COUNCIL ON FOREIGN RELATIONS

NONLETHAL WEAPONS AND CAPABILITIES

Report of an Independent Task Force
Sponsored by the Council on Foreign Relations

Graham T. Allison and Paul X. Kelley, Co-Chairs
Richard L. Garwin, Project Director

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CONTENTS

FOREWORD

The recent war in Iraq proved to be a military triumph. The aftermath of major conflict, however, has been marked by looting and sabotage that has severely damaged Iraq's infrastructure and eroded popular support for the liberating forces. Although lethal force is necessary to successfully wage war, we are learning that it is not always appropriate for winning the peace. Nonlethal weapons—ranging from slippery foam and gun-fired bean bags to Taser guns and nets designed to entangle and stop vehicles—could be a better way to arm and protect U.S. forces and its allies without killing innocent people or destroying civil infrastructure.

The Council on Foreign Relations–sponsored Independent Task Force on Nonlethal Weapons and Capabilities, originally established in 1995 and reconvened last June, found that incorporating these and additional forms of nonlethal capabilities more broadly into the equipment, training, and doctrine of the U.S. armed services could substantially improve the United States's ability to achieve its goals across the full spectrum of modern war. This report, the Task Force's third publication since 1995, contends that many of the difficulties of the past year could have been minimized or even avoided with proper equipment and training in the use of nonlethal weapons.

The Task Force finds that for the United States to benefit fully from nonlethal weapons and capabilities the Joint Nonlethal Weapons Directorate requires as much as a sevenfold increase in funding; a broader mandate to conduct and fund programs in science, technology, engineering, and development; and an extension of the range of nonlethal weapons to 100 meters or more. The Task Force also recommends that the administration create a bureaucratic entity of sufficient size and budget, building on the Joint Nonlethal Weapons Directorate, to serve as the single focal point for all nonlethal weapons activity.

The report, which includes a large number of specific observations and suggestions, constitutes a valuable resource on an important but underappreciated subject. My deepest gratitude goes to the co-chairs, Dr. Graham T. Allison and General Paul X. Kelley, USMC (Ret.), as well as to Task Force Director Richard L. Garwin and the Task Force members and observers, who have drawn on their extensive backgrounds in the armed forces, national security policy, and technology to contribute insights and judgment to the substance and form of the report. Their efforts have produced thoughtful analysis and relevant recommendations.

Richard N. Haass
President
Council on Foreign Relations
February 2004

ACKNOWLEDGMENTS

The report of the Independent Task Force on Nonlethal Weapons has been a collective endeavor that reflects the contributions and hard work of many individuals. The Task Force was composed of Council members and nonmembers drawn from diverse backgrounds, including former military officers, business executives, academics, diplomats, and congressional staff. They all shared an active interest in U.S. policy regarding nonlethal weapons as well as a deep concern about the integration of nonlethal weapons into the armed forces' capabilities.

Task Force members and observers participated energetically in three meetings that took place at the Council on Foreign Relations in Washington, D.C., in June, July, and September 2003. They generously shared their ideas and offered valuable suggestions on various drafts. The report reflects the shared views of the Task Force members except as indicated in Additional or Dissenting Views.

In the course of the three meetings, the Task Force heard from government officials and outside experts. We appreciate their willingness to share their perspectives on the challenges and opportunities of nonlethal weapons and their current and future role in U.S. armed forces. The Task Force benefited greatly from their expert knowledge.

I am particularly grateful to Leslie H. Gelb, the Council's previous president, for his vision in establishing this Task Force on Nonlethal Weapons. I am also indebted to Richard N. Haass, the current Council president, for his editorial suggestions, which have strengthened the focus of the Task Force report. Thanks go also to research associates Scott Kemp, James Bergman, and Smita Aiyar for their tireless work in staffing the Task Force meetings, organizing material distributed to Task Force participants, and managing the many drafts that preceded the final report.

Richard L. Garwin
Project Director

EXECUTIVE SUMMARY

In the four weeks of "major conflict" in Iraq that began on March 19, 2003, U.S. forces demonstrated the power of training, transformation, and joint operations. However, the ensuing support and stability phase has been plagued by looting, sabotage, and insurgency. Wider integration of existing types of nonlethal weapons (NLW) into the U.S. Army and Marine Corps could have helped to reduce the damage done by widespread looting and sabotage after the cessation of major conflict in Iraq. Incorporating these and additional forms of nonlethal capabilities more broadly into the equipment, training, and doctrine of the armed services could substantially improve U.S. effectiveness in achieving the goals of modern war. Nonlethal weapons and capabilities have much to offer also in the conduct of war, in the prevention of hostilities, and in support of homeland defense. Indeed, a force using nonlethal weapons and capabilities has the potential of achieving combat and support goals more effectively than would a force employing only lethal means. How to achieve these benefits is the subject of this report.

While NLW are not yet widely integrated into the armed forces, their utility has been demonstrated when they have been used. In March 1995, a force of U.S. Marines equipped with NLW safeguarded the withdrawal of 2,500 UN peacekeepers from Somalia without a death among the peacekeepers, the marines, or the populace. Subsequently, in 1997, the Joint Nonlethal Weapons Directorate (JNLWD) was created, supporting the commandant of the Marine Corps in his role as the Department of Defense's executive agent for nonlethal weapons. Funded at some $30 million per year on average over the past five years, the directorate has created and deployed with the U. S. Army and Marine Corps approximately 80 nonlethal capability sets (NLCS). These sets have seen use in Kosovo and Iraq, helping to provide a continuum of force between "don't shoot" and "shoot." Many who

have used these capabilities for force protection and crowd control are quick to sing their praises. As seen from successful utilization in conflicts abroad, NLW are particularly appropriate for stability and support operations such as those in Iraq. Last November in Iraq, a U.S. soldier shot and killed the chairman of the U.S.-appointed municipal council in Sadr City. Proper equipment and training in the use of NLW could well have avoided this debacle.

But much must change if the United States is to benefit fully from nonlethal weapons and capabilities:

- NLW currently deployed are short range; there is an urgent need to extend the range to 100 meters or more. More NLW are required in the field.
- The directorate has a budget for fiscal year (FY) 2004 of $43.4 million, up from an annual $22 million or so for the past seven years; we judge that there is a need for a sevenfold increase, resulting in a $300 million annual program.
- The JNLWD is limited to "advanced development" and does not have the authority to conduct or fund programs in science and technology, demonstration, engineering, or development. This needs to change, as the current limitation limits the rate of advance of nonlethal technologies to a snail's pace.

A wide range of NLW available for use includes blunt-trauma weapons, such as multiple rubber-ball loads for shotguns and grenades, and bean bags and dye markers, along with riot shields and masks. Among the anti-vehicle capabilities designed to bring vehicles to a stop are spike strips to deflate tires, a portable vehicle-arresting barrier for a car or a light truck, and the X-Net wheel entangler for heavier vehicles. More recently deployed is the electromuscular disruptive device—the Taser—designed to temporarily incapacitate an opponent. Also included in the NLCS are flash-bang grenades, intense lights for battlefield illumination (and for dazzling the opponent), laser dazzling devices that temporarily shield a person or group from sniper fire, and thirteen 10-watt bullhorns. It is important to note that these are not weapons but nonlethal capabilities. Additional and more effective means

can be developed for the remote observation of mixed groups and for inhibiting the action of selected individuals. Existing NLW have been assessed and approved by the directorate's program that assesses both the human effects of NLW and their environmental acceptability; future NLW will be evaluated in a similar fashion.

The Defense Department's Joint Requirements Oversight Council (JROC), chaired by the vice chairman of the Joint Chiefs of Staff, approved a Mission Need Statement for a family of nonlethal capabilities in December 2002. The statement said,

> The U.S. military lacks the ability to engage targets that are located or positioned such that the application of lethal, destructive fires are prohibitive or would be counter-productive to the U.S. objectives and goals. Operational and strategic applications of nonlethal weapons do not exist. At the operational level, U.S. military forces lack the ability to engage targets located where the application of lethal fires would be counterproductive to overall campaign objectives. At the strategic level, the U.S. needs a nonlethal capability that can help defuse volatile situations, overcome misinformation campaigns, and break the cycle of violence that often prolongs or escalates conflict.

The Task Force agrees with this assessment and urges the recognition that measured and variable application of force is essential to achieving America's limited goals, while avoiding injury to noncombatants and damage to the civilian infrastructure.

The Mission Need Statement calls for capabilities at the strategic level for countering misinformation campaigns and breaking the cycle of violence. Previous Council on Foreign Relations reports have stressed not only the importance of inhibiting hateful broadcasts, such as those of radio station RTLM that incited the Hutu populace in Rwanda to kill Tutsis, but also the need to be able to transmit U.S. or UN broadcasts over normal radio or TV channels. Moreover, there is a clear need for means short of invasion and destruction to discourage state tolerance or support for terrorist activities. These means might include the denial to decision-makers of reliable electrical power or communications. The JNLWD currently has no such programs, and the Task Force

was unable to obtain access to any that might exist in the military services. In the past U.S. troops have suffered sorely from the lack of such capabilities or from an inability or reluctance to use such as have existed.

The Task Force concludes that wider deployment of existing NLW capability—equipment, training, and command awareness—would greatly increase U.S. effectiveness in establishing a civil society after major conflict. Advanced NLW and augmented delivery capability for existing NLW could reduce the infrastructure damage in combat operations. A U.S. program to equip government forces in Afghanistan and Iraq with existing types of NLW would reinforce authority and allow the use of nonlethal force acceptable to the publics in those states and abroad.

As we have indicated, major changes are needed in NLW substance, budget, and organization. Concerning substance, we advocate a four-pronged approach:

1. Expand the deployment (and training in their use) of the current short-range NLW more widely in the Marine Corps and in the army infantry beyond the primary current NLW deployment in the military police. Ensure that the U.S. Navy and Air Force have such capabilities adapted for their force-protection missions and provide support and encouragement for other unique mission-specific nonlethal capabilities.

2. Extend the range of current NLW payloads to 100 meters, well beyond rock-throwing range, through precision delivery and fusing systems.

3. Complete the development, trials, and human effects qualifications of the millimeter-wave area-denial system that can compel aversive behavior at a distance of hundreds of meters by heating the skin, apparently without permanent injury, and field early models of the system.

4. Via more aggressive funding and technical support, advance the development of other concepts such as the advanced tactical laser—which shows promise for use against equipment—along with the advent of nonlethal payloads that home on a laser spot.

