company of any military intelligence battalion that has had continuous service since 1985. This device is out of the system but not "out of supply." The 588th Engineer Battalion has obtained 22 HEXJAMs. Now each line company can deny the enemy significant portions of the engagement area.

The hand-emplaced jammer is not a sensitive item or a classified device, but its range and power output are classified "confidential." The exact specifications are published in Training Circular 34-98, *Expendable Jammers* (U), 29 May 1984 (a confidential document). This pamphlet, which offers excellent TTPs for engineers, is available at the same units where the HEXJAMs are obtained.

Conclusion

The effect of denying the enemy communications on a particular piece of ground is similar to blowing a track to disrupt his formation. The usefulness of this weapon is limited only by the imagination of the commander, the S2 who knows the location of the enemy's decision points, and the engineer or scout who emplaces the device.

The HEXJAM must be added to the task force engineer's equipment. Although current supplies of HEXJAMs are adequate for training units in peacetime, they are not adequate for wartime needs.

The strengths and limitations of the HEXJAM must be developed through the normal training cycle so we can

employ them to better defend ourselves from similar devices fielded by adversaries. In the Force XXI era, this simple, inexpensive combat multiplier will help ensure that the Army achieves success on the modern battlefield.

Endnote:

¹ The memorandum authorizing engineers to obtain HEXJAMs from MI units is on file at the Directorates of Battle Lab Support and Combat Developments, U.S. Army Engineer School, Fort Leonard Wood, Missouri.

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Send your ideas about shaping tactics and techniques of future engineers to CPT Bryan Green, the Battle Lab Integration Officer, (573) 563-7355 or DSN 676-7355.