

2015

# *Non-lethal Weapons Techno-Tactical Scenarios*



*Homeland Security Research Corp.*

# ***Non-lethal Weapons Techno-Tactical Scenarios***

***August 2015***

**Homeland Security Research Corp. (HSRC)** is an international market and technology research firm specializing in the Homeland Security (HLS) & Public Safety (PS) Industry. HSRC provides premium market reports on present and emerging technologies and industry expertise, enabling global clients to gain time-critical insight into business opportunities. HSRC's clients include U.S. Congress, DHS, U.S. Army, U.S. Navy, NATO, DOD, DOT, GAO, and EU, among others; as well as HLS & PS government agencies in Japan, Korea, Taiwan, Israel, Canada, UK, Germany, Australia, Sweden, Finland, Singapore. With over 750 private sector clients (72% repeat customers), including major defense and security contractors, and Fortune 500 companies. HSRC earned the reputation as the industry's Gold Standard for HLS & PS market reports.

**Washington D.C. 20004, 601 Pennsylvania Ave., NW Suite 900,  
Tel: 202-455-0966, [info@hsrc.biz](mailto:info@hsrc.biz), [www.homelandsecurityresearch.com](http://www.homelandsecurityresearch.com)**

## Table of Contents

<b>1</b>	<b>Non-Lethal Weapons Usage .....</b>	<b>4</b>
1.1	NLW Strategies.....	4
1.1.1	Law Enforcement.....	4
1.1.2	Low Intensity Conflicts.....	4
1.1.3	Peacekeeping Operations .....	5
1.1.4	Emerging Conflicts .....	5
1.1.5	Use of NLW in Major Violent Conflicts .....	6
1.1.6	Battlefield Application of NLW .....	9
1.2	Operational Scenarios .....	11
1.2.1	Rescue Operations at a Critical Site in Urban Terrain .....	11
1.2.2	Threat of WMD in Urban Terrain .....	11
1.2.3	Protection of Key Installations .....	12
1.2.4	Crowd Control at a Food Aid Distribution Point .....	12
1.2.5	Protection and Evacuation of a Minority .....	12
1.2.6	Asymmetric Threat.....	12

# 1 Non-Lethal Weapons Usage

## 1.1 NLW Strategies

### 1.1.1 Law Enforcement

Law enforcement officers encounter incidents involving hostage rescue, vehicle pursuit, attempted suicide, the need to detain or control unruly individuals and crowds, and domestic disturbances continue to dominate daily activities. A difficult aspect of civil law enforcement is the need to manage individuals or groups when more than a show of force or voice commands are required and deadly force is neither authorized nor the preferred method of resolution. To meet this need, many law enforcement authorities have developed and used less-lethal technology.

In the context of civil law enforcement, less-lethal weapons are those primarily designed to temporarily disable or stop suspects without killing. Examples of less-lethal weapons include kinetic impact munitions, oleoresin capsicum pepper spray, electronic stun devices, and vehicle-disabling technologies. Interventions using these less-lethal systems have helped to conclude many potentially lethal use-of-force situations.

### 1.1.2 Low Intensity Conflicts

In Iraq and Afghanistan soldiers are conducting operations where they are exposed to the use of human shields and so called “intermingled targets,” whereby assailants hide amongst the benign population or in vehicles parked next to mosques, hospitals and schools. NLWs could be used to target those assailants without causing unnecessary loss of life or property damage. NLWs are most effective for the stability operations, but can also be applied in offensive and defensive operations, as well. An example might include military police conducting activities where they will be expected to control or disperse a crowd, provide convoy protection, transport suspects or detainees, or just to augment their arsenal of lethal weapons.

NLWs provide an option for those desiring to maintain control of a particular situation, person or population while also maintaining legitimacy and preserving basic human dignity.

NLW might be used against the insurgent and local population, particularly if used in concert with lethal weapons.

### **1.1.3 Peacekeeping Operations**

Thousands US and NATO troops are deployed worldwide, conducting a variety of missions including peacekeeping, combat, security and deterrence operations. Many of the missions include providing humanitarian aid, noncombatant evacuation operations and stabilization and reconstruction. The ultimate goal of these missions cannot be accomplished through destruction and brute force.

In stability operations, Soldiers and Marines can expect to control crowds, deny access to personnel and vehicles, neutralize vehicles, clear facilities, and shape the area of responsibility (AOR) as needed. In order to achieve success, noncombatant casualties must be kept to a minimum. Limiting collateral damage and noncombatant deaths serves to encourage stability and restore key infrastructure.