Current Department of Defense (DOD) and service programs are simply inadequate in size and scope to yield these benefits from NLW. Building on the Joint Nonlethal Weapons Directorate, the administration should create an entity of sufficient size and budget that is the single focal point for all NLW activity.

In addition, the Task Force recommends the following:

1. The secretary of defense conduct a comprehensive review of NLW with the objective of providing specific guidance to the services that will result in a more robust and expanded NLW capability. This guidance should ensure that all facets of a complete nonlethal weapons program are provided resources with the goal of expediting both basic and advanced NLW capabilities to all of the services.

2. To expand the scope and effectiveness of the U.S. NLW program:
   a. A greatly expanded JNLWD or a new Nonlethal Joint Program Office (NLJPO) headed by a general officer with access to all program element lines (budgetary categories 6.0 to 6.6) would elevate the current priority status of NLW within the DOD. It should operate at a level of some $200 million to $400 million per year with the mission of fulfilling the JROC Mission Need Statement for a joint family of nonlethal weapons.
   b. Within the Joint Forces Command (JFCOM), there should be a small support cell for NLW that would work closely with the expanded JNLWD, both to inform the directorate of needs and to facilitate the placement of prototype and production capabilities within JFCOM. JFCOM's stated tasks include "discovering promising alternatives through joint concept development and experimentation, defining enhancements to joint warfighting requirements, developing joint warfighting capabilities through joint training and solutions, and delivering joint forces and capabilities to warfighting commanders."

3. Actions are necessary to remove barriers to the incorporation of nonlethal weapons. There is a need to integrate information and training regarding NLW capabilities into the curricula of schools at all levels in each service; this in turn would increase the rate of NLW integration into current force capabilities. The DOD can assist in this process by emphasizing the acquisition of existing, proven NLW capability and also by the development, early evaluation, and choices made among high-payoff systems.

Despite our assessment that the nation lacks feasible and essential nonlethal capabilities, the Task Force is encouraged by the outstanding performance thus far of the Joint Nonlethal Weapons Directorate. Another encouraging indication was that in early November 2003, as part of the next Strategic Planning Guidance, the Office of the Secretary of Defense will require combatant commanders "to identify what they need for nonlethal weapons and to plan for the use of nonlethal weapons in operations."

This should initiate urgent top-down planning in the Defense Department and the individual armed services. Such planning should be augmented by the creation of demand for these weapons from the field, as personnel gain experience with prototype equipment provided by the Joint Directorate or its successor. This mixed approach (spiral development) is likely to lead to better capabilities sooner than one limited to production of equipment and the subsequent force-wide deployment.

TASK FORCE REPORT

The Independent Task Force on Nonlethal Weapons (NLW) and Capabilities established in early 2003 by the Council on Foreign Relations met in June, July, and September. A review seemed timely in view of the December 10, 2002, action by the Joint Requirements Oversight Council (JROC).

The JROC (chaired by Vice Chairman of the Joint Chiefs of Staff General Peter Pace) endorsed and forwarded to the undersecretary of defense for acquisition, technology, and logistics a joint Mission Need Statement (MNS) for a family of nonlethal capabilities.[1] In "Timing and Priority," the MNS notes:

> "The Services and combatant commanders consider a family of nonlethal capabilities to be a high priority need that must be satisfied immediately."
>
> *"Current Deficiencies (Shortfalls).* The U.S. military lacks the ability to engage targets that are located or positioned such that the application of lethal, destructive fires are prohibitive or would be counter-productive to the U.S. objectives and goals. Operational and strategic applications of non-lethal weapons do not exist. At the operational level, U.S. military forces lack the ability to engage targets located where the application of lethal fires would be counterproductive to overall campaign objectives. At the strategic level, the U.S. needs a non-lethal capability that can help defuse volatile situations, overcome misinformation campaigns, and break the cycle of violence that often prolongs or escalates conflict."
>
> The need is characterized as "controlling hostile populations, minimizing infrastructure damage, controlling lethality of conflict, and controlling long-term environmental impacts." The demand is not only for improved self-protection capabilities, but for improved range and tactical standoff in order to counter personnel, observation, communication, and the like—i.e., for "non-lethal options in each core capability that can be applied across the range of military operations."

[1] The following indented paragraphs summarize the MNS, together with a few phrases identified as direct quotes.

The MNS identifies several potential options. Smoke and obscurants are called for, along with tagging, tracking, and locating devices. Such enabling technologies as "frangible or combustible casings, micro-encapsulation, and proximity fusing" are identified for extending the range and improving the effects of current munitions. More capability for modeling and simulation is demanded for better estimates of environmental impact, confidence, and the like.

The mission of NLW should be to "provide more flexible options, tailor effects to achieve a desired response, offer reversibility of effects, and reduce or avoid non-combatant casualties and/or unintended destruction of equipment or infrastructure."

While some of these JROC goals can be met through increased purchase and integration of current capabilities, others require additional development of known technologies or extensive invention, research, and choice.

The initial purpose of the present Task Force was thus to evaluate the degree to which NLW and necessary training and tactics were being integrated into plans and operations; and the degree to which they should be available and so integrated. To achieve the capability anticipated by the JROC, the services and the combatant commanders would need to evaluate the status of NLW and the potential for future NLW more urgently and on a larger scale. Development and integration into the services, with appropriate training and changes in doctrine, would be required. Note, however, that progress can also be made by a demand-pull mechanism: prototype NLW can be placed with our operating forces to obtain vital user feedback and (where successful) create demand up the chain of command.

The question remains: Where do the Department of Defense (DOD) and the armed forces stand on the road to acquiring and integrating these capabilities?

We found little evidence that the value and transformational applications of nonlethal weapons across the spectrum of conflict are appreciated by the senior leadership of the Department of Defense. Despite successes on the small scale, NLW have not entered the mainstream of defense thinking and procurement. Accordingly,

this report addresses the Office of the Secretary of Defense (OSD)—primarily the secretary and deputy secretary of defense along with the Joint Chiefs of Staff (JCS). Support and initiative are also needed from the National Security Council (NSC) and from the Armed Services and Appropriation Committees of the Senate and the House.

Positioning of Nonlethal Weapons in Current U.S. Capabilities

In the 1991 Gulf War, U.S. forces used for the first time on a large scale the forces and tactics created during the Cold War. These were refined and extended in later actions in Kosovo, in Afghanistan after September 11, 2001, and most recently in Iraq in 2003. Suppression of air defenses (or their absence) allowed the flexible delivery of high-precision, low-cost bombs to destroy targets that could be observed visually or those whose location could be precisely mapped. U.S. night-vision capability, mobility, firepower, and armor allowed U.S. ground forces to quickly move and overwhelm enemy forces.

The high quality and training of U.S. military personnel were essential to the performance of these feats. The evolving capabilities of network-centric warfare permitted intelligence, reconnaissance, and surveillance to be accomplished and conveyed at unprecedented speed, especially by satellite and unmanned air vehicle (UAV) imaging but also by signals intelligence and Special Forces on the ground.

Previous Council Task Forces in 1999 and 1995 considered aspects of NLW technologies and capabilities.[2] The reports supported and encouraged wider use of existing systems for force protection, crowd control, and urban combat, as well as the development of more effective NLW both for these tactical and for larger-scale

[2] *Nonlethal Technologies: Progress and Prospects: Report of an Independent Task Force Sponsored by the Council on Foreign Relations* (New York: Council on Foreign Relations Press, 1999). This report also includes the 1995 report. The report is available at www.cfr.org/publication.php?id=3326.

uses. The reports also emphasized the continuous spectrum from NLW to tools such as psychological operations (psyops) and other aspects of information warfare, as well as the utility of nonweapon capabilities for sensing and disruption.

Changes in Politics, Security, and Technology

Politics and technology have changed at a dizzying pace. The peaceful dissolution of the Soviet Union is old-old news, but security problems abound in the new world. Since 1991, the United States has fought Saddam Hussein's forces twice in Iraq, deposed the Taliban in Afghanistan, and wounded al-Qaeda on its Afghan home territory. The empowerment of the individual for destruction has raised questions about the conduct of war, surrender, control, and governance. During peace and war, but particularly in a theater of war in the aftermath of combat, one now needs to expect and to deal with jihadists, diehards, and guerilla tactics, including suicide bombing.

Further evolution is to be found in aspects of asymmetric warfare. These range from efforts to counter, rather than to emulate, U.S. capabilities such as global positioning system (GPS) to means illegal under the rules of war, such as Iraq's placing of air defense elements or mortars at schools or hospitals. As seen in Iraq, enemy combatants with light weapons can merge with the population, protected by their knowledge that U.S. forces are inhibited by the presence of innocent civilians from responding with lethal force to a sniper or the firing of a rocket propelled grenade (RPG).

At the same time, the evolution of technology—particularly information technology—has had a revolutionary impact on modern society. A revolution or transformation is underway in the U.S. military as well. It extends not only to weapons to destroy military materiel and personnel and to cyber warfare and nonlethal weapons but also to tremendous changes in the pace of combat. For air attack on ground targets, the cycle time for intelligence,

target nomination, and attack is now hours or even a few minutes rather than days. Any proposed change or restructuring must be evaluated in the context of these evolving capabilities and not in that of the old baseline forces.

The United States has amply demonstrated its capability to strike defined targets with guided bombs and missiles from long distances with an accuracy of a few meters, and with direct fire from tanks and artillery. From orbiting aircraft, the response time can be a minute—mostly the fall time of the self-guided bomb. With direct observation from helicopters or even UAVs, the response time can be seconds.

Some existing U.S. materiel and organization do not fit this highly evolved new face of war, and the details of force transformation are properly in dispute. While transformation is in midstream, the robustness of these new capabilities, their adequacy, and the optimum mix of transformation and evolution are still being evaluated. That there are still problems to be overcome was evident in the effectiveness of decoys in Kosovo mimicking armored vehicles and in the continuing attacks on U.S. personnel on the ground in Iraq, causing injury or death and also interfering with the conduct of the mission.

The adversary adapts, and his adaptation can be rapid, since it is a matter of survival. One adaptation has been the increasing use of underground facilities that are unaffected by normal munitions. We must adapt to this adaptation—using intelligence to identify entrances and exits, which can then be attacked with precision weapons.

