

**STRATEGY
RESEARCH
PROJECT**

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**EMERGING NONLETHAL WEAPONS TECHNOLOGY AND
STRATEGIC POLICY IMPLICATIONS FOR
21ST CENTURY WARFARE**

BY

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USAWC STRATEGY RESEARCH PROJECT

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ABSTRACT

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While technological advances continue to provide U.S. forces with decided advantages over potential adversaries, emerging nonlethal weapons technologies promise to provide additional military options to policy makers and commanders which were heretofore unthinkable, providing a strategic advantage to U.S. forces well into the 21st century. The potential impacts emerging nonlethal weapons technologies will have on strategic policy for future military operations are immense. These weapons possess the potential to carve out an intermediate position on the use of force spectrum that lies juxtaposed between no use of force and the use of lethal force. Nonlethal weapons present the United States with a potential strategic flexibility no nation has possessed in the past, but is increasingly possible due to developments in nonlethal technologies.

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Emerging Nonlethal Weapons Technology and Strategic Policy Implications for 21st Century Warfare

Generally in war the best policy is to take a state intact; to ruin it is inferior to this. To capture the enemy's army is better than to destroy it; to take intact a battalion, a company or a five-man squad is better than to destroy them. For to win one hundred victories in one hundred battles is not the acme of skill. To subdue the enemy without fighting is the acme of skill.¹ Sun Zu, The Art of War

Increasingly, U.S. forces find themselves facing a multitude of challenges in the highly complex and ambiguous global environment of the post-Cold War. Since the fall of the Berlin Wall, U.S. military operations have ranged from major theater warfare and the defeat of Iraqi forces in the Gulf War to present day smaller-scale contingencies such as peace enforcement operations in Bosnia-Herzegovina. The end of the Cold War and dawn of the information age with rapid developments in technology have done nothing to lessen operational requirements to deploy our military forces into a variety of situations. While technological advances continue to provide U.S. forces with decided advantages over potential adversaries, emerging nonlethal weapons technologies promise to provide additional military options to policy makers and commanders which were heretofore unthinkable, providing a strategic advantage to U.S. forces well into the 21st century.

The potential impacts emerging nonlethal weapons technologies will have on strategic policy for future military operations are immense. This paper will examine current and proposed nonlethal weapons policy at the strategic level, while developing and exploring strategic policy implications for the United States into the next century using an incremental, two-tier approach: first, the development, testing, and use of nonlethal technology in smaller-scale contingencies such as peace operations; second, potential use

in major theater warfare. The paper concludes with an analysis of the strategic advantages to the United States in terms of operational flexibility and technological dominance should the potential of emerging nonlethal weapons technologies be exploited to their fullest.

Background

Definitions regarding nonlethal weapons abound and there is certainly no absolute agreement as to what constitutes a nonlethal weapon or family of weapons. A workable definition, and the one used here, is provided by the National Defense University: "Nonlethal weapons are characterized by their ability to disable or incapacitate people or things while minimizing physical harm to them, either because their effects are highly discriminate or relatively reversible."²

Notice the definition does not suggest that nonlethal weapons are completely harmless, only that the intent is to minimize harm to people, equipment, and infrastructure, while gaining the desired military effect on targets. Nonlethal clearly does not mean completely risk free. In some instances nonlethal operations could unintentionally result in lethal consequences. The intent is to conduct militarily effective operations while, to the maximum extent possible, incapacitate personnel and equipment, simultaneously limiting the collateral damage to noncombatants and infrastructure.

