
Non-Lethal Weaponry:



From Tactical to Strategic Applications

By DENNIS B. HERBERT

Non-lethal weapons are evolving. To date they have been seen as applicable on the tactical level in military operations other than war. The demand for them will increase and spread across the conflict spectrum. A new class of non-lethal technology is also emerging that will have more direct applications on the operational and strategic levels. This evolution will depend on research to ensure that these weapons comply with political, legal, and ethical considerations.

From Eclectic to Synergistic

Until recently the development of non-lethal weapons has been a disparate effort. Isolated corners of the defense establishment focused on various technologies. Some laboratories worked on acoustics while others pursued laser technology. Moreover, it was difficult to get institutional support for non-lethal weaponry. Although senior officials expressed interest in such weapons as early as 1991, that support was not communicated to lower echelons. Some were strongly in favor of such efforts while others were very much opposed to them.

The 1995 evacuation of Somalia brought about a change in support for non-lethal weapons. While preparing for the operation, Chief

Colonel Dennis B. Herbert, USMC (Ret.), is program developer at the Institute for Non-Lethal Defense Technologies at Pennsylvania State University.

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE 1999		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Non-Lethal Weaponry: From Tactical to Strategic Applications				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Center for Counterproliferation Research National Defense University Washington, DC 20319-5066				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES The original document contains color images.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



DOD (Joe Gawlowicz)

Marines patrolling Mogadishu during Restore Hope.

Warrant Officer Charles Heal, USMCR, observed fellow marines planning to confront hostile mobs with deadly force. Having witnessed failures in crowd control during the Los Angeles riots as a member of the sheriff's department, he recommended that the Marine Corps obtain and deploy non-lethal weapons to Somalia. It was the first occasion when such weaponry was thoroughly integrated into U.S. operational planning.¹

From a tactical perspective, these weapons filled a critical vulnerability gap in the operation. "People would run up and try to steal equipment off a marine's person, knowing that our rules of engagement wouldn't allow us to shoot them," according to one marine after his tour in Somalia.² As an adjunct to deadly force, non-lethal weapons offered new options to the Marines by delaying, degrading, and denying an enemy while minimizing casualties. This suggested greater freedom of action in what had otherwise been a restricted situation.

Somalia became a catalyst for a coherent program. "The fact that marines were enthusiastic about non-lethal weapons had a positive influence on other armed forces."³ Moreover, it captured the attention of Congress. The National Defense Authorization Act of 1996 directed the Secretary of Defense to centralize responsibility for non-lethals. In January 1997, the Commandant of the Marine Corps was designated as executive agent. Shortly thereafter, the Joint Non-lethal Weapons Directorate was formed to coordinate programs across the Armed Forces and within U.S. Special Operations Command.

Over the last few years much has been done in development. A joint concept for non-lethal weapons has been issued. Related training is being developed for every service and joint standing rules of engagement are being amended. A Human Effect Advisory Panel on non-lethal weapons has been established. Moreover, such weapons have been provided to U.S. forces in Bosnia and soon will be fielded with forward-deployed Marine Expeditionary Units. This advancement comes at a time when these weapons are needed more than ever.

Across the Conflict Spectrum

The international security environment makes non-lethals an imperative today. Superpower rivalry has been displaced by a clash of cultures—or "dangerous conflicts...between people of different cultural entities," as one scholar refers to them.⁴ U.S. involvement will be unavoidable in such conflicts. As the Chief of Naval Operations and Commandant of the Marine Corps indicated, "The United States and the world cannot afford to allow any crisis to escalate into threats to [their] vital interests."⁵ Therein is the danger. Local clashes can trigger wider conflicts as outside nations and groups with cultural affinities take sides with consequences for the global order and economy.

In this environment the Armed Forces must walk a fine line. While the use of force may be tactical in application, it can be profound in strategic terms. Consider the Balkans where Russia identifies with the Serbs while Saudi Arabia, Turkey, and Iran align with Muslim minorities. The misuse of force, real or perceived, could inflame cultural animosities well beyond the tactical level.

Sole reliance on lethal force will prove a liability. Its use by the Russians in Chechnya did more to strengthen resistance than weaken it. After the Tiananmen Square incident it turned international opinion against the regime in Beijing. It also jeopardizes coalitions. Almost every government in the Islamic world, to include many which had supported the coalition during the Persian Gulf War, has condemned U.S. strikes against Iraq in the aftermath of Desert Storm.