In the transformation of a process or a product, there are often elements less subject to evolution. In the case of the U.S. military, although combating major identifiable forces with the evolved U.S. joint capabilities has been a major achievement, the task and conflict have moved to a more dispersed resistance—often confounded by or even masked by the large presence of civilians—many of them innocent of hostile intent. **In this increasingly important aspect of warfare, nonlethal weapons are an important tool.**

Background on Nonlethal Weapons

Nonlethal weapons are defined by the Department of Defense as "discriminate weapons that are explicitly designed and employed to incapacitate personnel or materiel, while minimizing fatalities and undesired damage to property and environment." Both the term NLW and the definition leave something to be desired. In a sense, "nonlethal weapons" is a misnomer. The program includes, importantly, technologies and tactics that are not "weapons." And there is no requirement that NLW be incapable of killing or of causing permanent damage. Moreover, the ideal NLW would be a system with continuously variable intensity and influence, ranging from a warning tap to a stunning blow to a lethal effect. As with lethal weapons, much of the impact of NLW is psychological—persuading people that they would much rather be someplace else, or on our side rather than opposing U.S. military forces. Yet alternative terms such as "less lethal weapons" do not seem to capture the meaning sufficiently better to repay the effort required to change the name.

Some of the anti-materiel goals of nonlethal weapons may be achieved by lethal weapons capable of precision attack. Their effect on materiel is destructive but in some cases with very limited unintended damage. Such is the case, for instance, with the use of a laser-guided bomb (or one guided by GPS) to destroy underground fiber optic cable. Or on occasion concrete-filled bombs can demolish a small structure with minor damage to neighboring facilities. Bearing witness to such precision attack by nominally lethal weapons were Baghdad residents confidently and casually reporting by cell phone from their terraces the attack on a government building across the city. A downside of the speed of conquest—achieved in this case by reliance on discriminating, effective weapons—was the escape and merging into civil society of the vast majority of the enemy combatants without prior capture, processing, and release.

Nonlethal weapons first achieved prominence in U.S. military operations when they were used to facilitate and safeguard the extraction of UN forces from Somalia in 1995. The conventional alter-

native was the use of firepower to suppress and scatter crowds and militants. Instead, commanders managed on an urgent basis to bring into the military theater techniques used in domestic law enforcement and crowd or riot control. In a law enforcement confrontation, the police typically outnumber their adversaries, but there are often many innocent bystanders. In some situations, however, a relatively few officials must control a crowd or deal with a riot, and for this there are familiar tools—tear gas, water cannon, blunt-trauma projectiles such as rubber bullets, marking dyes, barricades, and flash-bang grenades. NLW help to provide a continuum of force between "shoot" and "don't shoot." As such, they may prevent crowds and even armed combatants from massing a large antagonistic force in close proximity to U.S. forces. One example is recounted in Appendix B, together with three potential encounters.

Distinct from blunt-trauma devices such as rubber bullets, bean bags, and sponge projectiles is the Taser—a pistol that fires two barbs trailing wires, along which controlled, very high voltage is automatically transmitted, to definitively and temporarily immobilize the person targeted. There are also anti-materiel capabilities, such as the ancient caltrops that, deployed on a road or path, effectively puncture tires and immobilize many vehicles. Other types of anti-materiel items include net-type vehicle stoppers. Appendix A lists existing and developmental NLW.

Since 1997, the Joint Nonlethal Weapons Directorate (JNLWD) has had the responsibility for developing, testing, standardizing, and preparing for procurement these types of tactical capabilities. Most recently, they have been incorporated in nonlethal capability sets (NLCS), of which some 18 exist in the U.S. Army and some 50 in the Marine Corps. Six NLCS were deployed with army units in the Iraq theater.

Current Administration of Nonlethal Weapons–Joint Nonlethal Weapons Directorate

Established in 1997, the Joint Nonlethal Weapons Directorate serves as the focal point for NLW research and development efforts on behalf of the DOD. The National Defense Authorization Act for fiscal year (FY) 1996 designated that the commandant of the Marine Corps, as the executive agent for the NLW program based in Quantico, Virginia, would be "responsible for program recommendations and for stimulating and coordinating NLW requirements." The undersecretary of defense for acquisition, technology, and logistics exercises the principal oversight for NLW policy, while the undersecretary of defense for policy helps produce a usage policy for NLWs. An Integrated Product Team (IPT)—composed of flag officers from each service, who have equal votes—provides guidance and approves the budget. Nonvoting members of the IPT include Department of State (DOS), Department of Justice (DOJ), and Department of Energy (DOE) representatives; combatant commanders; and Joint Staff representatives. Additionally, a Council of Colonels is used to collect information from all the services to guide research efforts.

The JNLWD is a joint organization; its scope is based on direction from DOD D 3000.3 Policy. It seeks undeveloped technologies from the science and technology (S&T) community and then presents them to the services as possible concepts. If a service wants to purchase the concept, the JNLWD will fund all research and development costs up to milestone C (full-rate production) to the extent that its budget allows. The service must then pay for the procurement.

The establishment of the directorate provided a substantial increase in the services' capability for force protection, dependent on the products and results of JNLWD activities that were evaluated and, where appropriate, brought into the services—specifically, into the forces under the combatant commanders (COCOMs). The jointly staffed JNLWD supports the Department of Defense's executive agent for NLW, the commandant of the Marine Corps.

The army has established an NLW Integrated Concept Team to routinely pull together relevant players from the service to discuss and define NLW requirements. Thus far, army NLW has been primarily in the domain of the military police (MP) rather than the infantry. Clearly, with current army commitments, infantry units would benefit from expanded NLW capabilities. The Marine Corps Combat Development Command has adopted a system of education and "requirements pull" through the mechanism of a Marine Corps NLW Integrated Product Team with membership from the operating forces to stimulate its requirements identification process.

The directorate's efforts to work closely with all services to meet their mission-driven needs for nonlethal weapons technologies are constrained by its small staff of 19 government personnel and budget of $24.3 million for FY 2003. The JNLWD staff spends a lot of effort on necessary administration, ranging from the preparation of budgets to congressional testimony to responding to requests under the Freedom of Information Act (FOIA). To what extent the burden could be eased within the staff limitation by the more extensive use of contract personnel is not clear. In any case, a much larger program than the FY 2004 $43.4 million and 19 staff members would be required to provide the development, evaluation, and human effects testing for a wider range of tactical, operational, and strategic NLW capabilities. Past and projected budget figures are shown in the following table on the next page.

While the JNLWD has done an excellent job in developing and fielding current NLW capabilities, it has been too severely understaffed and underfunded to address much development beyond elements of force protection. It has not had the staff to coordinate fully with other governments in order to obtain promptly the best ideas and technologies nor even to coordinate fully with other agencies within the United States. Currently the JNLWD has only 2 staff members who participate in about 20 war games out of 300 formally identified exercises in the DOD. The directorate can therefore play no more than a minor role in the larger (1,000-person) war games. Thus it is missing many opportunities and requirements to be represented in war games, to provide information at various

JNLWD Budget and Projections

	FY97	*FY98*	*FY99*	*FY00*	*FY01*	*FY02*	*FY03*	*FY04*	*FY05*	*FY06*	*FY07*	*FY08*	*FY09*
Core ($millions)	$9.3	$16.1	$21.9	$22.8	$22.1	$21.3	$22.9	$43.4***	$43.5	$44.1	$44.6	$45.2	$45.7
Plus-up			$12.0*	$3.0*	$6.0*	$11.8**	$1.4*						
Total ($millions)	**$9.3**	**$16.1**	**$33.9**	**$25.8**	**$28.1**	**$33.1**	**$24.3**	**$43.4**	**$43.5**	**$44.1**	**$44.6**	**$45.2**	**$45.7**

* Congressional plus-up.
** PBD 810: increased funding by $10.4 million per year in addition to congressional plus-up.
*** PBD 751C: increased FYDP funding by $18 million per year.

Source: June 18, 2003, Presentation of the Joint Nonlethal Weapons Directorate at the first meeting of the Nonlethal Weapons Task Force by Colonel David P. Karcher, USMC.

levels in the military and elsewhere, and to take the initiative to explain to potential users the capabilities and limitations of NLW.

Likewise, the JNLWD has insufficient resources to ensure that information on the status of NLW is present at all necessary levels. Virtually all the DOD's NLW research and development (R&D) is being funded by the JNLWD program budget. The increase in the budget to $43.4 million for FY 2004 and to $45.7 million for FY 2009 is inadequate if NLW are to play their proper role in the transformation of U.S. military capabilities. The budget is inadequate even for development, and JNLWD's authority does not extend to procurement. In addition, the JNLWD provides complex and expensive human effects testing services for both the military and the greater NLW user community, including law enforcement groups. To the extent that NLW will be used on mixed combatant and civilian groups, it is important to understand their effects on children as well as adults. NLW effects must be understood in order to allow the setting of rules of engagement that will protect both the security and the reputation of America's armed forces.

A staff of 19 is insufficient for the JNLWD to process the information to which it potentially has access, both from the services and from international NLW programs. An increased budget could not only stimulate R&D conceptual efforts and help mature potential NLW solutions but could also assist in financing the acquisition of a greater number of NLW and in providing improved education and support exercises across the DOD.

Since the JNLWD has access only to program element (PE) line 6.3B, or advanced development, to fund NLW, a program outside of that category (in S&T funding or demonstration, engineering, and development) has to be funded by the services. Without significant and dedicated funding for NLW S&T, technology in this field will advance at a snail's pace.

The services have identified $70 million in desired concept development beyond the $24.3 million budget of the JNLWD. As a consequence, it is likely that innovations come late, and procurement funds will be expended on inferior technologies for lack of awareness of better ones. Despite the existence of various coordinating

groups and integrated product teams, the JNLWD remains formally as a line item in the Marine Corps budget that must compete with other Marine Corps programs. Therefore it has been simply too small and is positioned at too low a level to work across the entire span of potential NLW—including directed energy.

Despite limited funds and lack of manpower, the directorate has several visible accomplishments, including the development of the nonlethal capabilities set (NLCS). First fielded in 1997, these sets contain about 55 types of NLW in four different modules to equip military units with a range of nonlethal support, including pepper spray, portable bullhorns, plastic handcuffs, high-intensity light systems, and personal protection equipment such as face and body shields and shin guards.

