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Counter-Optical Lasers and OPFOR

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Regimental reconnaissance reported that the lead task force (which was delayed by the munitions) had committed south to reinforce their advance guard team.

Summary

Decision point tactics are essential to fighting the fluid battlefield conditions present during the meeting battle. There are four imperatives to the successful execution of decision point tactics during the meeting battle:

- Imperative 1: A unit must have good battlefield vision to clearly identify the conditions necessary to execute a specific decision. The simplicity of the meeting battle maneuver plan, coupled with a solid wargame and

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Seeing the commitment of the main body, the brigade committed its reserve in an attempt to block the OPFOR attack north of the Racetrack. Main body forces destroyed the brigade reserve and continued to envelop and destroy the lead task force.

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  rehearsal process, commander in battlefield vision.

- Imperative 2: Successful reconnaissance and counter-reconnaissance efforts by both regimental reconnaissance and CRPs are essential to identifying the decision point conditions and denying the same to the enemy.
- Imperative 3: The OPFORs highly trained crews and platoons are the foundation for the execution of decision point tactics.
- Imperative 4: Deception operations in support of the meeting battle, although not as resource intensive as other operations, are essential to gaining the time necessary to get inside the enemy commander's decision cycle.

Decision point tactics are neither unique nor new, but they form the foundation for the successful execution during the meeting battle. See you on the battlefield.

Endnote:
1. The NTC OPFOR receives its initial warning order 45 days prior to execution. The warning order comes in the form of combat battle instructions (CBI). The CBI outlines OPFOR missions, forces available and the area of operations for every mission. This allows the OPFOR to execute the DDMP for each mission.

Counter-Optical Lasers and OPFOR

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Counter-optical laser simulation is currently omitted from the realistic training provided to combined arms and services brigades and regiments rotated through the National Training Center (NTC).[1] Such simulation had been discussed by the command staff in the past but was deemed unfeasible because of technical and integration problems.[2]

While use of the class of these lasers "specifically designed to cause permanent blindness of unenhanced vision" has been deemed criminal by the Department of Defense, the growing significance of counter-optical lasers to future warfighting scenarios makes renewed discussion warranted.[3] Given the OPFOR or "New Krasnovian" predilection toward the use of persistent chemicals on Bluefor lead elements and as a means of area denial, a perception of their future use of counter-optical lasers is not unrealistic.

The Krasnovians are not inhibited by Western ethical constraints. Therefore, in pursuit of an operational edge, they can be expected to employ advanced weaponry which they obtain, such as counter-optical lasers, without moral reservation. If our soldiers are expected to face the rigors that the future battlefield holds, then simulating the use of these lasers by an opposing force would appear prudent.

Counter-Optical Lasers

The threat counter-optical lasers pose has been discussed

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for well over a decade. A *Military Review* article written by LTC Douglas P. Bacon in 1980 recognized that the laser technology employed in range finders and target designators would undoubtedly be exploited for other purposes.[4] This was further made clear by David Morrison in two mid-1980s articles concerning the use of lasers against electro-optical and bio-optical systems: that is, electronic and human eyes.[5] The subsequent use of lasers by the Soviet navy in the late 1980s against the crews of US reconnaissance aircraft, such as the P-3C, served to validate these early warnings.[6]

Against electro-optical systems, lasers are able to produce what is know as "crazing" (see side bar below). Such an effect is catastrophic because it denies an opposing tank or fighting vehicle crew much of its ability to identify and acquire opposing forces. Because of this threat, new optical sights are being built with laser protection in mind, although in some cases, as a defense against only a single wavelength. While older systems can be retrofitted with laser protection, it is expensive, amounting to $30,000 per tank in the M1 upgrade program.[7]

Against bio-optical systems, lasers have an even more pronounced effect than crazing. While the optics on a tank can be replaced, if the retina within the human eye is severely damaged, vision loss is permanent. Vision loss may result from three main damage processes: ionization, thermal and photochemical. Ionization refers to the formation of plasma bubbles within the eye which causes shock waves resulting in tissue damage. Thermal damage refers to the overheating of the eye which breaks down its structure and functioning. Photochemical damage, the least likely to take place because of the long exposure time required, alters the eyes chemical properties.[8]

The effects of lasers on the human eye are increased when magnifying optics are used. As a result, tank commanders and gunners are particularly vulnerable. A tank having had both its optics crazed and crewmen blinded

would thus be a natural outcome stemming from a counter-optical laser directed against it.