NLWs are designed to provide the user the capacity to incapacitate or repel a hostile as much as lethal weapons but without permanent consequences. There are a wide variety of counter-personnel and counter-material NLWs as well as some counter-capability options which can be used in conventional military operations and in unconventional warfare. In the end, a successful operation rests on the counterinsurgent's ability to protect the population and meet their needs to the extent of overt support from the populace for the government. And while there still exists the possibility of misapplication or misuse of these weapons, the comparative diminution of irreversible damage makes them all the more advantageous for stability operations.

### **1.1.4 Emerging Conflicts**

On the lower end of the spectrum of conflict, non-lethal technologies could substantially increase the effectiveness of traditional sanctions and economic measures. A greater ability to enforce compliance of sanctions by other states, allowing a non-lethal means to stop or inspect suspect shipping and an ability to selectively disrupt transportation within the target state adds significant strength to this option. Non-lethal “technical sanctions” may achieve more immediate results, permit selective effects against the specific vulnerabilities and enhance the ability to vary the level of effects to complement political initiatives. In addition, non-lethal technologies may offer the means to intervene in close proximity to noncombatants without unnecessary risk to the civilian population.

The combination of effects provides an incentive to compel a change in behavior and may preclude intervention by lethal military force. Non-lethal technologies enable intervention at a lower threshold of conflict. The precision of effects and the ability to employ as a standoff weapon (via cruise missile, UAV, or aircraft) will decrease the political and military risks that presently constrain the decision to intervene. While military intervention may not be able to resolve the core issue driving the confrontation, the appropriate non-lethal application may provide the

time and distance necessary to de-escalate a crisis or signal the intent to ward off a potential conflict. A non-lethal intervention can maintain political options since it may not harden a population against future diplomatic efforts or arrangements. National decisions makers no longer have to contend with the paradox of engaging in peacekeeping operations with overwhelmingly lethal military tools. Non-lethal weapons enable a lower risk option for intervention. Non-lethal means with large radius effects can have significant visibility and impact without the use of ground troops.

The combination of fewer engaged forces and the less destructive nature of non-lethal technologies reduces the overall “cost” of intervention in terms of physical damage and political risk. The reduced risk of noncombatant casualties is also significant. In 1950, noncombatants accounted for about one-half of world-wide casualties during war; in 1980 the rate rose to about 80 percent. Curbing this trend is worthy of the best efforts. Further, non-lethal engagements reduce the necessity of escalation by the targeted state or group. Arguably, there may be a less emotional response to an EMP attack on a state’s communications equipment than a visible, lethal attack on the communications facility. This maintains a more open environment for negotiations and adds to the synergy of political and economic tools.

Non-lethal weapons enable effective conflict termination. The reversibility of most non-lethal effects limits the duration of the “damage.” Assuming that the political objective is to re-establish stability, it becomes necessary to assist the failed state to restore economic and political processes. A non-lethal strategy provides one option. The “reversibility” of effects is dependent on the particular non-lethal methods used and the selected targets being attacked. However, several non-lethal technologies could provide this capability. As airpower doctrine continues to emphasize the destruction of national leadership, infrastructure, and economic capabilities to achieve ‘strategic paralysis,’ the element of “reversibility” becomes more critical. The ability to rapidly re-build the infrastructure avoids the creation of an economically and politically failed state and continuing regional instability.

### **1.1.5 Use of NLW in Major Violent Conflicts**

At the higher end of the spectrum of conflict, non-lethal technologies provide a significant complement to lethal force during a major conflict particularly as the effectiveness of non-lethal technologies develop.

The precise effects and selective nature of engagement can support an efficient, high-tempo strategic attack of vital targets while limiting the level of violence. The larger radius of effects for future weapons may enable devastating, simultaneous effects on a countrywide scale. Although it may not be politically feasible, a sea-launched ballistic missile armed with EMP munitions could achieve substantial disruption to a nation’s vital centers of gravity with a single strike. Conversely, the employment of non-lethal technologies allows a modest

sized force to apply overwhelming pressure to the leadership and war-making capabilities during the initial stages of a campaign.