Among the newer NLW capabilities being developed or fielded are the mobility denial system, which would stop vehicles by spreading a slick substance across a road; the portable vehicle-arresting barrier (PVAB), which would be able to stop a 7,500-pound vehicle traveling up to 45 miles per hour within 200 feet; and the running gear entanglement system (RGES), a rapidly deployable rope that can stop a boat, for example, by entangling its propellers. The directorate is also conducting major initiatives in NLW technology that include high-power microwaves (HPM) for countering equipment containing electronics (including some vehicles), counterpersonnel lasers, and countermateriel lasers. One of its largest efforts is the active denial system (ADS) that uses millimeter wave energy to create an intolerable skin heating sensation, repelling targets without damage. With its long range and rapid, universal, and reversible effect, ADS has many potential military applications. More coordination will be required for the use of such a weapon that has its own vehicle and operators. The services of such a system must be requested or assigned to a particular mission.

An Expanded Nonlethal Weapons Program

An expanded NLW program should invest significant sums of money on the NLW component of future twenty-first-century warfighting needs, including

- Directed energy;
- A robust S&T program;
- Human effects characterization;
- Operational development and improvement of existing NLW; and
- Establishing dedicated test facilities or cells to support S&T as well as R&D.

Sure and rapid progress requires that the staff be augmented by skilled engineers and scientists with expert knowledge in areas including

- Directed energy;
- Electromagnetic coupling;
- Modeling; and
- Physiology.

Of course most of the funds will be spent on contracts to industry, including research institutes and universities.

For purposes of both continuity and leadership there should be an executive director position (at the senior executive service [SES] level) as a civilian counterpart to the flag officer director.

To aid with wider integration of nonlethal capabilities into U.S. forces and operations, the JNLWD will need to expand its capability for outreach to

- Appropriate JCS staff;
- Formal service schools;

- Treaty organizations (i.e., North Atlantic Treaty Organization [NATO] schools); and
- Peacekeeping centers around the world.

An expanded NLW program should also work to develop robust modeling and simulation and decision-support tools for joint and service-unique nonlethal capabilities. These tools should be available to

- Law enforcement personnel;
- War game and simulation efforts;
- Coalition authorities; and
- Nascent governments in areas of recent conflict.

Current and future investments should include a broadening and strengthening of the joint service capabilities and supporting service-unique needs through

- Operational-level NLW capabilities that steer and support transformational concepts;
- Marriage of psychological operations (psyops) with information warfare; and
- Highly classified initiatives.

JNLWD should create a formal interagency support function, with interfaces in the

- Department of Homeland Security;
- Department of Homeland Defense;
- Department of Energy;
- Department of State; and
- Department of Justice.

This function might include small cells of people in these departments to enable the directorate to communicate efficiently with

and to learn from people who spend most of their time in these interagency contacts in the development of operational concepts and the definition of requirements.

A Caution

Because of classification barriers, the present Task Force was largely limited to considering point- and crowd-control measures and could not examine cyber, electronic, or communications warfare or anti-materiel technologies. We note that the legislation establishing the Joint Nonlethal Directorate mandated oversight over these areas. We recognize that a small directorate could not in fact exercise such a vast responsibility. The directorate also recognized this and agreed to substitute "insight" for "oversight." Even that insight, however, has in fact been sharply limited. The leadership of the NLW program must have more frequent and deeper insights into classified programs in the services that contribute to or bear on nonlethal capabilities.

To achieve the much larger NLW program and its early integration into the U.S. Armed Forces, the Task Force considered two options for the substantial expansion and acceleration of the NLW program, which we regard as essential for the transformation of the military. The outline in the box on pages 22–23 guided the Task Force's consideration of a Joint Program Office (JPO) or greatly expanded JNLWD.

ISSUE: CREATION OF A JOINT PROGRAM OFFICE TO MANAGE THE DEVELOPMENT OF NONLETHAL WEAPONS

Current Situation

- The commandant of the Marine Corps has served as the executive agent for nonlethal weapons since 1997.
- The Joint Nonlethal Weapons Directorate was established to execute and manage NLW program development and to conduct centralized coordination and integration of NLW technologies and systems in accordance with a Joint Service Memorandum of Agreement (MOA).
- Each service exercises development of NLW technologies through separate service-specific milestone decision authorities.
- While NLW are recognized as a requirement for combatant commanders, each service independently determines its NLW requirements (at varying levels) and prioritizes NLW against other competing requirements in the planning, programming, and budgeting process. The current procurement effort by all the services is less than $5 million per year.

Unique Nature of NLW

- The DOD seeks transformational capabilities of which NLW are clearly a part.
- NLW are unique because of the human effects testing requirement.
- Development and employment of NLW have implications at the tactical, operational, and strategic levels.

Required Capabilities

- When it is not clear to the services what capabilities are required, then the DOD must engage to define the requirement.

- In the case of nonlethal weapons, clearly defined requirements and capabilities common to all services are needed. But there are also some NLW needs and opportunities for the individual services.

Management Enhancement

Consideration should be given to establishing a Joint Program Office for Nonlethal Weapons for the following reasons:

- A JPO consolidates multiple separate and frequently distinct acquisition processes under a single acquisition process administered by one milestone decision authority.
- A JPO is best postured to develop NLW that respond to warfighter (combatant commander) needs.
- A JPO brings synergy to the acquisition process.
- A JPO will achieve greater efficiency and cost-effectiveness in the development and fielding of nonlethal weapons.
- JPOs have demonstrated their utility, responsiveness, and effectiveness. An illustrative case and a model that could be used to develop a JPO for Nonlethal Weapons is the one that has been applied to improve joint capabilities in chemical, biological, radiological, and nuclear (CBRN) defense.

Recommended Actions

- Establish a Joint Working Group to clearly define required capabilities.
- Establish a Joint Program Office or greatly expand the resources and authority of the JNLWD.
- Identify funds to manage and procure NLW.

The chosen organization would be headed by a general officer, preferably by a major general. What counts more than rank, however, is that the director should be recognized as having considerable decision authority and the ability to direct substantial amounts of money.

Although we have cast these considerations in terms of the familiar JPO, such capabilities could be given to a greatly expanded JNLWD—a JPO by another name.

The Task Force considered the alternative of housing an expanded effort within the Joint Forces Command (JFCOM). The head of U.S. JFCOM is also the Supreme Allied Commander, Transformation. As such, he oversees transformation for both NATO and the U.S. military. JFCOM's stated tasks include "discovering promising alternatives through joint concept development and experimentation, defining enhancements to joint warfighting requirements, developing joint warfighting capabilities through joint training and solutions, and delivering joint forces and capabilities to warfighting commanders." Evidently JFCOM already has the responsibility to include NLW where appropriate in the accomplishment of its stated tasks. This responsibility should be made explicit, whether or not JFCOM is given the primary role in NLW. This option might involve creating within JFCOM an entity similar to the free-standing, expanded JNLWD or Nonlethal Weapons Joint Program Office (NLJPO) detailed in the first option.

The Task Force has not explored whether JFCOM has a strong desire to house the equivalent of a JPO for Nonlethal Weapons or the expanded JNLWD. This should be pursued by the Office of the Secretary of Defense and Congress to compare a JPO with a comparable effort within JFCOM and to choose the approach that best fits with the ongoing transformation effort. The optimum appears to us to have a JNLWD or NLJPO outside JFCOM but to create a small cell within JFCOM to work closely with the expanded JNLWD, both to inform the directorate of needs and to facilitate the placement of prototype and production capabilities within JFCOM.

Whichever mechanism is chosen for the early realization of the benefits of NLW, there are objective problems to be overcome and opportunities to be seized. Here are some considerations.

Emerging Technologies and Unfulfilled Needs

Existing working arrangements do not permit frequent JNLWD insight into some apparently much larger classified programs in the individual services, and the JNLWD has no authority over these programs when they are in the services. One such development emerged from the classified world in 2001 as the vehicle-mounted area denial system (VMADS), a high-power millimeter wave system with a large and accurate antenna used to create intense surface heating of the skin of people targeted at a distance of hundreds of meters without producing permanent damage.

Many NLW are proposed, but few make the grade of effectiveness, compatibility with the presence of our own troops, and adequate safety for use in situations in which potential antagonists are mixed with civilian crowds or hostages. For instance, intense acoustic sources have thus far been found wanting, in that they expose our own troops to damaging sound levels when they are used to project sound to disable or repel opposing forces at a distance. Similarly, high-power microwaves or short-pulse systems for disabling vehicles will not work against simple diesel-powered vehicles. And clearly there are situations in which the VMADS would be helpful, but it is far from certain that a force to be protected would have a VMADS with it. In addition, countermeasures might proliferate in the form of aluminum-foil umbrellas, perforated with small holes to allow for visibility but able to block the penetration of the millimeter waves from the VMADS.

As noted by the JROC, there is a clear need to extend the effective range of NLW. In some cases, it is a matter of finding a way to use riot control means such as rubber pellets at a greater distance, in order to increase the standoff between the crowd and the friendly forces. As recognized by the JROC memo, one general approach is to provide remote-delivery capability, using

proximity-fused systems together with combustible or frangible cases for the submunitions carrying the pellets. The millimeter wave area denial system is one option, but it requires a clear line of sight. What is sought in this regard is the ability to send out in a discriminating fashion, preferably semi-automatically, containers with multiple rubber balls, dye cartridges, or whatever is in use, so that they will explode at a specified height above the crowd and project the NLW as desired. To clear a large crowd in other than combat situations, tear gas would also be a tool of choice, and such submunition systems would be helpful in that case as well as in the comparable domestic riot control actions. There is clear benefit to reducing the time currently required (from 45 minutes to a few seconds) for a soldier with a backpack sprayer to provide a mobility-inhibiting slippery coating over a large area; this could be achieved by a system of fireworks-like munitions and submunitions that would deploy from a kit to spread over an area and to dispense the liquid.

In one of the fables in Appendix B, we discuss a potential system that uses laser sources and relay mirrors mounted quickly and unobtrusively on buildings in order to direct the laser against targets that might not be in direct line of sight. This is, of course, only an example. Any contender for development and adoption needs not only a similar treatment but also an analysis of the detailed system and its cost and effectiveness, as well as its human effects.

As identified also by JROC, there are serious deficiencies in the U.S. ability to clear a space (i.e., to clear people from a space), whether a plaza or a building. If hostages are absent, and if proper investments are made using current technology, it is feasible and practical to collapse a building of almost any size. But this may be undesirable in view of the cost to the infrastructure of this destruction and the lack of reversibility. Distributed high-intensity sound projectors could be helpful, but for use in buildings they might need to be supplemented with robotic means for finding and blowing down doors—without setting buildings on fire—such as the use of mild thermobaric weapons. But with similar technology, a combination of robotic cameras and lethal force (to some extent suicide robots) might be used to search for enemy combatants. If

the outcome appears inevitable, combatants will normally surrender so long as they expect to be treated according to the rules of war, but responsibility for the enemy prisoners of war could greatly slow the lightning advance of modern war.