Nonlethal weapons technologies encompass an array of categories of technology with widely differing uses and potential applications. These weapons are generally categorized into two groups: those that affect personnel and those that have an effect on materiel. Though most potential nonlethal weapon technologies remain in the embryonic stage of development, the U.S. Army's Training and Doctrine Command (TRADOC) has already published a set of guidelines for the types of nonlethal weapons capabilities needed by the Army in the future:

Nonlethal capabilities will affect human abilities/senses and materiel in order to disrupt or prevent normal operations. Nonlethal capabilities intended for use against personnel will have relatively reversible effects. It is the Army's intent to develop nonlethal capabilities that do not maim, permanently disable, or kill personnel.³

Required nonlethal capabilities articulated by TRADOC include the ability to affect both human and materiel systems. Nonlethal weapons affect human capabilities through: temporary disorientation, crowd dispersal, calming or stunning of personnel, and sensory impairment. To defeat materiel systems, nonlethal weapons must: blind optical sensors and targeting devices, disable electronics in equipment, prevent movement of vehicles, and cause computer driven systems to fail.⁴

TRADOC also envisions additional capabilities other than direct attack on people or combat equipment. For example, nonlethal weapons can be used to provide security and surveillance by enhancing tactical area security and isolating adversaries. Additionally, a requirement exists to attack combat support systems and infrastructure to include weakening or changing fuels and metals, disrupting utilities, and defeating modern materials such as composites, polymers, and alloys.⁵

As mentioned, while not all the technologies required to meet TRADOC's articulated capabilities exist in a militarily usable fashion, their potential is recognized within military and civilian circles, and are probably within the realm of the technically possible in the future. Most of these technologies are achievable through intense efforts at research and development, assuming adequate levels of funding. Thus far, the U.S. military has shown a mild interest in their capabilities and has articulated policy in a Department of Defense (DoD) policy memorandum. The funding, research and

development, and procurement to date, however, do not appear to be indicative of an enthusiastic approach to the potential of nonlethal weapons at the senior levels of our military and civilian leadership.

Policy

Nonlethal weapons are not addressed in the National Security Strategy released in May 1997; however, the DoD has established a nonlethal weapons policy.⁶ The DoD has articulated nonlethal weapons policy in DoD Directive 3000.3 which recognizes the potential these technologies possess. It is DoD policy that:

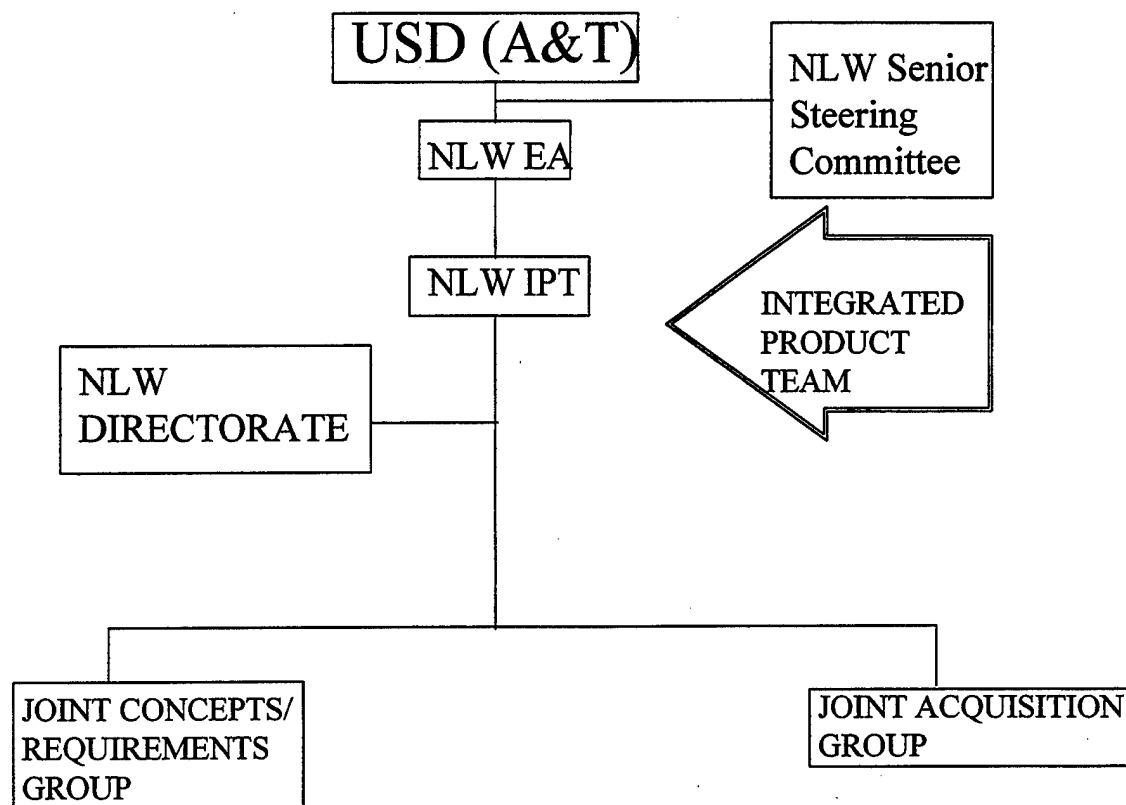
1. Non-lethal weapons, doctrine, and concepts of operation shall be designed to reinforce deterrence and expand the range of options available to commanders.
2. Non-lethal weapons should enhance the capability of U.S. forces to accomplish the following objectives:
 - a. Discourage, delay, or prevent hostile actions.
 - b. Limit escalation.
 - c. Take military action in situations where use of lethal force is not the preferred option.
 - d. Better protect our forces.
 - e. Temporarily disable equipment, facilities, and personnel.
3. Non-lethal weapons should also be designed to help decrease the post-conflict costs of reconstruction.
4. The availability of non-lethal weapons shall not limit a commander's inherent authority and obligation to use all necessary means available and to take all appropriate action in self-defense.
5. Neither the presence nor the potential effect of non-lethal weapons shall constitute an obligation for their employment or a higher standard for employment of force than provided for by applicable law. In all cases, the United States retains the option for immediate use of lethal weapons, when appropriate, consistent with international law.
6. Non-lethal weapons shall not be required to have a zero probability of producing fatalities or permanent injuries. However, while complete avoidance of these effects is not guaranteed or expected, when properly