Speculation on the battlefield advantages that counter-optical

Crazing

Higher-powered low energy laser weapons have the capability of heating and distorting or cracking the glass lenses of optical systems. This effect is called crazing and is caused when the heat buildup and subsequent cooling in the glass surface creates uneven stresses in the glass surface to crack it. The result is a frosted effect, making it impossible to see through the glass lenses or vision blocks (glass windows) in tanks. Such targets may be affected at long ranges, and the optics can be crazed in less time than is needed to blink an eye.

Laser Weapons: The Dawn of a New Military Age, p. 148.

lasers could provide the New Krasnovians is not difficult. These systems, mounted on BMPs and BRDMs, could be used to "lase" opposing Bluefor scout forces to deny them battlefield intelligence. The ranges of some of these lasers may give them the potential of providing a stand-off OPFOR weapon superior in range to conventional BLUFOR combat systems.[9] Further, Bluefor would be required to contend with large numbers of "blinded" soldiers who would require medical attention and evacuation, placing further logistical strain on its combat effectiveness.

As we enter the 21st century, the availability of these lasers becomes less and less of a question. The former Soviet Union "..reduced the size of their systems to a point where ground forces can be equipped with lasers for both offense and defense."[10] With the breakup of the Soviet Union and the emergence of new commercial systems which have proven to be more advanced than military based systems in a wide range of critical technologies, we may expect a future proliferation of counter-optical systems in the worlds armies."

Simulating Counter-Optical Lasers

Because the simulated OPFOR employment of counter-optical lasers has in the past been deemed problematic from a technical and integrational perspective, their inclusion only on a "limited basis" is advocated. This approach is further warranted because the threat that these lasers represent is still an emerging one, and the Army currently exists in a time of severe budgetary constraint.

The process behind the limited inclusion of these systems, nevertheless, would require an update to NTC Instrumentation System (NTC-IS) computer symbology.[12] A new kill code

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symbol termed "Sensor" would be required. It would represent an AFV or tank which has had its optics crazed. Such a vehicle would be unable to fire its main armament, spot for artillery fires or close air support (CAS), or communicate the movements of opposing forces. In essence, a sensor kill would designate a blinded vehicle.[13]

Crew members affected by such an attack could wear partial blindfolds or an eye patch to simulate the loss of vision.[14] While this could be initially damaging to the morale of our soldiers as many troops may rather be killed than blinded, it would help to desensitize them to the types of blinding weapons that Army forces may be facing in

the future, "Lasing" directed against dismounted infantry squads could also be explored.[15]

Rather than being incorporated into the MILES II system so that such counter-optical laser simulation would result from direct firing events, it could be more cost-effectively modeled by being designated an administrative function. While not as realistic as an OPFOR BMP directly lasing a BLUFOR M2/M3, this approach could form the basis of future direct fire implementation if counter-optical laser proliferation someday makes this a critical necessity.

For implementation purposes, an OPFOR scout company could be given a number of lasing missions to simulate the counter-optical systems mounted on its BMPs and BRDMs. The initial capacity to call in such a mission would be determined by range and line-of-sight constraints. Other parameters such as weather conditions, smoke, and countermeasures could then be factored into the successfulness of each lasing attempt. If a sensor kill is warranted, it would then be done administratively.

Such an implementation strategy is not meant to be definitive. Rather, as an illustrative example, it may help to serve as a catalyst concerning how counter-optical lasers could be cost-effectively simulated at NTC.

Conclusion

While many may find non-Western concepts of non-lethality abhorrent to our moral tenets, the danger of these concepts being applied to the advanced technologies which are developing cannot be ignored.[16] A Bluefor soldier blinded on the battlefield requires far more of our resources than one that has been killed. The frontal armor of an M1 Abrams may be impervious to the conventional armament of a BMP, but its optics may not survive one retrofitted with a state-of-the-art counter-optical system.

Ultimately, counter-optical lasers represent technically advanced directed energy-weapons. The future warfighting potential that they represent is far in advance of our traditional chemical/combustion based weaponry. Their battlefield use for purposeful blinding has been deemed unethical by a democratic West: however, their future employment in this manner by non-western forces may not be so constrained. If the New Krasnovians are to accurately model the threat that such forces pose to our Army, their simulated use of counter-optical lasers must be reexamined.