New packages for current payloads do not arouse the excitement of new and speculative developments but may be the most useful interim approach and may be a contender for the long term against alternative future capabilities.

Take the Taser, for example, as a candidate for product improvement. The Taser's range is strictly limited to the 21-foot length of its wires. It would be highly desirable to extend the range to 100 feet, and that could be done by a significant engineering modification, without the need for *ab initio* human-effects testing.

For instance, instead of the two barbs, one could propel the power source, equipped with barbs or nettles, to strike the target and make contact. Radio control would then allow the source to be turned on in a flexible fashion, just as is the case with the Taser-mounted source. No wires would be involved, so there would be no possibility of short circuiting. In order to maintain accuracy so as to strike the desired individual, even if he is moving, the cartridge could be equipped with a system to home on the laser spot provided by the current Taser system.

This modification of the Taser is similar in principle to the remote delivery of blunt-trauma weapons such as rubber balls by a dispenser that is proximity fused and perhaps guided to the vicinity of its target.

There is, of course, concern that enemy combatants will use countermeasures against U.S. nonlethal (or lethal) weapons. Such countermeasures can often be obtained on the global market, as is the case with body armor or gas masks.

The JROC Mission Need Statement (MNS) of December 10, 2002, judged that "at the strategic level, the U.S. needs a nonlethal capability that can help defuse volatile situations, overcome misinformation campaigns, and break the cycle of violence that often prolongs or escalates conflict." The Task Force recognizes the value that such tools could have had in direct communication to the populace for preventing the genocide in Rwanda or the

ethnic cleansing in Bosnia, for example. However, the Task Force was unsuccessful in learning about U.S. capabilities of this type and notes with regret that they were not used to a significant extent, if they did exist.

Learning from Experience

From April 21 to 26, immediately following the taking of Baghdad, U.S. Army MPs and a Marine Corps unit conducted a search for Baath Party members. Trained at a joint school, they used elements of marine and army NLCS to suppress crowds in an urban environment, both day and night, that would have interfered with the operation.

Army experience with nonlethal capability sets in Iraq has resulted in some early reports briefed to the Task Force. For instance, one of the NLCS was used to equip a Quick Reaction Force (QRF), and there are accounts of the QRF being called to support small units that had been surrounded by hostile crowds. The appearance of the QRF and the banging of batons on shields was usually enough to disperse the crowd and to allow the uneventful departure of the unit.

There is an understandable appeal to lightness and easy operability. Some NLW equipment is worn on the body so as to be available in combat. Equipment too heavy to be worn may be kept in the armed personnel carrier (APC) and may not be available when needed. Note that the Special Operations Command (SOC) might need lighter and smaller NLW tools than the infantry, with its greater transport capability, and SOC forces operating individually—as is the case with intelligence operatives—have an even greater need for such equipment. In all cases, training is essential so that the individual will understand the capabilities and limitations, as well as when it is more desirable or effective to use NLW in combat as opposed to or as a prelude to lethal force.

Because there was little NLW presence in the theater, experience is scarce. In early engagements, it was recognized by U.S. forces that NLW would be of use. Nonetheless, it was often too late or

difficult to arrange equipment supply from the United States and perform the necessary training. However, the Task Force is encouraged by the indication that as part of the next Strategic Planning Guidance, OSD will require combatant commanders "to identify what they need for nonlethal weapons and to plan for the use of nonlethal weapons in operations."

In addition, the Task Force considered three typical but fanciful applications—each keyed to a real-world event or need. The examples address both requirements and constraints and the need to repel or compel without lethality until hostile intent is inferred. These "Three Iraqi Fables," with commentary, can be found in Appendix B, preceded by an account of a real engagement.

Caveats and Comments

The Task Force does not suggest that the availability of nonlethal weapons reduces the legitimacy of the use of lethal weapons. The unit commander should have the choice of tools and tactics for achieving the goal, consistent with the rules of engagement (ROE). Higher military authority may set the ROE by considering not only tactical but operational and strategic goals.

For example, in response to attacks on U.S. forces by isolated snipers, a nonlethal response might be temporarily more effective—such as dazzling lights to block vision for a few seconds—but the enemy would continue to pose an unacceptable threat, and thus effective lethal counterfire would be most appropriate. In this case, NLW might be used to suppress further fire, while lethal countersniper action eliminates the sniper and serves to deter others who might otherwise become snipers.

If NLW are available, there is concern that U.S. armed forces will be required to use them for every situation and will be condemned if they do not do so. The concern is not only for potential legal liability but also that lives of troops will be lost by delay in resorting to effective lethal means.

NLW are a tool for achieving military goals while respecting the principles of the laws of warfare—military necessity, propor-

tionality, discrimination, avoidance of unnecessary suffering, and minimizing collateral damage. Television coverage of encounters involving NLW can still be repugnant, and it would be desirable to provide reliable information to minimize unwarranted criticism. A campaign of public diplomacy could help to enlist the support of at least some human rights advocates and specialists in international law.

Chemical Nonlethal Weapons

Existing chemicals have the ability to temporarily incapacitate personnel or to damage materiel, and there are lethal chemicals and toxins as well. Modern technology and the detailed and evolving understanding of the complex mechanisms of the cell, the nervous system, and other aspects of the human body indicate that research focused on military uses could result in substantial improvements in effectiveness over tear gas and other chemicals now used in domestic riot control. The use of existing or any future chemicals "as a method of warfare" is banned by the Chemical Weapons Convention (CWC), which the United States signed in 1993 and ratified in 1997, but their use for "law enforcement including domestic riot control purposes" is specifically permitted. The potential benefits of the use of existing chemicals and of the development of improved compounds must be weighed against the costs involved and also against the negative consequences of a U.S. rejection of the CWC.

The Task Force had extended discussion on the use of tear gas (CS-2) in Vietnam and of the pros and cons of the use of biological or chemical nonlethal weapons, together with the legal obligations on parties to the CWC and the Biological Weapons Convention (BWC). The MNS, for instance, in its mention of calmative compounds, noted that it would "require substantial research to develop a universally controllable capability." Note, however, that if enemy troops are flushed out with nonlethal force (or by the threat of lethal force), according to the rules of war they must be given

the opportunity to surrender unless they clearly retain a hostile intent, in which case lethal force is justified.

The Task Force considered the benefits that would accrue and the problems that would be posed by either a U.S. attempt to interpret the CWC or by a U.S. move to amend or to renounce the CWC in order to be able to use chemicals as nonlethal weapons against enemy combatants. Note that it is only chemicals used for their chemical action on individuals (or biological agents used against either personnel or materiel) that are banned under the CWC or the BWC.[3] Chemicals in napalm, no matter how toxic, are not banned; chemicals that are used to reduce or eliminate traction are not banned; nor are smoke, dyes, or obscurants.

There is little doubt that the use of tear gas would be helpful in reducing the threat to civilians in cases in which enemy combatants are present among noncombatant civilians. Weighing against this, however, is the prospect of the use of similar chemicals against U.S. forces in a conflict of nations, and, worse, the results of focused military research and development on chemical and biological agents, which is more likely to result in improved lethal agents than in NLW. We note also that we have seen no full scenarios for the use of calmatives. What happens in a situation where, after everyone is confused or knocked out, they begin to revive, and the United States does not have an overwhelming presence?

It has been the consistent U.S. position—codified in Executive Order 11850, which was issued in 1975 and later placed as a condition by the U.S. Senate of its ratification in 1997 of the CWC—that for the United States as an occupying power there are permitted uses of riot control agents (RCAs) even in a theater of conflict. For example, RCAs could be used to maintain order in enemy prisoner of war camps, to control crowds in occupied cities

[3]In a pending solicitation on NLW announced November 4, 2003, the JNLWD states, "Proposals that use chemical or biological payloads will not be considered for nonlethal counter-personnel concepts. . . . Proposals that use biological payloads will not be considered for nonlethal counter-materiel concepts. Proposals that use chemical payloads [for countermateriel purposes] must be consistent with U.S. obligations under the Chemical Weapons Convention, and other applicable law and regulations."

just as CS-2 and pepper spray (oleoresin capsicum, or OC) are used domestically, and in areas outside the zone of immediate combat to protect convoys from civil disturbances, terrorists, and paramilitary organizations.

The Task Force had a full discussion with considerable preparation and heard oral presentations from several authorities on these points. Some of the pertinent materials are included as Appendix C.

The Task Force believes that to press for an amendment to the CWC or even to assert a right to use RCAs as a method of warfare risks impairing the legitimacy of all NLW. This would also free others to openly and legitimately conduct focused governmental R&D that could more readily yield advanced lethal agents than improved nonlethal capabilities. While limited use of RCAs in accordance with the traditional U.S. position does not totally avoid these risks, we believe they are outweighed by the potential benefits.

Accordingly, the Task Force judges that on balance the best course for the United States is to reaffirm its commitment to the CWC and the BWC and to be a leader in ensuring that other nations comply with the treaties. Thus, the United States should declare that it will not employ RCAs "as a method of warfare" but will use them for law enforcement and other legitimate purposes, among which are controlling enemy prisoners of war and controlling crowds, in the exercise of its legal responsibilities as an occupying power. That is, the United States would comply with the CWC and the BWC but would not refrain from actions that are in its interest that it believes to be legal under the treaties.

Findings

The Task Force finds that a continuing lack of focus on NLW and on their subsequent integration in the DOD—with the changes needed to make best use of the new capabilities—have delayed the investments required to realize the benefits NLW have to offer. Our principal findings include the following:

1. If NLW capabilities are to realize their potential in greater and more usable military capability, U.S. military leaders must have a sound understanding of NLW technologies as they become available to the armed forces. Currently, both military and civilian leadership remain insufficiently familiar with the capabilities and limitations of NLW. This may stem from the fact that with the few million dollars in the service programs, NLW do not rise to the point of major decisions that would take into account the benefits they offer.

2. In addition, there is a growing need for transformation within the services in relation to NLW. Both the U.S. Army and the Marine Corps have reported success with the use of nonlethal capability sets. It is time for the marines and army to build upon this success and for their sister services, the air force and the navy, to join them in expanding their use of NLW. The Marine Corps must increase the basis of issue (quantity of items in the sets) in their version of the NLCS and further define requirements for advanced NLW capabilities. The army must continue and enhance their NLCS for the military police but, most importantly, extend the capability to their infantry divisions. This should be an immediate priority in support of Operation Iraqi Freedom. As with the Marine Corps, the army must further define requirements for advanced NLW capabilities. The navy has shown little interest in the subject of nonlethal weapons, despite the USS *Cole* incident, and the air force security forces have only recently initiated the process to obtain NLCS. Finally, and just as importantly, National Guard units should immediately be issued NLCS to support contingencies associated with homeland defense missions.