employed, non-lethal weapons should significantly reduce them as compared with physically destroying the same target.

7. Non-lethal weapons may be used in conjunction with lethal weapon systems to enhance the latter's effectiveness and efficiency in military operations. This shall apply across the range of military operations to include those situations where overwhelming force is employed.⁷

Within DoD, the nonlethal weapons program is managed by the Under Secretary of Defense for Acquisition and Technology (USD - A&T) (See figure 1). The USD(A&T) is assisted by a nonlethal weapons senior steering committee that serves in an advisory role, with the U.S. Marine Corps acting as the executive agent (EA) among the services for the DoD. The EA performs its function through a series of joint working groups that include a nonlethal weapons integrated product team (IPT) which has a nonlethal weapons directorate to execute program reviews and oversight for the IPT. Also reporting to the IPT are a joint concepts requirements group (JCRG) and a joint acquisition group (JAG).⁸

The nonlethal weapons directorate (NLWD) performs daily activities in support of the EA. The NLWD manages joint funding lines, provides liaison with the interagency and foreign governments, publishes a master plan, assists in program objective memorandum (POM) development, monitors the execution of the DoD nonlethal weapons program, and provides coordination across service lines.⁹ While the Office of the Secretary of Defense (OSD) has established a structure to attempt to synchronize DoD stated policy with emerging nonlethal technologies, the results to date have been mixed.



NLW MANAGEMENT STRUCTURE (Figure 1)¹⁰

Outside pressures from Congress have played a significant role in prompting OSD to direct the services to fund limited nonlethal weapons programs.¹¹ The current program budget for FY98 shows a total allocation of \$16.8 million in the DoD nonlethal weapons program for program administration, experimentation, modeling & simulation, technology investment, and service research, development, testing, & evaluation programs (RDT&E) for 14 separate service programs, at least 11 of which are Army programs. This number increases slightly to \$23.5 million in FY99 and remains constant throughout the Program Objective Memorandum (POM) years.¹²

Given this level of funding, DoD is operating under severe resource constraints in relation to current policy. With the current level of funding, the clear risk is that DoD will never be able to adequately develop the ways to execute the nonlethal program policy ends. This resource commitment figure appears to represent a caretaker approach to the integration of nonlethal weapons into the U.S. arsenal - just enough money to keep a few relatively low-tech programs afloat.