The ability of non-lethal weapons to delay, disrupt, and disorient can make the enemy forces more vulnerable to lethal attack. The destruction of electronic devices in military equipment and vehicles, disruption of vital transportation, and denying critical communications places the enemy leadership in a position to reconsider continuing military action or suffer the consequences of a lethal attack. For example, a non-lethal attack can disrupt air defenses, degrade sophisticated electronics in fielded military forces and aircraft, and render many vehicles unusable. The attack could render a significant portion of the military forces either undefended or non-operational leaving them in a highly vulnerable position. A subsequent attack on the disabled forces with conventional munitions can be conducted at the discretion of national decision makers and military commanders.

In several mission areas, non-lethal weapons may be more effective than traditional lethal means. The greater radius of EMP or HPM effects offer a better capability for electronic attack or suppression of enemy air defenses. The greater radius of effects provides an ability to disable dispersed air defense equipment more efficiently than precision munitions. An EMP or HPM attack on air defense can achieve a hard electronic kill of all radar and support equipment associated with an air defense site. This attack is equivalent to multiple missions with conventional munitions and provides more sustained results than electronic jamming. Also, non-lethal technologies offer a greater flexibility for targeting. Since the risk of collateral damage is reduced, non-lethal weapons can attack the “higher risk” targets. The location of command and control facilities or infrastructure targets in highly populated areas poses significant problems to targeting. In these situations, the availability of non-lethal weapons may provide a more acceptable alternative than lethal munitions. The strategic implications for a major conflict are significant. Non-lethal weapons present more than an adjunct to lethal force because they provide the ability to strike early in a conflict, significantly disrupt military actions, and increase the vulnerability of the aggressor’s military force. The combination of these outcomes will enable decisive intervention with a smaller deployed military force. In essence, the attributes of non-lethal weapons may allow technology to substitute for mass.

The employment of non-lethal technologies allows military force to better meet the future challenges. They reduce the risk of intervention, permit intervention at a lower level of conflict, protect the will to intervene, allow more rapid reconstitution of attacked infrastructure and permit greater synergy of political and economic tools. Restraints to intervention are weakened permitting a bolder, preemptive intervention strategy at a reduced risk and cost. Further, non-lethal technologies add strength to US forces engaged in a major conflict. The enabling features of non-lethal technologies allowed a smaller force to be decisive. Before non-lethal technologies are hailed as a panacea, two cautions are in order. The non-lethal employment assumes the appropriate use of the technology. The

limitations of non-lethal technologies previously discussed constrain the situations and missions where non-lethal employment is appropriate. Misuse of the capability may lead to dangerous political and military risks. Second, the assessment assumed unique capabilities common to all non-lethal technologies. The current selection of technologies have individual strengths, weaknesses, and effects. These individual characteristics must be considered for the employment of these weapons. Continued technology development will strengthen the unique competencies of these weapons and result in tools that are more effective for the future.

The following are examples of non-lethal technologies that can be employed in conjunction with lethal force to prosecute a major conflict.

- ❑ **Strategic Attack.** Non-lethal strategic attack includes simultaneous disruption of the enemy's key leadership, organic essentials, and infrastructure. Air-delivered EMP and conductive particle munitions can shut down electric power grids that support military facilities and logistics. Stand-off delivery of EMP munitions will target commercial communications (radio and television) and military command and control to degrade leadership control of the population and leadership coordination of the military deployment actions. In addition, EMP can disable electronic equipment on aircraft, neutralize computer systems, and disable sophisticated electronic equipment and vehicles.
- ❑ **Weapons of Mass Destruction (WMD) Sterilization.** A UAV-delivered HPM weapon will be targeted at assembly and storage areas to destroy the guidance, navigation, and detonation systems of the WMD and the respective delivery systems. To deny access to WMD storage areas, multiple UAVs will air-deliver sufficient polymer foam agent to render the facility temporarily inaccessible.
- ❑ **Suppression of Enemy Air Defense (SEAD).** A combination of lethal and non-lethal SEAD will be employed to disable key air defense sites. Air-delivered EMP munitions will disable radar, fire control, and associated electronic systems. The EMP attacks will concentrate in urban areas, mobile systems, and suspected areas with dispersed systems. The effective radius of the EMP weapons is adjusted to match the target requirements and minimize collateral effects.
- ❑ **Attack Enemy Logistics.** The enemy's logistics and transportation infrastructure will be impaired by air-delivered EMP munitions. The EMP burst will disable the electronic controls and ignition systems of supporting equipment and vehicles. Odor producing chemical munitions can be delivered to assembly areas and logistics facilities to disrupt deployment preparations. Air-delivered HPM munitions will attack munitions assembly and storage areas to disable vehicles and detonate fuses in exposed munitions. UAVs can deposit a super-lubricant to inclined sections of

railroad and key transportation nodes to deny movement of equipment and supplies.