3. The JNLWD has done an excellent job in developing and fielding current NLW capabilities, but some clearly feasible capabilities may be lacking due to the limited funds and personnel available to it. It has not had the staff or clout to coordinate fully with other agencies within the U.S. government or with other governments in order to obtain promptly the best ideas and technologies. Nor is its staff of 19 sufficient for the directorate to

process the information to which it potentially has access, both from the services and from international NLW programs.

4. Since the JNLWD has access only to program element (PE) line 6.3B, or advanced development, to fund NLW, a program outside of that category (in S&T funding or demonstration, engineering, and development) has to be funded in the services. Without significant and dedicated funding for NLW S&T, technology in this field will advance at a snail's pace.

5. The benefits of NLW will be attained only if U.S. military and civilian leaders along with diplomats and negotiators are aware of the capability of NLW and the situations in which they can be employed. Currently, successful use of NLW commands little press coverage. For example, U.S. marshals have had notable success using NLW in the Vieques mission and in the control of crowds demonstrating against World Trade Organization sessions in the United States. In Iraq, those who have been struck with rubber bullets from the NLCS fielded by the U.S. forces left promptly and did not return.

6. In regard to recent concerns over homeland security and weapons of mass destruction (WMD), NLW could be useful in isolating a hot zone in the aftermath of a biological attack. Through the assistant secretary for homeland defense, the Department of Defense has the responsibility for plans and equipment for the National Guard in the event it should be federalized. But even in the case of National Guard activities under the command of the governor of an individual state, NLW equipment and training would be of value.

7. Beyond the tactical use of NLW exemplified by Tasers and caltrops, there are opportunities and unmet needs, such as the detection and disruption of roadside bombs, the rapid deployment of sensors, and the fusion of their output in support of the use of nonlethal or lethal force or information warfare. Similarly, the ability to broadcast television or radio signals to the population and to selectively disrupt unwanted broadcasts is clear-

ly a nonlethal but valuable tool that, although it may exist in limited form, has not been used to full effectiveness by the United States in recent conflicts.

Recommendations

The Task Force concludes that wider deployment of existing NLW capability—equipment, training, and command awareness—would greatly increase U.S. effectiveness in establishing a civil society after major conflict. Advanced NLW and augmented delivery capability for existing NLW could reduce the infrastructure damage in combat operations. DOD and service programs are simply inadequate in size and scope to yield these benefits from NLW. Building on the Joint Nonlethal Weapons Directorate, the administration should create an entity of sufficient size and budget that is the single focal point for all NLW activity. This would provide a basis for interagency oversight across the departments and agencies of the federal government that would allow for efficient pooling of intellectual resources to assist in the development and acquisition of nonlethal weapons and technologies.

The Task Force recommends:

1. *The secretary of defense conduct a comprehensive review of NLW with the objective of providing specific guidance to the services that will result in a more robust and expanded NLW capability.* This guidance should ensure that all facets of a complete nonlethal weapons program are provided resources with the goal of expediting both basic and advanced NLW capabilities to all of the services.

2. *The creation of a greatly expanded JNLWD or a new Nonlethal Joint Program Office (NLJPO) headed by a general officer with access to all program element lines (budgetary categories 6.0 to 6.6).* This would elevate the priority status of NLW within the DOD. The office should operate at a level of some $200 million to $400 million per year with the mission of fulfilling the

JROC Mission Need Statement for a joint family of nonlethal weapons.

3. *Within the Joint Forces Command (JFCOM) there should be a small support cell for NLW that would work closely with the expanded JNLWD both to inform the directorate of needs and to facilitate the placement of prototype and production capabilities within JFCOM.* JFCOM's stated tasks include "discovering promising alternatives through joint concept development and experimentation, defining enhancements to joint warfighting requirements, developing joint warfighting capabilities through joint training and solutions, and delivering joint forces and capabilities to warfighting commanders."

4. *Regardless of the details of organization, it is imperative that the JNLWD have insight into other NLW projects, both inside and outside the services and on the national and international level.* The leadership of NLW development must have more frequent and deeper access to classified programs in the services in order not to expend resources on creating capabilities that already exist or that can be counted on to emerge. Improved insight requires additional staff and funds but is not automatically a consequence of such expansion. Insight, access, and authority are essential for influence.

5. *Actions are necessary to remove barriers to the incorporation of NLW.* There is a need to integrate information and training regarding NLW capabilities into the curriculum at entry-level, career- level, intermediate, and top-level schools of all services; this would increase the rate of NLW integration into current force capabilities. A military occupational specialty (MOS) with NLW expertise in each battalion, similar to the nuclear, biological, and chemical (NBC) officers located at the battalion level, will allow combatant commanders to know what is available in the current inventory of NLW. Beyond a NLW-specific field manual, NLW should be included in the mission-essential task list. The DOD can also assist in this process by emphasizing both the acquisition of existing, proven NLW capa-

bility and also the development and early evaluation and choices among high-payoff systems.

6. *The acquisition and employment of nonlethal weapons and technologies would benefit if additional objective public information were readily available from the JNLWD.* While not suppressing the negatives of NLW, the directorate or its successor should be a reliable and timely authority regarding the status and utility of NLW.

7. *To provide a focus and to ensure progress on realizing the benefits of nonlethal weapons and of more general nonlethal capabilities, including the extension of range by the use of submunitions and straightforward improvements, the secretary of defense would benefit from having a special assistant for nonlethal capabilities.* It is important that this official have full knowledge of broadly relevant nonlethal capabilities—including classified and compartmented ones such as psyops, means for preventing the detonation of roadside bombs, and sensors that can be integrated with immediate response capabilities.

ADDITIONAL OR DISSENTING VIEWS

We are not yet doing enough to develop nonlethal capabilities or to integrate them with our other capabilities. Missions such as Iraq today demonstrate the need for life-conserving, environmentally friendly, and fiscally responsible nonlethal options with which to manage emerging challenges.

Janet Morris

I thank the Task Force chairmen, director, and members for this important and timely report and offer additional views on: 1) the Joint Nonlethal Weapons Directorate (JNLWD) funding proposal, 2) the JNLWD/Joint Program Office (JPO) structural emphasis, and 3) the treatment of information operations.

My first two observations stem from a belief that the development, fielding, and employment of nonlethal weapons (NLW) can be fixed neither by spending "more" nor by changing staff relationships. In the former case, the Task Force had so little insight into classified or special access programs of a relevant nature that the "$300 million" figure is at best unhelpful and at worst a gross underestimation of the real requirement within the context of a $400 billion defense program. On the latter—no matter how well conceived by the Task Force and distinguished advisers—debate and discussion on the "who/where/what level" etc. of a JNLWD only serves to blur the need for political direction. NLW suffer a lack of prioritization by key civilian leaders. The fielding of a robust NLW capability requires that Congress (members and staff) and the administration (both the White House and the Defense Department) determine that NLW play an essential role in American defense policy. Only decisive political direction will enable NLW to compete with the plethora of mission-critical program priorities. In both of these cases, I fear that our focus fuels future

debates over dollars and directorates and bogs down real NLW development until the next Council Task Force is convened.

Finally, I believe that we should clearly distinguish NLW from the tools of information operations. In the context of this report, NLW are weapons employed by combatant forces. Information operations are generally conducted by C^4ISR (command, control, communications, computers, intelligence, surveillance, and reconnaissance) forces. While these are complementary, we do neither good service to blur their distinction.

Roderick von Lipsey

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APPENDIXES

APPENDIX A: CURRENTLY AVAILABLE (OR NEARLY AVAILABLE) NONLETHAL WEAPONS[4]

1. Weapons and Technologies Included in the Nonlethal Capability Sets (NLCS)

200 riot face shields
200 31-inch riot batons
12 training batons
13 10-watt bullhorns
5,000 caltrops
45 squad OC (pepper spray) dispensers
92 fireteam OC dispensers
891 individual OC dispensers canisters
81 shotgun ammunition pouches
236 shotgun training rounds
27 shotgun gas grenade launchers cartridges
4,050 buckshot cartridges
702 40-mm rubber rounds
1,512 40-mm Stinger cartridges
162 Stingball/flash-bang pouches
729 Stingball/grenades
40 full-length riot shields
2 riot baton training suits
9 rifleman's combat optics
3 handheld spotlights
200 flexcuff packs (10 per pack)
18 squad OC training canisters
120 fireteam OC training canisters
400 individual OC training canisters
27 12-gauge shotguns (redistributed)
741 shotgun bean bag rounds
348 blank/shotgun launching cartridges
798 fin-stabilized rubber 40-mm shotgun rounds
702 40-mm wooden rounds
162 40-mm nonlethal ammunition-carrying pouches
72 Stingball training grenades
729 MK 141 flash-bangs

[4]As provided to the Task Force by the JNLWD, November 11, 2003.

2. Other Commercial Off-the-Shelf NLW Capabilities

a. Taser—causes electromuscular disruption to incapacitate personnel
b. lightweight shotgun system (LSS)
c. high-intensity directed acoustics (HIDA)
d. OC pepperball rounds
e. X-Net—man-portable or pre-emplaced
f. tactical unmanned ground vehicle (TUGV) nonlethal payloads
g. MK 19 nonlethal short-range munition

3. Joint Nonlethal Weapons Program (JNLWP) Acquisition Program

a. 66-mm vehicle-launched nonlethal grenades (VLNLG)
b. mobility denial system (MDS)
c. clear a space distract/disorient (CAS D/D)—distracts or disorients
d. hand-emplaced nonlethal munition (HENLM)—passive infrared (IR) trigger sensors and two Taser subassemblies
e. nonlethal mortar munition (NLMM)
f. objective individual combat weapon (OICW) nonlethal rounds—nonlethal airburst munition to burst at a precise location

4. Advanced Concept Technology Demonstrations (ACTD)

a. active denial system (ADS)—millimeter wave energy
b. advanced tactical laser (ATL)

5. JNLWP Development Programs

pulsed-energy projectile (PEP)

APPENDIX B: THREE IRAQI FABLES

Lessons for Nonlethal Weapons

First the report of one actual incident:

Background

As a major in the Marine Reserve, XX graduated from the first nonlethal weapons instructor course. Leaving Kuwait for Baghdad, he requested nonlethal weapons (NLW) from the ships and took them with the team into Iraq.