There is some good news, however. As mentioned, beginning in FY99, spending increases slightly to \$23.5 million with the money stream adjusted for inflation extending out to FY05. Additionally, the Army has programmed for procurement of five different type classified nonlethal weapon munitions during FY99-02. Also, about \$2 million dollars were recently spent to purchase off the shelf nonlethal weapon munitions to support commanders in contingency operations.¹³

Previously, the U.S. military, with the exception of CS gas, did not keep nonlethal weapons of any type in its operational stocks, even the low-tech, blunt trauma variety fired from infantry type weapons. With the nonlethal weapons program in its infancy, requirements from the field have sometimes outstripped the time needed for research, development, testing, and procurement. For example, when operations turned violent in Bosnia in August 1997, commanders began to request a nonlethal capability from the Pentagon which had to go into a crisis response mode to quickly buy nonlethal munitions off the shelf from a civilian firm that manufactures them, and ship them off to Bosnia to soldiers and leaders whose prior training amounted to familiarization by a mobile training team.¹⁴

In recognition of this readiness vacuum, a conference hosted by the Nonlethal Weapons Directorate at Quantico, Virginia was held on 4-5 November 1997 to coordinate nonlethal weapons requirements for future contingency operations such as Bosnia. During the conference, service and CINC representatives discussed not only contingency stock needs, but future potential use of nonlethal weapons as we approach the realities of 21st century warfare.

Nonlethal weapons represent a capability that possess potential uses across the entire spectrum of warfare, a potential that will become increasingly relevant as we move into the 21st century. The United States should develop this capability on a number of fronts, engaging technologies that have application to both smaller-scale contingencies and major theater warfare. The recommendation here is for an evolutionary approach. The timing is right for us to incrementally develop significant nonlethal capability while engaged in smaller-scale contingencies such as peace operations, with a view toward capitalizing on these experiences and advances in technology to provide the United States with a significant nonlethal advantage in the early part of the next century; an advantage with decided applications to both smaller-scale contingencies such as peace operations as well as major theater warfare.

Smaller-Scale Contingencies (Peace Operations)

An August 1997 *Washington Post* story captured the essence of the violent and ambiguous type of operations that our forces face today, and will most assuredly face again in the future. The story read in part:

Brcko, Bosnia, Aug. 28 - Mobs of Bosnian Serbs egged on by their hard-line leaders, hurled rocks and molotov cocktails at U.S. peacekeeping troops today in an explosion of rage over U.S. and allied backing for Bosnian Serb President Biljana Plavsic.¹⁵

Should commanders have options that go beyond doing nothing, yet fall short of using lethal force? Clearly in the television age, policy makers prefer operations that are as bloodless as possible, yet effective. This is particularly true when the object of a deployed force is to maintain an equilibrium between former warring forces, or to implement a peace agreement, preferably without having to resort to force of any type, and certainly not lethal force. As noted by Morris, et al.: "The ability to nonlethally overwhelm an enemy who is using lethal force has become a clear requirement for peacekeeping, peace enforcement, operations other than war, and military operations in built-up areas where minimum destruction of life and property are prerequisites for action."¹⁶

A clear trend in the post Cold War era is the persistent phenomenon of "failed states." The United States has most recently found itself involved militarily in Somalia, Haiti, and Bosnia, nations with extremely weak governments. With U.S. and other forces called upon to provide stability and order in these political vacuums, peace operations have

proven to be highly complex and unpredictable. Nonlethal weapons would seem to be a permanent fixture in support of these operations.