### **1.1.6 Battlefield Application of NLW**

There are various opinions favoring the development and employment of non-lethal weapons in combat. One of the most prevailing arguments deals with the likelihood that future combat operations will occur in urban environments. According to Joint Publication 3-06 on Joint Urban Operations: Rapid urbanization is changing the physical and political face of nations. Demographic studies indicate a vast increase in the number and size of urban areas throughout the world; medium sized towns have become large cities, and large cities have become the modern megalopolis. This population concentration has ensured that many future military operations will be taking place in urban areas. US forces must be prepared to conduct effective joint urban operations more than ever before.

About 75 percent of the world's population lives in urban areas. The increased population and accelerated growth of cities have made the problems of combat in built-up areas an urgent requirement for the U.S. military. Urban areas are expected to be the future battlefields and combat in urban areas cannot be avoided. As a result, it will be much more difficult to differentiate friend from foe from noncombatant as civilians and combatants occupy the same factor space. Consequently, enemies are likely to exploit this situation by intentionally embedding within innocent civilian populations.

In this urban environment, there exists the potential for massive collateral damage to persons and property. With the continuing expansion of media and information organizations in both size and scope, coverage of any unintended collateral damage will be distributed with near real-time speed. Some have christened this the “CNN effect” in which military operations are being dissected and scrutinized at the highest levels to determine the potential media fallout from civilian casualties. Certain domestic news services may provide accurate backgrounds for objective analysis of the events and censor graphic images in the interest of good taste. However, the same discretion will not be universally shared by all global news outlets. This is likely to provoke international reaction and bolster an already apparent public intolerance towards the loss of innocent life. This could have disastrous political implications to an operation. Consideration must be taken to execute major combat operations without alienating the local population or arousing international outrage.

Another argument for the use of non-lethal weapons in combat operations encompasses the concept of reversibility. Attaining a military objective while minimizing unnecessary loss of human life and gross physical destruction will aid in the transition to security and stability operations upon conclusion of combat operations. Crucial support during the early months of reconstruction and

stabilization may be lost if valuable infrastructure cannot be restored quickly. The strategy postulated that the attacked nations would eventually need the electrical distribution capacity during the post-conflict rebuilding process. Ridding the power facilities of graphite wire was theorized as being a quicker and more cost-effective solution than the alternative of rebuilding a destroyed power plant.

The final argument supporting the need for NLWs in combat deals with the maturity of technology. Advancements in technology have altered the way we have fought wars in the past and will continue to do so in the future. For example in World War II, one thousand sorties of B-17s with nine thousand bombs were required to destroy a single target. Today, the U.S. Air Force can destroy 16 different targets using only one B-2 sortie delivering 16 global positioning system (GPS) bombs. The notion of a contemporary air operation using World War II era unrestricted, non-precision bombing techniques is politically and socially unthinkable. In a sense, we have become victims of our own success. The technology has proven to be so overwhelming and so precise that it has drastically affected the perception of combat. Wars are expected to be short, simple, and executed with precision. NLWs are intended to be used in conjunction with lethal weapon systems to enhance the latter's effectiveness and efficiency in military operations. However, as technology continues to evolve, it is conceivable that the capabilities and effectiveness of some future NLWs will surpass lethal counterparts. Future NLW capabilities include high-energy laser weapons systems, short-pulse, laser-induced plasma technology, and high power microwave technology. The capabilities and effectiveness of such weapons could far exceed the value of bullets and bombs in terms of area denial to personnel or material and particularly in disabling systems or facilities. It may be possible to influence targets that are normally unaffected by or considered undesirable to attack with normal lethal munitions. Examples of such targets are those that are subject to deep burial making them impregnable to even the deepest penetrating bunker buster warheads. A strike on a chemical, biological, or nuclear facility or delivery system using blast or fragmentation weapons may not be desirable or feasible. A preferred alternative may be an attack with an NLW as a means to disable such a system without risking nuclear, biological, or chemical release.