Non-lethal weapons are indispensable to military operations other than war. They not only fill a gap on the tactical level, but also on the strategic level. They offer options in circumstances in which diplomacy is not enough and lethal force is too much. They are also less provocative than deadly force and less likely to erode local and international support. Moreover, they are essential to maintaining the moral high ground in an otherwise chaotic and strife-ridden world.



Using sticky foam to create a road obstacle.

Urban Warfare

Non-lethal weapons will become more widely applicable across the conflict spectrum. This will occur as the locus of war shifts from the battlefield to urban areas. "A particularly challenging aspect of the future security environment will be the increasing likelihood of military operations in cities," as the National Defense Panel reported.

There are several reasons for this shift. First, the world is becoming more urban. Relative to 1990, urban dwellers are expected to triple by 2025, reaching four billion, or 61 percent of the world population. Moreover, the Armed Forces will be unable to avoid built up areas in maneuver warfare. Deployment will require movement through ports and airfields located in cities. Nor will they be able to bypass sprawling "megacities" that continue to grow in the developing world.

In addition, enemies may lure us into urban areas "in an attempt to mitigate our capabilities and make us fight where we are least effective," as the Commandant of the Marine Corps has remarked. This was the situation in 1993 when Somali warlords sought to fight U.S. forces in the alleys of a third world city where combat was reduced to rifle against rifle.

Urban warfare poses unique problems for less discriminate and catastrophic use of force. Enemies may blend with noncombatants. Moreover, they may use civilians as shields to deter attack, as occurred in Somalia and Iraq. At the very least they will use the urban infrastructure for cover, concealment, and movement.

Non-lethals will be vital in urban warfare, as indicated in the Joint Warfighting Science and Technology Plan. They can be used to channel noncombatants away from combat. They can also enable a commander to separate the combatants from noncombatants with a minimum of casualties. They can be used to clear human roadblocks which protect high-value targets. Additionally, they can reduce collateral damage to the infrastructure and ultimately the cost of war. It may no longer be necessary to destroy a village in order to save it.

The implications of non-lethals for regional conflict may go well beyond the tactical level. They will significantly contribute to preventing hostilities. An enemy may see high lethality as too disproportionate a penalty to be a credible deterrent whereas non-lethal weapons may be deterrents at lower levels. The end result is best described by the current commander in chief of U.S. Central Command, General Anthony Zinni: "Non-lethal weapons when properly applied . . . make the United States more formidable, not less so."

Non-lethal weaponry is also key to maintaining political will. As one report has explained, "In regional conflict, [the U.S.] stake may seem less apparent. We should provide forces with capabilities that minimize the need to trade American lives with tyrants and aggressors who do not care about their own people."⁶ To a great extent, non-lethals represent such capabilities.

Weapons of Tomorrow

The next generation of non-lethal weaponry holds great promise. By comparison, today's capabilities are manifest by blunt trauma weapons, aqueous/sticky foams, and oleoresin capsicum spray. Their applications are tactical whereas the next generation will have more direct operational and strategic applications.

Desert Storm provided a glimpse of things to come. Electronic microchips with a computer virus were reportedly inserted into a printer being smuggled into Iraq via Jordan for delivery to an air defense bunker. The virus was designed to disable the computers that enabled coordination and communications between air defense batteries. According to one account, it devoured "Windows" whenever technicians opened monitor screens to check on aspects of the air defense system.⁷

A more strategic example was the use of carbon fiber in the Gulf War. Tomahawk missiles released thousands of spools of carbon fibers over Iraqi power stations that floated down to short circuit electrical components that ultimately disrupted electrical supplies. Such technology revealed the possibility of attacking military and civilian infrastructures without the catastrophic damage associated with conventional weaponry.

the next generation includes acoustics, electromagnetic pulse, lasers, and other directed energy weapons

The next generation of non-lethals is now emerging. It includes acoustics, electromagnetic pulse, lasers, and other directed energy weapons. In the future, microwave weapons might disable communications in enemy rear areas. Lasers might degrade key sensor systems. Cruise missiles carrying electromagnetic pulse systems or microscopic carbon fibers that can penetrate almost any electrical system could shut down military and civilian infrastructures.

Such technology can serve several strategic purposes. It can support economic sanctions. Prior to more lethal warfighting, it can create strategic paralysis—a pause that gives diplomacy time to work. The basic principle is that non-lethals can leave an enemy more vulnerable to deadly force. If such force becomes justified, this technology can degrade and disable enemy forces until conventional force can be brought to bear.