Their potential in these situations was recognized by the Combined Task Force Commander of Operation *United Shield*, Lt.Gen. Anthony Zinni, when he decided to rely on nonlethal weapons to cover the withdrawal of U.N. peacekeepers out of Somalia in 1995.¹⁷ We'll now briefly examine the use of nonlethal weapons in operations in Somalia, and discuss their possible future use in similar peace operations environments.

Based on experience, planners knew the possibility existed that hostile groups could try to interfere with the withdrawal of forces from Somalia. Lt.Gen. Zinni recognized that nonlethal weapons could help to save lives and minimize the impact of a confrontation during this phase of the operation. Rapidly, Marines identified off-the-shelf nonlethal weapons and some that were in the developmental stage to assist them in their operations. Following coordination with a host of governmental and nongovernmental agencies, they decided upon munitions which could be fired by weapons already organic to a rifle company (M203 grenade launcher, M-16 rifle, and 12-gauge shotgun).¹⁸ The systems included:

- Nonlethal projectiles (bean-bag rounds, rubber baton rounds, and rubber pellet rounds).
- Stinger grenades (which disperse rubber pellets instead of metal shrapnel).
- Sticky foam (dispensed by an operator against an individual target).
- Barrier foam (resembles soap suds, but laced with irritating gas).¹⁹

The Marines trained with these nonlethal weapons while policy makers grappled with legal and policy reviews in the Pentagon. An effort was made to warn Somali clan leaders as to their existence prior to employment, along with a briefing to the press back in Washington. The weapons were not employed against the Somalis as the operation went peacefully, leading some to believe the weapons played a major role in deterring violence.²⁰

This experience with relatively low-tech nonlethal weapons presented a number of important lessons:

- There are significant shortcomings in the Department of Defense's ability to identify, acquire, and deploy nonlethal weapons. In particular there is no unified process in place to coordinate the fragmented efforts in nonlethal weapons research and development.
- Since the use of nonlethal weapons was allowed only in situations where lethal force would be authorized, current U.S. military rules of engagement with respect to the tactical decision to use nonlethal or lethal means need to be clarified. Thus, the Marines believed nonlethal weapons could not be used readily to control escalation or to apply a graduated response to the threat.
- In training for operations other than war, traditional wartime skills, such as the return of a high volume of fire immediately when fired upon, must be modified, since there is a premium on restraint in the use of firepower and violence.
- A media plan must be carefully crafted and conscientiously followed by commanders and spokesperson, releasing sufficient information to deter, but not so much information that U.S. tactics could be easily defeated by a cognizant adversary.²¹

If nonlethal weapons had such an apparent positive impact in Somalia, why aren't they being employed widely in Bosnia today, and why hasn't their employment become an integral part of U.S. strategic thinking? The answer may lie in criticism by some groups

raising a panoply of questions clearly aimed at eliminating or seriously degrading nonlethal weapons research and development. The main criticism of the development of nonlethal weapons is that they may make warfare more inhumane, raising many potential ethical and legal questions. For example, Nick Lewer and Steven Schofield write:

What kinds of non-lethal weapons should defence departments acquire and what kinds should not be acquired, for reasons like scarce resources, mission importance, legal obligations? Relating to legal and treaty obligations, do non-lethal weapons using hallucinogens or other psychotropic substances qualify as toxic chemicals or riot control agents under the Chemical Weapons Convention? In what circumstances should non-lethal weapons be used? And, given a choice, would it be preferable to kill a combatant or take action that could leave him or her alive but permanently maimed?²²

Others look at nonlethal weapons as a panacea to replace bloodshed as a means of settling differences. David Morehouse writes: "Nonlethality is a revolutionary concept that can guide the international community into realizing a new world order. When nonlethal technologies replace the old weapons of destruction, diplomacy will take its rightful place as the supreme method of conflict resolution."²³

These may be difficult issues, questions, and points of view raised by those with a variety of expectations, but issues, questions, and points of view that nonetheless must be confronted and overcome by U.S. policy makers. It is not so much whether or not nonlethal weapons will be used in military operations, but rather when and under what circumstances. In this information age, politicians under the watchful eye of the press and ultimately the American people, will be under increasing pressure to limit violence, casualties, and collateral damage in military operations, especially peace operations.