**(Sources:** R. L. Scott, J. P. Greene, J. Siniscalchi, HSRC)

## **1.2 Operational Scenarios**

### **1.2.1 Rescue Operations at a Critical Site in Urban Terrain**

A group of fighters has taken hostages to coerce the government to release an imprisoned rebel leader. The rebels made sure there is heavy media coverage of the event. However, the government learned that the rebels intend to capture a chemical plant and eventually release a toxic cloud if conditions are not met. The chemical plant is located on a riverbank in the immediate vicinity of a city. Closing the plant down is not an option. At this point, the rebels are moving towards the plant in a small boat with the hostages on board. The objectives associated with this scenario are preventing the rebels from reaching the chemical plant and releasing a toxic cloud as well as rescuing the hostages. Meeting the first objective will involve denying an area to vessels, denying an area to personnel, and potentially neutralizing or clearing facilities. Meeting the second objective will involve neutralization of individuals or groups and rescuing of individuals or groups. Key constraints include avoiding a toxic release, minimizing damage to facilities and infrastructure and minimizing harm to hostages (also, it is desired not to kill the rebels but instead to allow the government to bring them to justice).

### **1.2.2 Threat of WMD in Urban Terrain**

The military is involved in liberating a country led by a dictator. As the military approaches the country's capital a large number of civilians in it have been forced to serve as human shields in close proximity to WMD production and storage sites. The dictator is threatening to launch WMD (chemical and/or biological materials) attacks. In addition, there are terrorist cells operating in the capital and they may represent another means for the dictator to apply the WMD threat. In addition to main forces approaching the capital, NATO has Special Forces already operating in the capital. In this scenario, the key objectives are to secure WMD materials, protect civilians from threats posed by the dictator and his regime and to address the threat posed by terrorists. The first objective will involve preventing movements by land, sea, and air; capturing and controlling facilities; and seizing or sealing/neutralising WMD materials. The second objective will involve facilitating the release of human shields; capturing or neutralising, guards; and denying or degrading the regime's ability to move, sense, or communicate. The final objective will include identifying, marking, tracking, and seizing/neutralising terrorists. Associated with the objectives are a couple of overarching constraints: avoiding the release or dissemination of WMD materials and minimising civilian casualties.

### **1.2.3 Protection of Key Installations**

A large city holds a substantial amount of military and government facilities and infrastructure including land, sea and air assets. The government received a threat report that an attack on an unspecified part of these facilities / infrastructure is imminent. The nature of this potential attack is unknown. The available sensor network monitors the environment and detected a hostile group moving about. The intent of the group is not clear. The military has a rapid reaction force available and may launch a preventive action sanctioned by the responsible authority. The key objectives for this scenario are to control crowds and to protect facilities, equipment and individuals. The associated constraints are to minimize harm to non-combatants and to the civil infrastructure.

### **1.2.4 Crowd Control at a Food Aid Distribution Point**

Conflict has ended in an urban area and now the mission is to secure an area allowing food/water distribution to take place. There is a big UN HCR warehouse. There is a very large, desperate crowd. The threat of starvation is there. Intelligence says - hostile action expected by OPFOR / criminals in the crowd. The objectives are to take all necessary actions to ensure that food and water can be distributed within a secure environment. Supporting tasks involve protecting the warehouse, protecting re-supply convoys, checkpoint establishment, crowd control/channeling, and prevent hostile acts.

### **1.2.5 Protection and Evacuation of a Minority**

A minority group in a village asks to be protected from the majority group. Preventive action is taken to protect the minority group but the initial protection effort fails. The minority group demands to be evacuated out of the village. During the evacuation, a hostile crowd attempts to prevent the evacuation. The key objective is associated with movement and action through a crowd. Supporting tasks include area denial, securing lines of communications, carrying out an evacuation, crowd control, and neutralisation of individuals and groups demonstrating hostile intent.

### **1.2.6 Asymmetric Threat**

At the invitation of a government faced with narco-terrorist threats beyond their capacity to address, NATO deploys forces to help stabilize the situation, to prevent the spread of security problems and instability across borders to other countries in the area, and to target the narco-terrorists and prevent them from conducting attacks here or elsewhere. The objective for this scenario is to

identify, mark, track, and neutralize the narco-terrorists and to prevent or degrade their ability to access civilian facilities and equipment. Constraints include minimizing civilian casualties, safeguarding major facilities and equipment for future use, and preserving the ability to prosecute narco-terrorists.

(Source: NATO)

**More information can be found at:**

**[Non-Lethal Weapons \(NLW\): Industry, Technologies & Global Market – 2014-2020](#)**