> NLW was worth its weight in gold.
>
> The perfect situation occurred in Baghdad one night when we were at Rasheed Military Base (home of the Republican Guard). One night [Iraqi civilians] were coming through holes in the walls and looting the quartermaster's buildings inside our perimeter. The company CO [commanding officer] ran over to me and asked if we had NLW. I told him we did. He asked if we knew how to use them, and I told him we had been training for two months for this exact situation. Then I asked him how many guys were we dealing with? He said about a thousand. I said, "We only have 8 guys."
>
> We went out anyway and moved them using LAPD [Los Angeles Police Department] riot control tactics since my team chief is an LAPD firearms instructor. I'm a DEA [Drug Enforcement Administration] firearms instructor too. We got on line with the public address systems running with my Arabic speaker, spot lights, shotguns loaded with bean bag rounds, Stinger grenades, and of course everyone with lethal weapons. Within 10 minutes we were able to clear about a thousand people which a company [lacking NLW] could not for hours. Simply because we could fire [at them] and the other guys were restricted from shooting civilians. We held that perimeter until the next afternoon when [another unit] showed up to take the perimeter. During those hours I can't tell you how many people had NLW used on them. I personally shot at least 50 rounds of bean bags, another 30 fin-stabilized rubber rounds, at least a dozen Stinger grenades, a bottle of OC, and [engaged in] plenty of good old fashioned action with batons.
>
> Bottom line: *NLW worked great!* We later employed them from time

to time when the circumstances dictated during stabilization operations. The message was loud and clear to the civilian looters/rioters. NLW were a big success story for us.

Iraqi Fable 1

A Confrontation (as reported by Pangloss International)
Two Iraqi civilians suffered broken ankles and one a bruised elbow in the town of al-Majar al-Kabir on June 25, 2003, when a 400-person civilian protest over intrusive searches of Iraqi homes escalated into a confrontation. British troops had carried out house-to-house searches in a manner offensive to Muslim traditions. As the crowd of protesters grew large, vocal, and confrontational, children began the fighting by throwing stones. The British troops responded with warning shots and then launched CS-2 tear gas canisters to disperse the crowd. The incident was not considered news.

In Reality
Six British soldiers and 4 Iraqi civilians were killed and another 8 Britons and 17 Iraqis were injured in the town of al-Majar al-Kabir on June 25, 2003, when a 400-person civilian protest over intrusive searches of Iraqi homes escalated into a firefight. British troops had carried out house-to-house searches in a manner offensive to Muslim tradition. As the crowd of protesters grew large, vocal, and confrontational, the British troops were left with nothing but rubber bullets and live ammunition to quell the uprising. Children began the fighting by throwing stones, and the British troops responded with warning shots, eventually firing into the crowd with live ammunition.

http://www.arabia.com/newsfeed/article/english/0,14183,401552,00.html
http://edition.cnn.com/2003/WORLD/meast/06/25/sprj.irq.intl.main/

Interpretive Note

From experience with crowds in the United States and Europe, the use of tear gas (CS-2) would have cleared the crowd and avoided the escalation to live fire. Widely used in domestic riot control, CS-2 would have caused little harm. Why was this not done?

Because the Chemical Weapons Convention (CWC) bars riot control agents "as a method of warfare." It also requires nations that are parties to the treaty to register with the CWC Organization the riot control agents they have used domestically, and CS-2 is one commonly registered. To permit the Panglossian outcome, an interpretation of the CWC might be sought as an amendment, or as a judgment in a suitable court, or simply asserted by a substantial number of treaty parties, that such riots in wartime or in the aftermath of war are not "warfare" and thus registered riot control agents could be used. A more far-reaching amendment could seek to eliminate the bar to the use of riot control agents as a method of warfare and thus permit the use of those that have been registered by a treaty party for at least two years.

In this particular confrontation, if it was judged that the crowd was civilian and not combatant, even if many were armed with the self-protection arms ubiquitous in Iraq after the end of major conflict, the use of tear gas by an occupying authority would be acceptable under the CWC.

Iraqi Fable 2

A Van at the Checkpoint (as reported by Pangloss International)

The driver of a van approaching a U.S. checkpoint ignored signals to stop. Warning shots were fired, with no result. Arms at the ready, the soldiers activated the X-Net barrier; barbs penetrated the front tires of the van, and the strong net to which the barbs were fastened wound around the van wheels, bringing the vehicle to a screeching stop.

In Reality

U.S. troops killed seven Iraqi women and children on March 31, 2003, when the Iraqis' van failed to stop at a U.S. checkpoint. The officer in charge ordered his troops to open fire when faced with no alternative means to force the car to stop. U.S. Central Command (CENTCOM) said the soldiers followed the rules of engagement to protect themselves.

A statement issued by CENTCOM said soldiers motioned for the driver to stop but were ignored. The soldiers then fired warning shots, which also were ignored. They then shot into the vehicle's engine, but the van continued moving toward the checkpoint. Ultimately, shots were fired into the passenger compartment.

The soldiers involved were from the Third Infantry Division, the same unit that had lost four soldiers at a checkpoint near Najaf two days earlier when an Iraqi soldier dressed as a civilian detonated a car bomb.

http://www.cbsnews.com/stories/2003/04/01/iraq/main547091.shtml

Interpretive Note: Problems for Dr. Pangloss

The X-Net barrier is a commercial offering and works as indicated. As of June 2003, the U.S. Army has the responsibility for evaluation, and the U.S. Special Operations Command has also "expressed interest." It would not totally solve the checkpoint problem.

The vehicle driver, passengers, or the vehicle itself may pose lethal threats to soldiers at vehicle checkpoints. When the threat comes from the vehicle, the driver and passengers may be unwitting or the driver coerced—even to the point of giving his life to spare his family from torture. This means that inspection is difficult and dangerous; perhaps paradoxically, one guard as an inspector is a less lucrative target and may be less likely to be killed by a bomb than would a team of three.

In case of a checkpoint guarding access to a valuable site, where a ton or more of explosive could cause much more damage than would a smaller bomb more readily concealed, the driver might try to run the checkpoint. More effective sign barriers

warning of death if the vehicle does not stop and backed up by command-detonated explosives would be useful. They could serve as the ultimate backup to serpentine deployment of Stinger spike strips, heavy block or earth barriers, and X-Net.

Iraqi Fable 3

Clearing an Apartment Block (as reported by Pangloss International)
As coalition forces entered Baghdad, the Special Revolutionary Guard (SRG) was ordered by Saddam Hussein to distribute itself in apartment blocks and government office buildings, ensuring that many civilians in the same buildings would serve involuntarily as human shields. U.S. and British forces had practiced military operations in urban terrain (MOUT) and were confident that they would prevail, although they expected to suffer 30 percent casualties in the process.

With the SRG holding hostage the civilian population, block by block, building by building, coalition forces could not use global positioning system (GPS)–guided bombs—Joint Direct Attack Munitions (JDAM)—to level buildings containing combatants without killing the civilian hostages.

U.S. forces executed for the first time a block-by-block sweep to acquire territory and buildings. They were able progressively to

1. Monitor the surrounding streets to ensure no one was in the street or to see how many were there and whether they were likely to be armed;
2. Strike armed personnel if they ventured out; and
3. Destroy the site if the civilians left and the combatants remained.

Predator unmanned air vehicles (UAVs) helped with the monitoring. Primarily, however, the operation used tiny cameras remotely mounted on walls and parapets, with signal egress by radio. Siege without food and water would eventually empty the buildings—with the hostages in poor shape.

The ability to kill or disable fighters holding human shields, though not a new-felt need for law enforcement, was new for the military. The laser-driven pulsed-energy projectile with remote relay mirror filled this need. In some cases, remotely fired Taser packages were used, which homed on spots from laser designators. As a consequence, the SRG stayed in the buildings until they surrendered.

The operation took six weeks because some buildings had stores of food and water. It depended on a prior heavy investment in an integrated system of observation and response—both lethal and nonlethal.

In Reality

Iraqi armed forces did not fight this way, although persistent sabotage and lethal attacks on coalition forces kept the economy on its knees and are a serious and increasing but different problem.

Interpretive Note

In this scenario, there is an evident need to render buildings temporarily uninhabitable and thus to reduce the need for widespread siege. Closed interior doors appear to make infrasound ineffective as a tool to cause building evacuation. Finely dispersed pepper spray and tear gas (e.g., oleoresin capsicum [OC] and CS-2) are banned by the Chemical Weapons Convention (CWC) when employed "as a method of warfare." Malodorants, although nontoxic in normal terminology, are probably also classed as "riot control agents" and their use in this application is forbidden by the CWC. However, police forces in the United States have begun to use foul-smelling materials (gelled essence of skunk) to prevent the occupation of vacant buildings; it would likely be acceptable to do the same in a theater of war, even if the treatment prevented the entry of combatants as well as civilians.

Laser weapons for blinding are banned under Protocol IV of the Convention on Conventional Weapons (CCW). The prohibition on lasers is not as strict as is commonly interpreted, since Protocol IV reads,

> Article 1: It is prohibited to employ laser weapons specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blindness to unenhanced vision, which is to the naked eye or to the eye with corrective eyesight devices. The High Contracting Parties shall not transfer such weapons to any State or non-State entity.[5]

The pulsed-energy projectile (PEP) under development uses a chemical laser technology to produce a large flash, bang, and shock wave to temporarily disorient and incapacitate individuals in a crowd. Many obstacles must be overcome to make it a useful and practical weapon, including the transition to solid-state laser technology. The result may be too large to provide the necessary presence without the relay mirror system invoked in the fable. For instance, such a laser weapon operating from a range of 500 meters would need a lens about 8 centimeters (three inches) in diameter to produce a focused spot one centimeter in diameter with a wavelength of 1.3 micrometers. Smoke would be a readily available counter to this weapon and also to surveillance of the street.

General Comments on the Fables

These specific cases do not capture the full impact of a family of nonlethal weapons and capabilities. Furthermore, the examples are limited to the tactical realm, with, of course, operational and strategic implications. Another approach would be to start with the operational need and from this to infer the requirement to "clear a block" of buildings. This would entail the consideration of existing and potential lethal and nonlethal weapons and is closely related to the planning and implementation process for both the acquisition and use of these capabilities. Nevertheless, the specifics illustrate the more general concepts involved.