We witnessed the phenomenon in Somalia, and are beginning to see it happen anew in Bosnia where nonlethal weapons of the relatively low-tech variety like those used by the Marines in Somalia are being introduced into theater.²⁴ Unfortunately, we once again find ourselves buying off the shelf munitions from industry in response to a commander's desires. This seems to argue for continued planning and an acceptance for the use of these weapons in military operations, particularly in future peace operations.

A step in the right direction would be increased emphasis and funding of the existing 14 DoD programs currently underway. Ranging from crowd dispersal rounds to acoustic bio-effects, all 14 programs seem to have a potential role in smaller-scale contingency operations, and perhaps even in major theater warfare. As these and future systems are developed, care must be taken to ensure binding legal arrangements and treaties governing warfare are complied with, and that weapons effects are in consonance with the humane intent of nonlethal weapons and not cause undue pain and suffering.

The United States should take advantage of the opportunity to test and develop nonlethal technologies during this period of strategic pause. Nonlethal weapons use in peace operations on a relatively limited scale could serve as a prelude to use on a wider scale in major theater warfare. As nonlethal weapons technologies become more available and better understood by military and civilian leaders, the call for more capable and sophisticated systems in the future is a probable outcome, particularly as their potential use in major theater warfare becomes apparent. Not only can these technologies be used to limit casualties and collateral damage in politically sensitive

operations, but their use will also enhance the lethal weapons advantage the United States already possesses.

Major Theater Warfare

As technology continues to move forward at unbelievable speed, more and more capabilities will emerge with military applications that were once thought possible only in science fiction. Let us imagine for a moment what some of these potential capabilities might be:

...strategic targets are attacked with a wide range of non-lethal weapons delivered using UAVs, stealth and 'smart' technologies. The targets include: power grids which are neutralized by disrupting them with carbon fibres released from cruise missiles; weapons of mass destruction (WMD) such as biological and chemical agents, which are sprayed with agents that form tough, hard coats over them; and radar and missile sites which are disrupted by electromagnetic pulses. Runways, roads and rail tracks needed for military logistics and supplies are made slippery and impassable by Teflon-type anti-traction agents; fuel dumps are contaminated by bacterial agents that degrade the petrol and diesel; and computer systems are invaded by computer viruses that attack software programmes, and also by ultra-fine carbon fibres that short-out and disrupt the computer hardware. Runways and roads are put out of action by dispersing four-spiked caltrops over them, which are cemented in place using hardening adhesives. Chemical embrittlement agents, which attack metallic components by weakening them and causing structural fracture, are applied to weapons and military installations. All these actions have the effect of denying military capability and degrading the military infrastructure.²⁵

A scene from a science fiction book or movie? Actually, the scenario above describes nonlethal weapons technologies and capabilities that could potentially be available in the future. The capabilities described are consistent with possible future military applications in major theater war and represent an entirely new way of looking at the potential of nonlethal weapons applied at the high intensity end of the conflict spectrum.

While the U.S. military does not currently possess the technology to execute the operation depicted in the fictitious scenario, could we in the future? The answer is that

most, if not all of the nonlethal technologies described, with sufficient funding, research, and development are quite possible. The larger question is should we possess these capabilities in the future? And, if these technologies were to exist, are U.S. military capabilities degraded or enhanced? The position here is that through an evolutionary process of development of nonlethal weapons technologies, future U.S. military capability will be significantly enhanced. Nonlethal weapons are a combat multiplier in the context of the realities of the political nature of war, particularly the unique nature of the information age battlefield.