The applications of such weapons on the operational and strategic levels must be weighed. Their advent is rapidly approaching. In addition, turning new technology into military capabilities is time-consuming. Finally, the United States is not the only nation developing this technology. China, Russia, Germany, Israel, France, and

ethical terms. This legitimacy as well as further development will largely depend on a precise understanding of their human effects. These impacts determine what makes a weapon either lethal or non-lethal. But this is easier said than done.

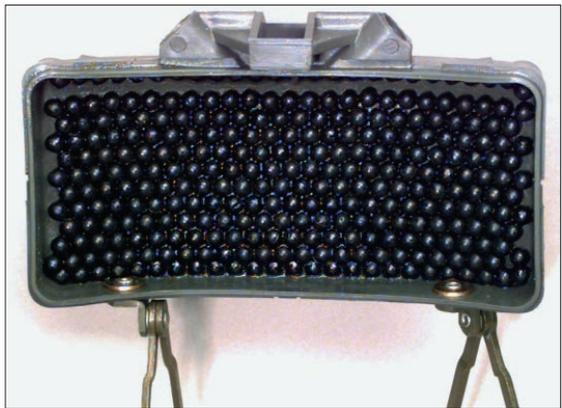
As the TECOM Technology Symposium in 1997 concluded regarding non-lethal weapons, “Determining the target effects on personnel is the greatest challenge to the testing community.” There are several reasons for this problem. The potential of injury and death severely limits human tests. Animal testing, which is also limited, is not always reliable. In addition, the biotechnology required for developing non-lethals does not fit within the bounds of past research disciplines. The problem is compounded by the fact that non-lethal technology cuts across the spectrum of science.

Yet understanding non-lethal weapons effects determines safe employment parameters and ultimately rules of engagement. It is also necessary to ensure compliance with international law. Lasers that cause permanent blindness violate the Blinding Laser Ban of 1995—a treaty initiated by the United States. Directed energy weapons that target the central nervous system and cause neurophysiological disorders may violate the Certain Conventional Weapons Convention of 1980. And weapons that go beyond non-lethal intentions and cause “superfluous injury or unnecessary suffering” could violate the Protocol I to the Geneva Conventions of 1977.

Environmental consequences must also be considered. A modification of the environment with harmful effects on humans would violate the Convention on the Prohibition of Military or Hostile Use of Environmental Modification Techniques. Knowledge of human and environmental effects may be necessary to establish international standards. Past conventions were drafted when such technology was the stuff of science fiction. How non-lethals are defined and employed may be subject to broad interpretation. New protocols may be needed to ensure that they are not abused in warfare or in domestic law enforcement.

Controversy already surrounds non-lethals. A number of speakers at the Symposium on the Medical Profession and the Effects of Weapons in 1996 at Montreux, Switzerland, claimed that many violated international laws and that the medical and legal communities must use medical data to counter arguments to the contrary. Subsequently, in a statement presented to the U.N. General Assembly the International Committee of the Red Cross warned that “the obligation to examine the humanitarian law implications of all new weapons, including those assumed to be ‘non-lethal,’ must be taken with the utmost seriousness.”