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[5]*Protocol on Blinding Laser Weapons (Protocol IV)*, Chemical Weapons Convention, adopted October 13, 1995.

APPENDIX C: CHEMICAL AND BIOLOGICAL NONLETHAL WEAPONS

An Object Lesson—Tear Gas in Vietnam

A memo for the president from Secretary of Defense Robert S. McNamara of September 22, 1965, requested presidential approval for reaffirmation of "the current national approval for use of riot control agents CS and CN under the combat conditions described above." He noted, "Of particular importance would be the reduction in casualties to civilians who are inevitably mingled with hostile military elements as the result of VC (Vietcong) tactics."

The abstract of a very interesting 1973 U.S. Army report on tear gas in Vietnam reads,[6]

> This report summarizes data on agent CS that was used operationally in Vietnam. The characteristics and uses of CS munitions are presented and discussed. Results of this survey indicate that agent CS was employed in the following roles: (1) suppression of enemy fire; (2) enhancement of friendly fire; (3) search (or reconnaissance); (4) restriction of enemy use of areas; and (5) reduction of property damage. The assessment of the effectiveness of a nonlethal weapon, such as CS, was difficult because of different objectives for its use. The high demand for CS munitions by troops in the field may be an indication of the effectiveness of CS (as used in Vietnam). [p. iii]
>
> Agent CS was used operationally in Vietnam from late-1965 through 1971. Many tons of bulk CS and many thousands of CS munitions were expended during this period. [p. 118]

The text also comments,

> Numerous reports, given to show the utility of agent CS in combat, indicated that conventional weapons had been used extensively, and unsuccessfully, prior to the introduction of CS munitions, sometimes for a period of days.

[6] "Technical Report: Operational Aspects of Agent CS," by Paul L. Howard, April 1973. (Unclassified, originally "Confidential.")

Then with the use of CS the objective was attained and with very few casualties. Proper training and/or the proper integration of CS weapons into infantry tactics would have assured success of the maneuver initially. The use of CS munitions as an integral part of our combat capability will optimize the successful results expected from such use. The programmed or concurrent use of CS with conventional fires will enable combat troops to receive the most benefit from the enhancement of the conventional fires by the CS. [p. 118]

The report concludes,

8.1.3 (U) *Observations* (U)
Based on a review of the available data on the use of agent CS in Vietnam, the following observations are deemed pertinent:

Nonpersistent CS was a useful complement to conventional weapons and contributed to the success of units in combat in attaining their objectives.

There was little evidence that the extensive use of bulk CS in the area restriction role was effective in reducing the enemy's combat capabilities.

The availability of protective masks was essential to preclude the abort of CS missions. Equally essential was the requirement that troops be trained in the use of the mask and be confident of their ability to fight while masked.

The reported ability of friendly troops to fight while masked would indicate that the successful use of protective masks *by an enemy* would severely limit the contribution of agent CS to the success of a mission.

Field reports have indicated that the use of nonpersistent CS to enhance friendly fires by flushing the enemy from hidden or fortified positions contributed to a reduction in the number of friendly casualties in Vietnam. [p. 119]

Tear Gas and the Chemical Weapons Convention (CWC) of 1993

With respect to riot control agents, we find the following in the Chemical Weapons Convention:[7]

Each State Party undertakes not to use riot control agents as a method of warfare. [3. Art. I, Sect. 5]

[7]See http://projects.sipri.se/cbw/docs/cw-cwc-text.pdf.

> "Riot Control Agent" means: Any chemical not listed in a Schedule, which can produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure. [3. Art. II, Sect. 7]
>
> Specify the chemical name, structural formula and Chemical Abstracts Service (CAS) registry number, if assigned, of each chemical it holds for riot control purposes. This declaration shall be updated not later than 30 days after any change becomes effective. [3. Art. III. Sect. 1e]
>
> Investigations of alleged use of chemical weapons, or of alleged use of riot control agents as a method of warfare, initiated pursuant to Articles IX or X, shall be conducted in accordance with this Annex and detailed procedures to be established by the Director-General. [3. Part XI. A1]

The Confluence of Chemistry and Biology

As is evident from modern anticancer research, the development of chemical and biological antitumor agents depends in large part on a better understanding of the mechanisms of the cell. In some cases, the mechanisms of tumor cells can be countered by chemical agents very specific to the tumor. In other cases, biological agents such as viruses can be used. The same research can be applied to produce lethal or nonlethal weapons.

The unilateral renunciation of research on offensive biological warfare agents by President Nixon on November 25, 1969, was soon followed by the president's renunciation of work on toxins—the product of bacteriological organisms.[8] Thus, botulinum toxin is banned as a means of warfare by the Biological Weapons Convention (BWC), although it is a chemical that could be synthesized without the intervention of *botulinus* bacteria. For example, it could be produced efficiently by genetic manipulation of plants. No matter how produced or synthesized, it would be banned by the BWC. Likewise, modified toxins, which could never be produced by living entities, are banned by the CWC.

Nonmilitary research in biology and medicine will lead to understanding that can greatly facilitate the development, production,

[8]See www.fas.org/bwc/nixon_bw_renounce.pdf.

and use of lethal and largely nonlethal chemical and biological agents. But NLW-focused research will hasten the day that such materials are available not only to the United States but also to those who would use them against us. In his November 25, 1969, statement, President Nixon said, "First, in the field of chemical warfare, I hereby reaffirm that the United States will never be the first country to use chemical weapons to kill. And I have also extended this renunciation to chemical weapons which incapacitate."

A World without Biological Weapons or Chemical Weapons?

If the choice were between a world in which the United States would have and use chemical nonlethal weapons (CNLW) and biological nonlethal weapons (BNLW) that were available also to other states and nonstate groups and in which nonstate groups used also lethal chemical weapons (CW) and biological weapons (BW), and a world in which there were no use of lethal or nonlethal chemical or bacterial agents in a theater of warfare, we would all choose the latter. While a world free of BW and CW is not within our grasp, it is highly probable that if the United States espouses BNLW or CNLW several nations (and not only the renegades) will adopt serious military programs for the development of lethal agents in the guise of advancing the capabilities of nonlethal ones.

It seems that the United States has three policy options at this juncture in regard to CNLW and BNLW:

1. State unilaterally that the United States interprets the CWC and BWC as allowing the use of nonlethal chemical and biological agents as a method of warfare.

2. State unilaterally, but preferably with some coalition partners, to the CWC that the use of registered riot control agents (RCA) is in the interests of humanity and that the United States would use CNLW and BNLW as a method of warfare in the

interests of reducing civilian casualties when civilians are involved.

3. Take measures within the organizations of the CWC and the BWC, in the UN Security Council, and in the North Atlantic Treaty Organization (NATO) and other military organizations to put teeth into the promised response to any use in warfare of CW or BW agents, lethal or nonlethal, in order that U.S. forbearance in such use would indeed result in a world in which legitimate governments did not develop, possess, or use lethal or nonlethal BW or CW in the theaters of conflict. The goal would be that even renegade governments would be deterred from such use by the prospect of a concerted response led by the United States. This would not eliminate the prospect of use by individuals or groups of terrorists, but it could limit the progression to more capable and tested agents that might become available to terrorists.

In the short term, there is no doubt that the use of tear gas or other chemicals (option 1) could be helpful to U.S. troops in environments such as Iraq and Afghanistan. On the other hand, the Task Force discussion indicates that there will be no support among the parties to the CWC for such U.S. positions on use. Even our key partner in Iraq—the United Kingdom—has a strong position against this.

The use of registered RCAs (option 2) might seem to have a somewhat better chance. It would involve only those agents used domestically as riot control agents and properly registered with the CWC organization as RCAs. One could additionally limit the number of RCAs currently registered by any given state. But the CWC contains a clear prohibition, as stated, of the use of RCAs as a method of warfare. There would be no support among the parties to the CWC for an exception.

There is much merit to option 3: "no gas" (and no poison either), as expressed in the CWC and the BWC. Any other position opens a Pandora's box of national research and development of new agents, which can be far more toxic and more effective against

U.S. and coalition forces than the existing agents. It may also lead to the legitimization of such weapons.

Option 3 would not restrict the U.S. use of tear gas or other RCA in controlling riots in enemy prisoner of war camps or in missions to rescue downed pilots, for instance. On balance, the Task Force notes the costs and benefits beyond those directly involved with the first use of tear gas as a method of warfare in the modern age. Expanding and strengthening the U.S. commitment to the prohibitions on the use of chemicals and biological and toxic agents in warfare is essential if we are not to see such weapons developed by states and used by them or others to devastating effect.

Option 3, which we advocate, would be far from a do-nothing approach. It would require initiatives on the part of the United States for the community of nations to universalize the CWC and the BWC, and for the United States to lead a coalition for the enforcement of the CWC and the BWC by actions against those violating these conventions, even if they did not directly injure the United States.

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NONLETHAL WEAPONS AND CAPABILITIES

REPORT OF AN INDEPENDENT TASK FORCE SPONSORED BY THE COUNCIL ON FOREIGN RELATIONS

U.S. military forces, superbly capable of countering a defined enemy in intense combat, are not properly supported for important current roles as experienced in Kosovo and Iraq. If U.S. units and allied forces are to prevent looting and sabotage, control individuals and crowds, stop uncooperative vehicles in an urban environment, and protect themselves in stabilization and reconstruction activities, they will require new tools and proper training to accomplish these objectives without harming innocent people or destroying civil infrastructure. Had more of the current nonlethal weapons (NLW)—including nets to entangle and stop vehicles, slippery spray, rubber-ball projectiles, and electroconvulsive weapons such as the Taser—been available for use by military and security forces, such events could have been minimized or perhaps even avoided.

By providing an intermediate option between "don't shoot" and "shoot," the Task Force observes, NLW have enormous potential in the new military roles of modern combat. Wider integration of existing types of NLW into the U.S. Army and Marine Corps could have helped to reduce the damage done by widespread looting and sabotage after the cessation of major conflict in Iraq. This Independent Task Force report on Nonlethal Weapons and Capabilities finds that incorporating these and additional forms of nonlethal capabilities into the equipment, training, and doctrine of the armed services could substantially improve U.S. military effectiveness.

Led by Dr. Graham T. Allison, Director of the Belfer Center for Science and International Affairs at Harvard's John F. Kennedy School of Government, and General Paul X. Kelley, USMC (Ret.), former Commandant of the Marine Corps, the Task Force consists of former military officers, business executives, academics, diplomats, and congressional staff.

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