The great strategist Carl von Clausewitz in his discussion of the political aspects of war stated: "The political object--the original motive for the war--will thus determine both the military objective to be reached and the amount of effort it requires."²⁶ According to Mr. Charles Swett, Assistant for Strategic Assessment (Office of the Assistant Secretary of Defense - Special Operations/Low Intensity Conflict) a major aspect of the introduction of nonlethal technologies is to better enable commanders to achieve military objectives subject to political constraints.²⁷ Political constraints upon military operations are nothing new. What is emerging, however, is the potential capability for significant military options beyond the juxtaposition of doing nothing and the use of lethal force. Even in major theater warfare, the nonlethal option may make the most sense in view of the political restraints placed upon a particular military operation. The Gulf War offers an excellent example.

Going into the Gulf War, it was apparent that excessive infrastructure damage and Iraqi casualties would be politically and militarily tricky. The political realities of a

televised public blood bath and its impact upon strategic military operations were clearly recognized by the Chairman of the Joint Chiefs of Staff, General Colin Powell:

Despite all the firepower, anticipated swiftness and violence, Powell had worked with Schwarzkopf to make sure the offense showed some restraint. Collateral damage had to be minimized. Of the half dozen bridges inside the Baghdad city limits, the air campaign was, at Powell's urging, only going to hit two. Four would be left standing. Powell was convinced that it would not be in the U.S. interest to have a totally defeated Iraq with no capability to defend itself. So some of the Iraqi tanks and military would have to be left in tact.²⁸

While not suggesting that sufficient, usable nonlethal weapons technologies existed then, or even exist today, just suppose the United States possessed a technologically superior and capable nonlethal weapons arsenal to complement its already superior lethal weapons inventory. Following 100 hours of war, with the Iraqi Army in full retreat, would the political decision have been to stop the war, or would the National Command Authority have had a more desirable option to switch to primarily nonlethal technology, continuing to destroy Iraqi military capability in a politically acceptable manner?

Many today believe the war was stopped short of truly destroying sufficient Iraqi military capability, a decision that was based largely on humanitarian concerns and the politically unacceptable specter of media focused on the "highway of death," the very public destruction of Iraqi divisions.²⁹ Emerging nonlethal weapons technologies could be applied to similar situations in the future.

Imagine for a moment how nonlethal weapons technologies could be applied in situations such as termination of the Gulf War. With the application of antitraction technology, key escape routes (highways, key intersections, railroads) are interdicted to slow or stop the mechanized retreat of a defeated army. Technology using

electromagnetic pulse (EMP) is used to disable field artillery and air defense artillery radar, missile launch electronics, and vehicle ignition systems. A combination of nonlethal weapons systems using technology such as material embrittlement, adhesives, and combustion modifiers are used to disable enemy combat systems. The same is done for weapons storage facilities. Imagine that rather than our engineers tediously blowing up huge enemy ammunition storage sites, nonlethal weapons technology is applied to render them unusable; this same technology could be applied to aircraft sitting on the ground. All nonlethal operations are conducted with the understanding that if units resist, lethal force is once again unleashed.

In the scenario just described, the political and military end state become the reduced combat capability of an enemy army in politically acceptable and militarily effective terms. There is mounting evidence that in the Gulf War, our senior civilian and military leadership chose to end the war as a result of humanitarian concerns, and the fear of losing public support and allied support if the killing continued.³⁰

This is an excellent example of the all or nothing choices that policy makers are left with when lethal weapons are the only choice. Again, this is not to suggest that a nonlethal choice existed at the time; it is to suggest, however, that emerging nonlethal weapons technologies that are properly funded and developed could provide the National Command Authority and combatant commanders with increased military capability, in politically acceptable terms, which have not existed in past wars.

Nonlethal weapons technologies possess the potential to become an important combat multiplier in major theater warfare. Their development and fielding to date have focused

primarily on the low-tech end of the spectrum, with use in smaller-scale contingencies such as peace operations using Vietnam era weapons as delivery systems. Future development should focus on selected high-tech options with applicability across a host of military operations.