Endnotes:

I would like to thank Dr. Timothy L. Sanz, Foreign Military Studies Office, Fort Leavenworth, KS, and Dr. William C. Green, California State University, San Bernardino, for their help in the preparation of this article.

1. Counter-optical lasers are known by many terms. These include tactical lasers, low-energy lasers and blinding lasers.
2. Briefing conducted by MAJ Andy Toro, Executive Officer, 11th ACR, May 4, 1996, Fort Irwin, CA.
3. Office of Assistant Secretary of Defense (Public Affairs), *DOD Announces Policy on Blinding Lasers*, NO. 482-95 (Washington, District of Columbia: September 1, 1995). Regarding their future significance see Maj Gen Bengt Anderberg and Dr. Myron L. Wolbrasht, *Laser Weapons: The Dawn of a New Military Age* (New York, New York: Plenum Press, 1992).
4. LTC Douglas P. Bacon, US Army, "Battlefield Lasers: A New Problem With an Old Cure ,*"Miitary Review"* (October 1980), pp. 33-39.
5. David C. Morrison, "Laser Weapons Come Down to Earth; Their Targets Electronic and Human Eyes", *High Technology* May 1985), pp. 69-70, and "When Eyes Become the

Targets," *National Journal* (March 4, 1987), pp. 822-823.

6. See *Soviet Military Power,* (Washington, District of Columbia: U.S. Government Printing Office, March 1987). Low energy lasers were also employed by the British during the Falklands War in 1982. Lieutenant A. Bazhov, "Laser Weapons, *"Morskoy sbornik (Naval Journal)* (1996), No. 3, p. 78.
7. Murray Hammick, "Laser Protection for AFVs: The Eyes Have It," *International Defense Review* (August 1991), p. 821.
8. Ibid. See Figure 3: Laser damage to eyes.
9. Allied Signal's experimental "Dazer" which is man-portable can introduce temporary blindness out to about one kilometer. Lieutenant A. Bazhov, p. 78. Los Alamos National Laboratory is working on a man-portable or crew-served truck-mounted laser weapon with a range of one to two kilometers. Andrew C. Tillman, "Weapons for the 21st Century Soldier," *International Defense Review,* (1994). No. 1, p. 38. Armored Fighting Vehicle-mounted systems are presumed to operate at greater ranges than man-portable units.
10. Anderberg and Wolbrasht, p. 166.
11. Such a concern has already been expressed. See Louise Doswald-Beck, ed. *Blinding Weapons: Reports of the Meetings of Experts Convened by the International Committee of the Red Cross on Battlefield Laser Weapons 1989-1991.* (Geneva, Switzerland: International Committee of the Red Cross, 1993).
12. My understanding of this symbology is based on the briefings conducted by COL Ron Thomas, NTC Deputy Commander and Chief of Staff, and LTC Rich Rees, Plans/Operations, Operations Group, on May 4-5, 1996, Fort Irwin, CA.
13. Given the battlefield digitalization effort in support of Force XXI, including sensor kill symbology makes even further sense.
14. The wearing of an eye patch has also been mentioned in the past as one means of protecting soldiers from the blinding effects of counter-optical lasers. For individual soldier protection, Ballistic and Laser Protective Spectacles (BLPS) are used. While effective against commonly used laser range finders, they will not provide protection against advanced laser systems.
15. "Lasing" is distinct from "painting" which is the illumination of a target. See Arthur Knoth, "Laser painting the Battlefield," *International Defense Review,* (October 1995), p. 79.
16. See Robert J. Bunker and T. Lindsay Moore, *Nonlethal Technology and Fourth Epoch War: A New Paradigm of Politico-Military Force,* Land Warfare Paper No. 23. (Arlington, Virginia: Institute of Land Warfare, Association of the United States Army, February 1996).

Threat Update

The *Khrizantema* Missile System

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Introduction

Until 1994, Commonwealth of Independent States arms manufacturers were only producing antitank guided missile (ATGM) systems that were wireguided, with limited range and subject to countermeasures. These included the *Fagot* (AT-4/SPIGOT), *Konkurs* (AT-5/SPANDREL), and *Metis* (AT-7/SAXHORN).