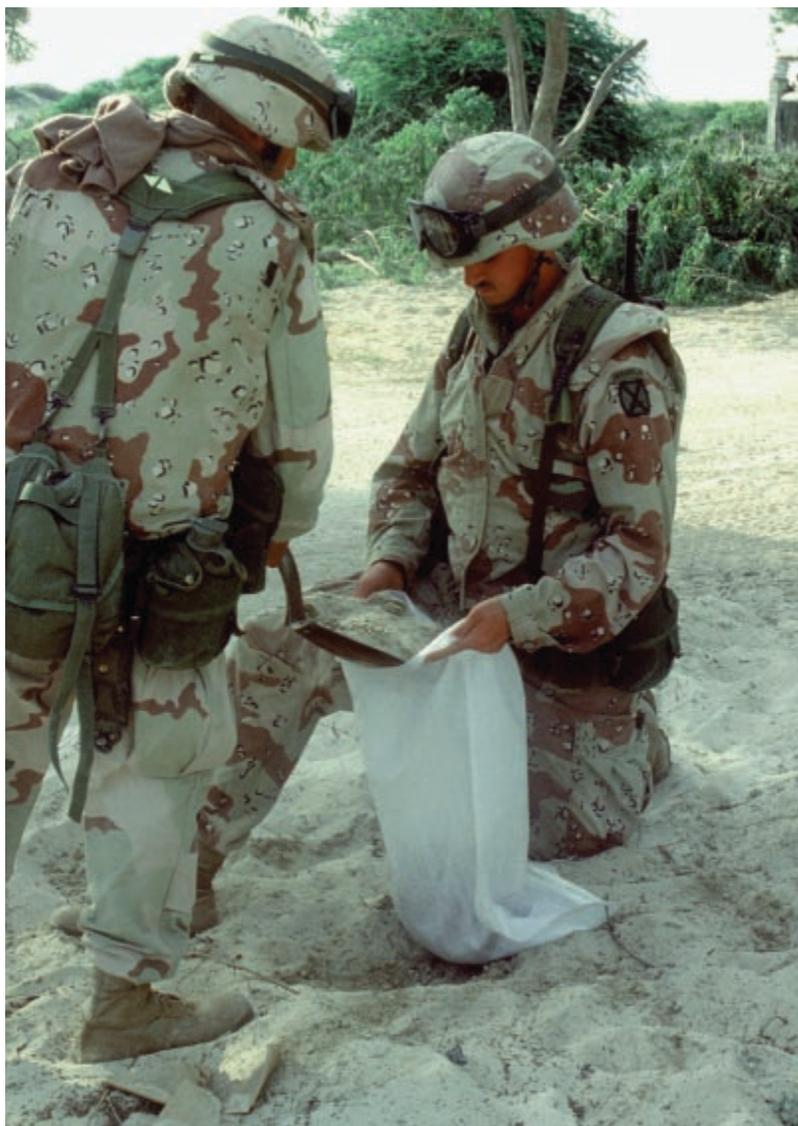
Modular Crowd Control Munition (non-lethal claymore mine).



Britain are thought to be pursuing antipersonnel laser programs or other directed energy weapons, many of which are covertly sold on the international arms market.

Multidisciplinary R&D

Non-lethals hold considerable promise but also pose tremendous challenges. Increasingly they will have to be acceptable in legal, social, and



DOD (Gary Bryant)

Filling sandbags for checkpoint speed bumps, Somalia.

Developing non-lethal weapons demands a concerted multidisciplinary approach, a reality recognized as early as 1973 in efforts at Aberdeen Proving Ground. However, two things have changed since then: technology has become more complex and so have regulatory oversights.

Pennsylvania State University possesses the expertise to conduct multidisciplinary research on non-lethal weapons. Many of the technologies being developed in its applied research laboratory have import for non-lethals. In 1977 the university established the Institute for Non-lethal Defense Technologies to coordinate various research projects among its colleges of medicine, health and human development,

engineering, and earth and mineral sciences as well as its Institute for Policy Research, the Dickinson School of Law, and the Applied Research Laboratory. This effort supports the Human Effects Advisory Panel, which will address human effects for the Joint Non-lethal Weapons Directorate, including quantitatively defining non-lethal and incapacitation effects.

In testimony before Congress, the director of the Defense Intelligence Agency noted that non-lethals have “the potential to dramatically alter the nature of warfare.” Their application is evolving from the tactical to strategic levels. However, their complexity makes them unlike other weapons, and many of their effects remain undetermined. The outcome of this evolution depends on an unprecedented multidisciplinary research and development effort. It will mean the difference between the use and misuse of non-lethal weaponry not only by the Armed Forces but other organizations as well. **JFQ**

NOTES

¹ Charles Heal, “Nonlethal Technology and the Way We Think of ‘Force,’” *Marine Corps Gazette*, vol. 81, no. 1 (January 1997), p. 26.

² Darlene Himmelspach, “Marines Deploy Non-lethal Weapons to Stop Mock Melee,” *San Diego Union Tribune*, November 1, 1997.

³ Nick Lewer and Steven Schofield, *Non-lethal Weapons: A Fatal Attraction?* (Atlantic Highlands, N.J.: Zed Books, 1997), p. 71.

⁴ Samuel P. Huntington, *The Clash of Civilizations: Remaking of World Order* (New York: Simon and Schuster, 1996), p. 28.

⁵ Jay L. Johnson and Charles C. Krulak, “Forward Presence in a Violent World,” *Surface Warfare*, vol. 22, no. 4 (July/August 1997), p. 4.

⁶ *Defense Strategy for the 1990s: The Regional Defense Strategy* (Washington: Office of the Secretary of Defense, January 1993), p. 15.

⁷ U.S. News and World Report, *Triumph without Victory: The Unreported History of the Persian Gulf War* (New York: Random House, 1992), p. 224.