A top-down approach by service chiefs and CINCs with the clout to hasten their development and fielding will significantly enhance U.S. military nonlethal warfighting capabilities in major theater warfare. While DoD policy addresses nonlethal weapons capabilities and their potential effectiveness, increased funding and senior leader emphasis are required to properly develop and usher in these technologies in a concerted, effective fashion.

Analysis

First, it seems unusual in view of potential applicability to Army operations across both the smaller-scale contingency and major theater spectrums of warfare, that the Army has not positioned itself as the executive agent for nonlethal weapons policy. The Army, of all the services, has the most to gain from these capabilities and the most to lose from not exploiting their potential. No other service is engaged in the panoply of current peace operations throughout the world; and no service can better reap the potential benefits that nonlethal weapons offer in the area of maneuver support, than the Army. While the Marine Corps has done an admirable job of keeping nonlethal weapons programs alive, the Army should immediately take the lead as DoD's Executive Agent.

Second, the funds to support adequate RDT&E must be found. Nonlethal weapons could become an integral piece of Army XXI in a limited way, and most certainly the Army After Next in a much more significant way. The Army should recognize nonlethal weapons for the potential they possess to revolutionize the manner in which wars will be fought in the future. The process, however, need not be revolutionary; an evolutionary approach seems most likely at this time. But the process must begin seriously for two primary reasons: operational flexibility and technological dominance.

Nonlethal weapons present policy options (operational flexibility) that have not been available in the past. These weapons possess the potential to carve out an intermediate position on the use of force spectrum that lies somewhere between no use of force and the use of lethal force. Undoubtedly, this development is particularly attractive to politicians, policy makers, and commanders operating in a complicated and ambiguous world where

a graduated response and graduated capability, literally the ability to rheostat force, may be more appropriate than the current all or nothing proposition. They present the United States with a potential strategic flexibility no nation has possessed in the past, but one which is increasingly possible due to recent developments in nonlethal weapons technology.

Additionally, recent developments in these technologies give the United States the opportunity to possess technological dominance in a form of warfare that promises to become increasingly likely in the future. Like nuclear weapons in the 1940s, there are many who would like to see this "genie" back in the bottle. But that is not about to happen. Reality is that nonlethal technologies exist and their application to military affairs will surely increase in significance as existing applications are refined and new, more sophisticated capabilities emerge. Nonlethal weapons will become an important piece of the military element of national power, and a combat multiplier in the future.

The real U.S. policy choice is whether to lead or to follow other nations in the development of nonlethal technologies and military applications. Now is the time to do it while we as a nation are unburdened by the specter of a major theater war. It makes more sense to develop these capabilities in an incremental fashion using smaller-scale contingencies such as peace operations, where their potential failure has less long-term impact, with a view toward large scale application in future major theater warfare. It would be tragic if a future adversary develops a significant, usable nonlethal advantage, putting the United States at a disadvantage because of our failure to fully exploit this development in times of relative peace. The decision to pursue a path to use and develop

nonlethal capabilities is a strategic one. The strategic choice should be made now as the United States takes the lead in a development that is sure to impact military affairs for decades to come, revolutionizing the manner in which military operations are conducted in the 21st century.

word count - 5,198

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²⁴ Steven Komarow, "Peacekeepers to get Nonlethal Weapons to use on Protesters." USA Today, 3 September 1997, 10A.

²⁵ Lewer and Schofield, 123-124.

²⁶ Carl von Clausewitz, On War, ed. and tran. Michael Howard and Peter Paret (Princeton, New Jersey: Princeton University Press, 1989), 81.

²⁷ Charles Swett, Assistant for Strategic Assessment (OASD-SO/LIC), Pentagon, Washington D.C., interview by author, 26 September 1997.

²⁸ Bob Woodward, The Commanders, (New York: Simon & Schuster, 1991), 373-374.

²⁹ Richard M. Swain, "Reflections on the Revisionist Critique," Army, August 1996, 24-31.

³⁰ Ibid, 27, 30-31.

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